



MANIPAL COLLEGE
OF DENTAL SCIENCES
MANGALORE
(A constituent unit of MAHE, Manipal)

NAVIGATOR



Information Booklet for
First BDS Students

2026-27



MANIPAL

ACADEMY of HIGHER EDUCATION

(Institution of Eminence Deemed to be University)

The Manipal Academy of Higher Education (MAHE), established in 1993 under Section 3 of the UGC Act 1956, Government of India has 28 constituent institutions comprising Medical, Dental, Engineering, Architecture, Nursing, Allied Health, Pharmacy, Management, Communication, Information science, Hotel Management, Biotechnology, Regenerative Medicine, Law and Design. The university offers Bachelors, Masters and Doctoral degrees in various specialties. Among the above, the flagship institutions, viz. KMC, Manipal, Mangalore and Manipal Institute of Technology, Manipal have completed more than 60 years of service to the society in the field of medicine, health care and engineering. The Union Ministry of Human Resource Development (HRD) has granted Institution of Eminence (IoE) status to Manipal Academy of Higher Education, Manipal in 2018.



Professional institutions were granted deemed university status because of their superlative track record and academic excellence. Today, Manipal Academy of Higher Education boasts of students representing 53 countries. The university is accredited with "A++" grade according to the National Assessment and Accreditation Committee (NAAC). The university provides quality education to over 40,738 students admitted to one of the 554 courses which the university provides through its 28 institutes. It also has an active alumni base of over 2,31,452 students across the world. In the 2026 edition of Shanghai Ranking's ARWU, MAHE ranks 779th globally and 7th in India. This represents an improvement of 36 positions globally and three positions nationally compared with ARWU 2025.

Manipal Academy of Higher Education has been selected as the Institution of Eminence by the Government of India. According to the Quacquarelli Symonds University World Rankings 2026, MAHE has figured in the 851-900 band, which is the best for a private Indian university. In the Times Higher Education World University Rankings, MAHE figures in 601-800 category. Besides being an ISO 9001 :2015 and ISO 14001 :2015 certified University, it is home to many top 10 ranked institutions of India. In NIRF ranking 2025 the university is ranked 11th position in India.

Manipal Group of institutions are located on scenic campuses, which provide a high-quality lifestyle and an ideal environment for study. All campuses have excellent infrastructure for academic activities, sports and other extracurricular activities. Manipal Academy of Higher Education (MAHE) has been compared with Nalanda of yore for its excellent academic reputation, experienced and dedicated faculty, outstanding clinical facilities, and a world-class environment that supports education.

The Manipal Academy of Higher Education and Medical group has invested 6 decades of pioneering work in the social sector. The group has ventured beyond the boundaries created by history, geography, nationality, gender, social and economic development and has found opportunities in education and health care.

VISION

Global leadership in human development, excellence in education and healthcare.

MISSION

- Be the most preferred choice of students, faculty and industry.
- Be in the top 10 in every discipline of education, health sciences, engineering and management.

MANIPAL VALUES

- Integrity
- Transparency
- Quality
- Team work
- Execution with passion
- Humane touch

THE FOUNDER



The late Dr. Tonse Madhava Anantha Pai (1898 - 1979), physician, educationist, banker and philanthropist, is the founder and builder of modern Manipal. He established educational, medical, banking and industrial enterprises of national importance and repute.

Manipal is an eloquent testimony to the vision, motivation and labour of Dr. T.M.A. Pai. His zeal, dedication and infinite energy inspired others, motivating them for collective effort. This was the spirit of Dr. T.M.A. Pai. This is the spirit of Manipal. "We must have a residential university in Manipal", were Dr. T.M.A. Pai's prophetic words.

The aspiration of late Dr. T.M.A. Pai to turn Manipal into a university town, after his success in establishing a string of secondary schools and colleges of humanities and the crowning achievement of starting a medical college on public private partnership basis (the first of its kind in India), was realized in 1993 with the conferment of a deemed university status on Manipal Academy of Higher Education.

ADMINISTRATORS



Dr. Ramdas M Pai
Chancellor



Dr. H S Ballal
Pro-Chancellor



Dr. Sharath Rao
Vice Chancellor



**Major General
(Dr.) Mathews Jacob,
VSM (Retd.).**
Pro-Vice Chancellor
Health Sciences



Dr. Dilip G. Naik
Pro-Vice Chancellor
Mangalore Campus



**Dr. Karunakar A.
Kotegar**
Pro-Vice Chancellor
Technology & Science



**Dr. Madhu
Veeraraghavan**
Pro-Vice Chancellor
Management, Law,
Humanities and Social
Sciences



Dr. P. Giridhar Kini
Registrar



**Dr. Poornima
Panduranga Kundapur**
Director-Student affairs

MCODS, MANGALORE ADMINISTRATORS



Col (Dr). Rajat Mitra
Associate Dean



Dr. Ashita Upoor
Dean



Dr. Srikant N.
Associate Dean

Heads of Department- MCODES Mangalore



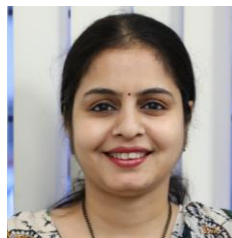
Dr Ceena Denny E
(Oral medicine and Radiology)



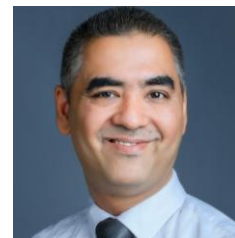
Dr Aravind R
(Oral and Maxillofacial Surgery)



Dr Manuel Thomas
(Conservative Dentistry and Endodontics)



Dr Sangeeta Nayak
(Periodontics)



Dr Ashwin Rao
(Pediatric and Preventive Dentistry)



Dr Ashith MV
(Orthodontics and Dentofacial Orthopaedics)



Dr Umesh Y Pai
(Prosthodontics and Crown and Bridge)



Dr Ramya Shenoy
(Public Health Dentistry)



Dr Nandita K P
(Oral Pathology and Microbiology)



Dr Prashanthi Madhyastha
(Dental Materials)

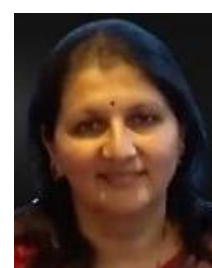
Heads of Department- KMC Mangalore



Dr Rajanigandha Vadagaonkar
(Anatomy)



Dr Anupama N
(Physiology)



Dr Rukmini M S
(Biochemistry)

ADMINISTRATORS' MESSAGE



**MAJOR GENERAL (DR.) MATHEWS JACOB, VSM
(RETD.).**

PRO VICE CHANCELLOR (MEDICAL AND DENTAL)

Dear Students,

Heartiest congratulations! Welcome to the Manipal Family. You are embarking on a transformative journey, transitioning from the confines of school to the realm of professional education. We are elated that you have chosen MCODS, Mangalore, one of the esteemed Dental Schools, as the launchpad for your career aspirations.

The curriculum has been meticulously crafted to equip you for success in the dynamic, ever-evolving domain of dentistry. Within the embrace of exceptional infrastructure and dedicated faculty, you will amass the essential knowledge, skills, and attitudes, paving the way for you to become a skilled and empathetic dentist in the years to come. The college also opens avenues for co-curricular and extracurricular pursuits, nurturing holistic development.

Undoubtedly, your time at this institute will be among the most cherished chapters of your life. Forge new friendships and capitalize on the academic, social, and cultural prospects that you shall encounter. Your unwavering dedication is pivotal to your achievements. We earnestly anticipate that your stay here will be marked by enriching experiences and joyful reminiscences.

Here's to a future that gleams brightly with success and promise.



DR. DILIP G. NAIK

PRO VICE CHANCELLOR (MANGALORE CAMPUS)

The Manipal Academy of Higher Education boasts a rich legacy of delivering exceptional professional education. Heartfelt congratulations are for securing a spot in the B.D.S. program at Manipal College of Dental Sciences, Mangalore—a distinguished institution under the Manipal Academy of Higher Education umbrella and a pre-eminent dental establishment in India. I am filled with immense pride as I affirm that Manipal College of Dental Sciences, Mangalore, stands as a towering presence among the most esteemed dental colleges in the country, securing a notable position within the top ten dental institutions nationwide.

As you step into this new chapter, I encourage you to not only excel academically but also embrace a holistic approach to life. Engage in the array of co-curricular and extra-curricular activities that Manipal Academy of Higher Education provides, allowing you to cultivate a well-rounded perspective. On behalf of the university, it is my privilege to extend a warm welcome to you, as you join the vast and continuously expanding community of students who have been profoundly influenced and shaped by the enduring "Manipal" spirit.

May your journey be marked by joy, learning, and indelible memories during your time at MCODS, Mangalore.

MESSAGE FROM THE DEAN

DR. ASHITA UPPOOR

DEAN

Manipal College of
Dental Sciences,
Mangalore



With more than three decades since its establishment, Manipal College of Dental Sciences (MCODS), Mangalore has consistently played a pivotal role in advancing the field of dentistry. Throughout these years, its remarkable growth has firmly positioned it as a premier dental institution synonymous with academic excellence in India. This distinction is underscored by its impressive rankings in esteemed survey assessments of dental colleges within the country.

On behalf of the dedicated management, esteemed faculty, and committed staff of MCODES Mangalore, I extend a heartfelt welcome to each of you as you embark on a promising journey of dental undergraduate studies that will culminate in the award of the coveted degree of Bachelor of Dental Surgery (BDS).

As a vital component of Manipal Academy of Higher Education, MCODES Mangalore boasts an impressive history of shaping dental students into standout individuals who excel in various dental post-graduate entrance examinations, securing admissions to esteemed international universities. Graduates hailing from MCODES, Mangalore have proven themselves as accomplished practitioners of exceptional dentistry, both within India and on a global scale. The adept teaching faculty at MCODES, Mangalore actively foster and imbue the spirit of continuous learning within their students.

This informational handbook, appropriately titled "Navigator," is designed to guide the incoming BDS students through the regulations of this institution and the intricate facets of the BDS course. It delves into examination patterns, subjects of study, evaluation methods, syllabus coverage, and clinical training, among other aspects. Undoubtedly, this resource will serve as a dependable companion throughout your entire BDS program.

I'm optimistic that your journey at MCODES, Mangalore, combined with your stay in this captivating coastal city, will unfold as an enriching experience, mirroring the transformative path taken by numerous students who have walked these halls before you. May your stay in Mangalore be brimming with happiness and fruitful pursuits.

MANIPAL COLLEGE OF DENTAL SCIENCES, MANGALORE

A constituent unit of MAHE, Manipal



INTRODUCTION

Founded in 1987, MCODS, Mangalore (a constituent college of Manipal Academy of Higher Education, Manipal) is the country's first dental college to admit 100 students to BDS course from the very first year of inception along with simultaneous commencement of postgraduate programmes. MCODS, Mangalore follows the guidelines of Dental Council of India and was recognized by it in the year 1991. Manipal Academy of Higher Education is accredited with A++ grade by the National Assessment and Accreditation Committee (NAAC). The institute follows the ISO 9001:2015 and 14001:2015 standards, imparting quality health care to patients as well as excellent education to students.



COURSES OFFERED

The institute offers undergraduate, postgraduate and diploma programmes in various branches of dentistry. Our institute has started Centres for Dental Advanced Education, Tobacco Cessation, Forensic Odontology and Centre for Digital dentistry. Additional Centres are being planned for caries research, pain alleviation, maxillofacial prosthesis, cleft palate, oral systemic link and oral cancer

RECOGNITIONS AND ACCREDITATIONS [RANKINGS]

As per the survey results by the nationally acclaimed magazines, the institute is one among the top 5 private colleges of India (India Today Ranking 2026 – 2nd among the top private colleges and 10th overall, Outlook India 2026– 2nd among private colleges and 3rd overall ranking, Week Magazine 2026 – 3rd among private and 8th overall). The institution has secured 11th rank in the National Institute Ranking Framework conducted by MHRD in 2025. Under QS ranking in the subject of Dentistry Manipal Academy of Higher Education was ranked in the 51-150 band (QS ranking band). In the 2026 edition of Shanghai Ranking's ARWU, MAHE ranks 779th globally and 7th in India. This represents an improvement of 36 positions globally and three positions nationally compared with ARWU 2025.



ACADEMICS

Our institute has recently upgraded the curriculum to an outcome-based education system which will modify the curriculum delivery from a teacher-centric to a student-centric mode. The assessment is also integrated with a course outcome evaluation module of E-Pad examination system, which gives the analytics of the individual student performance as well as mapping with the course and programme outcomes. The curriculum has been designed in accordance with the syllabus prescribed by the National Dental Commission (NDC). The core courses are the Bachelor's and Master's degrees in Dental Surgery. The institute has enabled the use of the online learning management system (LMS) via Impartus as well as the Brightspace platform and Impartus lecture capture system, which facilitates the delivery of the course content in the form of videos, demonstrations, lectures, PowerPoint slides, PDF's etc. The curriculum supports the use of innovative teaching modalities of 'flip classroom', small group teaching, student-directed learning etc. The evaluation has been divided into formative and summative assessments, and the practical assessment utilizes the Objective Structured Practical and Clinical Examination systems. (OSPE/OSCE). The university has subscribed to the "Coursera" platform which delivers free online courses on a variety of subjects, thus utilizing the Massive Online Open Course systems (MOOC's).

INFRASTRUCTURE

MCODS, Mangalore is spread over two locations, conveniently accessible in the city, namely Light House Hill Road and Bejai with dedicated facilities in each of them. A total of 311 dental chairs, state-of-the-art dental equipment, centrally air-conditioned library, modern air-conditioned lecture halls and continuing professional development (CPD) rooms with audio-visual aids, phantom head simulation laboratories for preclinical training and access to the newer generation of dental materials ensure delivery of optimal training to the undergraduate and postgraduate students. The institute has a mobile dental clinic with two automated dental units that render treatment in peripheral nodal centres and areas with limited access to dental care. MCODS, Mangalore successfully conducted 1085 dental camps screening and treating 1,13,414 patients in the year 2025. The institute also provides segregated hostel facilities for both male and female students with transport provided from the hostels to the institute. The 3D Cone Beam Computerized Tomography (3D CBCT) in our college is the first fully loaded system installed in the country. The Surgical Skills Laboratory, the first of its kind in a dental institute in India, has life-size mannequins for hands-on preclinical training in injection techniques (local anaesthesia, IM/IV), tooth extraction, suturing techniques and basic life support. State of the art

Surgical microscope and the CAD-CAM equipment, 3D printer, Face scanner. Intraoral scanners are the new equipments added to the inventory of MCODS, Mangalore.

FACULTY

REGULAR FACULTY

The dedicated teaching faculty are updated with recent advances in dentistry and contribute to the dental scientific temper by way of research, grants, publications in various international and national journals (152 indexed publications in 2025) and scientific presentations at various international and national fora (134 national and 17 international presentations by faculty and students in 2025). Our researchers have received a grant of ₹87 lakhs in the last 3 years from various national and international bodies. The faculty has found a permanent place in the field of dentistry by being authors of books that are sought after by students in India and abroad. The consistently excellent performance of our students who achieve top ranks in various national competitive postgraduate examinations and those studying further in international universities is a surrogate marker and testament of the high quality of training offered to the students of MCODS, Mangalore.

INTERNATIONAL ADJUNCT FACULTY

Collaboration and constant upgradation of the skills practiced globally is a must for holistic development of the student as well as the faculty. In this regard we have international adjunct faculty which include faculty from University of Western Sydney, Australia, University of Turku, Finland, Boston University, USA, Indiana University School of Dentistry, USA, MAHSA University, Malaysia, University of Alberta, Canada, NYU Langone Medical Centre, USA, Dalhousie University, USA, Maharajgunj Medical College, Nepal, University of West Indies, Jamaica, Creighton University, USA, University of Florida, USA, Yonsei University, Korea and University of Malaysia.

RESEARCH AND INNOVATIONS

MCODS Mangalore encourages

research, innovation, research publication, patent filing and technology commercialization at undergraduate and postgraduate level. We have collaborative and interdisciplinary research programs in association with premier research laboratories and have secured research grants from government both state and central (VGST, ICMR), industries and international funding agencies. The faculty members of MCODS Mangalore hold a record of being the foremost amongst Indian dental institutions in authoring textbooks that are preferred and recommended reading at most Dental Colleges in India. These include 29 textbooks besides contributions of chapters to many other textbooks. In the last 5 years, faculty and students published a total of 700 articles in reputed scientific journals, besides presentations at various national and international conferences. In the last 3 years there were >270 research projects, >50 of which were funded by external grants.

Staff and students of MCODS, Mangalore over the years have been associated with innovation incubators like Philips Base of Pyramid and Manipal Academy Technology Business Incubator.

COLLABORATIONS AND PARTNERSHIPS

Student and Staff Exchange Programs are facilitated through our MoU's with foreign universities. Our college has Memoranda of Understanding (MoU) with Queen Mary University, London, University of Portsmouth, UK and MAHSA University, Malaysia, MARA Malaysia, University of Turku, University of Tokushima in addition to the university MOU's with universities of University of Iowa, USA, Hiroshima (Japan), Sydney (Australia), Kentucky (USA), Peradeniya (Sri Lanka), Karabakh (Turkey), and Griffith university, Australia and UCAM Universidad Catholica San Antonia De Murcia, Spain, Caltech, India for academic and exchange programmes. Our university has over 200 MoU's with International universities the recent ones are with University of Adelaide, Australia, Euhst StPOL, Spain, University of Newcastle, Australia, University of Alabama, USA, National Cheng Kung University, Western Sydney University, Australia and Montana University of Leoben, Austria.

Our institute has signed MOUs with Dental manufacturer companies (Dentsply India, Prevest Denpro, Curaden, Dentcare Dental Lab, ScanO, Coltene Whaledent, Orthosystems India, IntEssence Soln Pvt Ltd etc.). Universities like St Aloysius Institute of Management and Technology (AIMIT), Milagres College and Collaborations with NITK Surathkal for research and academic activities. Our college has endeavored to meet the challenges of global recognition and is recognized by the Malaysian Dental Council, Kathmandu University (Nepal) and Sri Lanka Medical Council and is a member of the National Oral Cancer Registry recognized by IDA.

INTERNSHIP AND EXCHANGE PROGRAMS

The students have a compulsory rotatory internship in the final year of their graduation. MCODS Mangalore are identified as one of the research centres by Hindustan Unilever Limited (HUL) for clinical trials. Our students have exchange programs with Melaka Manipal Medical College (MMMC), B.P. Koirala Institute of Health Sciences (BPKIHS), University of Tokushima, Japan and Thammasat University, Thailand. We are a nodal training centre offering programmes by the Korean Orthodontic Research Institute.

COMMUNITY SERVICES

Community outreach programs are regularly conducted in our institution to bring oral health care closer to the underserved populations. Five peripheral centres have been adopted by the institution where screening, health education and treatment programs are conducted regularly in a fully equipped mobile dental bus. The institution has a tobacco cessation centre which provides tobacco cessation services and spreads awareness about ill-effects of tobacco use. The institution works in collaboration with national, regional and local organizations in government sector, private sector and Non-Governmental Organizations (NGOs) such as IDA and Red cross to bring oral health closer to the community. The students enjoy doing social services through the Voluntary Service Organization (VSO) of the university. The literary unit of the student council publish student magazines, pamphlets for dental health and participate in the road shows for oral health awareness.

CO-CURRICULAR ACTIVITIES

MCODS, Mangalore has a dedicated students council. The student council organizes the “Dental Week” where the students showcase their literary and co-curricular talents. The students participate in the intercollegiate programme “Utsav” (an intercollegiate cultural programme organized by MAHE), where we were the champions in the year 2016, 2022 and 2025, first runners up in 2019, 2023 and 2024 from amongst the 21 constituent institutions. Our students have participated in the Swachh Bharat Summer internship and also volunteer as a part of AIESEC; a global non-profit youth run organization. Our College has numerous clubs to encourage and nurture talent. These include the literary club, the drama club, the dance club and music club to name a few. The Crown jewel of the music club is the college Band ‘Silver Creek’ which has participated in various inter college events in and around Mangalore.

ALUMNI

MCODS Mangalore is proud to have a thriving and united alumni network. Our alumni, numbering 3709 spans across the seven continents and serve as brand ambassadors for our college in the community. We have a unique alumni portal that is web based and serves as a platform to connect, network and grow. Various local alumni chapters across India and abroad meet regularly and a Silver Jubilee Reunion is hosted every year at Mangalore to commemorate the 25th year of every academic batch. Our Alumni also give back to their Alma Mater through mentoring and funding opportunities. It has been two years since Alumni Relations, MCODES Mangalore has launched a pioneering program aimed at connecting students with alumni more meaningfully with the Alumni Student Mentorship Program. Our alumni have tasted success in academia with many of our alumni

associated with teaching roles in prominent universities both in India and abroad and some of them donning the mantle of Heads of Departments/Institutions in India and abroad. We are also proud that many have made a mark in private practices in India and abroad with many of alumni having set up high-quality treatment centres that are improving the lives of the communities they serve.

PLACEMENT

Our institute has always been very proactive in the success story of PG NEET exams. On an average, annually nearly 50% of our graduates are successful at the All India and State postgraduate entrance examinations and pursue higher education. The progression rate is one of the highest for any dental institute in the country. Many of our graduates have pursued or are pursuing higher education in Canada, USA, Australia, UK and Europe. Besides, hundreds of graduates are successful general dental practitioners in various parts of India and the world. Our institute has tied up with Dental clinic chains like OrthoSquare and Clove dental to recruit our students. Our Alumni entrepreneurs who have started their EduTech Company also recruit our students for their content creation and designing.

UNIQUENESS

- Teacher-Guardian mentoring for all 4 years of BDS.
- Active encouragement and financial support for presentations at conferences by students and faculty.
- Outcome-based education mode of delivery of curriculum.
- Student centred learning.
- Comprehensive ‘student life cycle management’ system and access to online teaching material created by teaching faculty.
- Holistic development of students and staff: Personality development, gender sensitization programmes, practice management, activities that foster universal values, patriotism and social cohesion etc.



REGULATIONS GOVERNING THE BDS PROGRAMME

DURATION OF THE PROGRAMME:

The duration of undergraduate dental training programme for BDS degree is four years with 240 teaching days in each academic year. In addition to this, the student has to undergo one year of compulsory rotatory internship.

COURSE CURRICULUM:

In the BDS curriculum, subjects are taught in the form of lectures and demonstrations. This course as a whole is an integration of Basic Sciences, Clinical Dentistry and Practical or Laboratory Skills.

The curriculum for First BDS is developed based on outcome based education incorporating a student centric learning approach.

The undergraduate course consists of three main components:

The first component consists of subjects common to Medicine and Dentistry like Anatomy, Physiology and Biochemistry, Pharmacology, Pathology, Microbiology, General Medicine and General Surgery.

The second component runs concurrently with the first and deals with the special aspects of oral and dental tissues, through the subject of Oral Anatomy and Oral Pathology. Finally, the third component is based on the foundations of the first two and deals with the clinical and technical aspects of dentistry as is required for general dental practice.

Students attend dental clinics from third year onwards. In addition to this, students also attend lectures, demonstrations and clinics in General Medicine and General Surgery in Third year. This is mainly to orient them to the role of dentists in general practice.

ATTENDANCE:

1. As per the existing regulations of the National Dental Commission, a student must attend 75% of lectures and 75% of practicals /clinicals to be eligible to appear for the University examination. All leaves including 'MEDICAL LEAVE' is permissible within 25% with medical certificate issued by KMC hospitals only. There is no provision for conducting extra classes/ assignments to make up the attendance shortage.

2. Students who are not permitted to appear for University examination due to shortage of attendance will have to make up the attendance along with succeeding batch by paying the casual fee specified by the University.

PATTERN OF EXAMINATION:

Evaluation is a continuous process and is achieved by

1. Formative or Internal Assessment

2. Summative or University

Examination Evaluation is carried out by

a) Written examination b) Practical examination c) Clinical test d) Viva Voce

INTERNAL ASSESSMENT:

Three internal assessment examinations will be conducted per academic year.

As a part of the green initiative, the university has introduced the use of e-pads for writing examinations. The students will give their internal assessments and University Examinations on electronic tablets (e-pads) which are comfortable to write and draw. This procedure would save paper and the turn-around time for results would also be faster.

1. Calculation of the Internal assessment marks involves the average of all three sessional examination marks that would form the basis (Theory + viva and practical/clinical examination separately) in that subject. In case a student is not able to attend any of the sessional examinations due to health reasons or any other emergencies, a committee

constituted by the Dean will look into the matter (case by case basis). In such a case the average of 2 sessional exams will be taken in accordance with the university rules. There shall be no scope for conducting extra exams.

2. A student must secure a minimum of 30% marks in the Internal Assessment (03 out of 10) in each of the subjects, theory and practical / clinical separately, failing which as per University rules he/she will not be permitted to appear for the University examination in that particular subject(s). To be eligible to appear for the next University examination he/she is required to improve his/her marks by appearing in the sessional examination.

3. Grace marks will be given as per DCI regulations.

CRITERIA FOR PASS AND CLASSIFICATION OF SUCCESSFUL CANDIDATES:

For declaration of pass in a subject, a candidate is required to secure 50% marks in the University examination both in Theory and Practical/Clinical examinations separately, as stipulated below.

A candidate is required to secure 50% marks in the University theory, Viva



Voce, and Internal assessment combined together. In the University Practical/Clinical examination, a candidate is required to secure 50% of University practical marks and Internal assessment combined together.

In case of Preclinical Prosthetic Dentistry and Preclinical Conservative Dentistry in II BDS, there is no written examination, minimum pass is 50% (Practical and Viva voce combined together in University examination including Internal assessment i.e. 50 out of 100 marks.)

Successful candidates who obtain 65% of the total marks or more shall be declared to have passed the examination in First Class. Other successful candidates will be placed in Second Class. A candidate who obtains 75% and above is eligible for Distinction. Only those candidates who have been declared pass in the university examination in the first attempt will be eligible for distinction or class.

UNSUCCESSFUL CANDIDATES:

Students who have failed in the examination can appear for supplementary examination conducted within six months after regular examination. A candidate can only appear twice for the university examination in an academic year. A candidate who fails in only one subject in university examination is permitted to go the next higher class. However, the candidate must appear for the university examination (six months after the regular examination) in that subject and complete it successfully before he/she is permitted to appear for the next higher examination.

DCI Regulation:

"Any student who does not clear the BDS Course in all the subjects within a period of 9 years, including one year Compulsory Rotatory paid Internship from the date of admission shall be discharged from the course"

GUIDELINES FOR APPEARING FOR THE EXAMINATION:

A student who fails to present himself/herself for examination at the time and place indicated in the published timetable will be deemed to have failed in that part of the examination. Misreading of the time table will not be regarded as a 'sufficient cause'. Candidates without the possession of Identity card and Hall ticket (Hall ticket is for university exam only) will not be allowed to enter the examination hall.

No candidate will be permitted to enter the examination room after the lapse of half- an-hour from the commencement of examination, and no candidate will be allowed

to leave the examination room until after the expiration of half-an-hour from the commencement of the examination. No extra time will be provided for late comers. Malpractice is strictly forbidden and indulgence in any form of the same may result in debarring of the candidate. The candidate will not be permitted to take practical and viva- voce examination till clearance is obtained from an appropriate authority.

In addition, students are expected to strictly abide by the rules and regulations as specified in the hall ticket issued by the University.

IDENTITY CARD

The MAHE ID card is issued to each student. This card functions as Student identity card, Access control card and Medicare card. Loss of Identity Card should be reported, to the Students Section. You are required to produce the valid Identity card whenever you appear for an examination. Without valid Identity Card no student will be permitted to appear for the examination.



MANIPAL COLLEGE OF DENTAL SCIENCES, MANGALORE - SPATIAL ORIENTATION

CENTRE FOR BASIC SCIENCES, BEJAI



FOURTH FLOOR

- Pre-clinical Dental Anatomy and Histology, Prosthodontics and Dental Material Laboratories

NURSING BLOCK

- Anatomy
- Physiology
- Biochemistry

BASIC SCIENCE BLOCK

○

MCODS, LIGHT HOUSE HIL ROAD (MAIN BUILDING)



GROUND FLOOR

- Reception (MRD)
- Department of Oral Medicine and Radiology
- Department of Oral and Maxillofacial surgery

FIRST FLOOR

- Pro Vice Chancellor's Office
- Deans' Office
- Associate Deans Office
- Administrative Office
- Board Room
- Department of Conservative Dentistry and Endodontics

SECOND FLOOR:

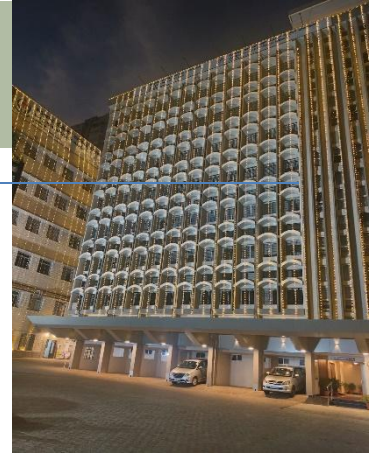
- Department of Orthodontics and Dentofacial Orthopaedics
- Department of Oral Pathology & Microbiology
- Department of Dental Materials
- Implantology
- Pre-Clinical Prosthodontics/ Dental Materials Laboratory



MCODS, LIGHT HOUSE HILL ROAD (ANNEXE) BUILDING)

GROUND FLOOR

- Department of Prosthodontics and Crown & Bridge (UG)
- Central Laboratory



FIRST FLOOR

- Department of Prosthodontics and Crown & Bridge (PG)

SECOND FLOOR

- Department of Paediatric & Preventive Dentistry (PG)

THIRD FLOOR

- Department of Paediatric & Preventive Dentistry (UG)

FOURTH FLOOR

- Department of Periodontics (PG)

FIFTH FLOOR

- Department of Periodontics (UG)

SIXTH FLOOR

- Department of Public Health Dentistry (UG)

SEVENTH FLOOR

- Department of Public Health Dentistry (PG)
- Preclinical Conservative Laboratory (Phantom head Laboratory)



BASEMENT

- Service Operational Office and Amenities



SUBJECTS OF STUDY

First BDS	
Exam - Going Subjects	Non Exam - Going Subjects
General Anatomy Including Embryology, Osteology & Histology	Dental Materials
General Human Physiology	Pre-clinical Prosthodontics
Biochemistry	
Dental Anatomy, Histology & Embryology	
Second BDS	
Dental Pharmacology & Therapeutics	Oral Pathology & Microbiology
General Pathology	Pre-Clinical Orthodontics
Microbiology	
Dental Materials	
Pre-clinical Prosthodontics	
Pre-clinical Conservative Dentistry	
Third BDS	
General Medicine	Oral Medicine & Radiology
General Surgery	Oral & Maxillofacial Surgery
Oral Pathology & Microbiology	Conservative Dentistry & Endodontics
	Periodontology
	Pediatric & Preventive Dentistry
	Orthodontics & Dentofacial Orthopedics
	Prosthodontics & Crown & Bridge
	Public Health Dentistry
Final BDS Part I	
Oral Medicine & Radiology	Conservative Dentistry & Endodontics
Periodontology	Prosthodontics & Crown & Bridge
Orthodontics & Dentofacial Orthopedics	
Public Health Dentistry	Oral & Maxillofacial Surgery
Final Year Part II	
Pediatric and Preventive Dentistry	
Conservative Dentistry & Endodontics	
Prosthodontics & Crown & Bridge	
Oral & Maxillofacial Surgery	

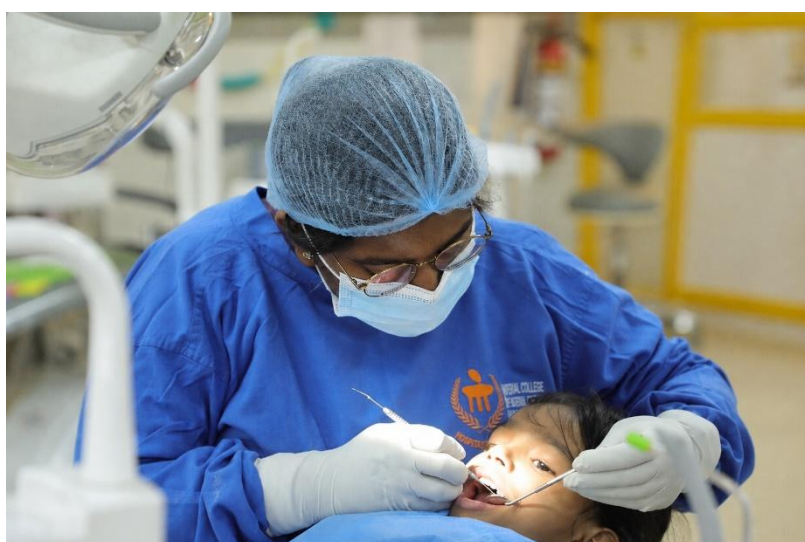


DISTRIBUTION OF MARKS FOR EXAM - GOING SUBJECTS:

Subject	Theory					Practical / Clinics			Grand Total
	MCQ	Descriptive	Viva voce	Internal Assessment	Total	University	Internal Assessment	Total	
First Year BDS									
Anatomy	10	60	20	10	100	90	10	100	200
Physiology	5	30	10	5	50	45	5	100	200
Biochemistry	5	30	10	5	50	45	5		
Dental Anatomy & Oral Histology	10	60	20	10	100	90	10	100	200
Second Year BDS									
Pharmacology	10	60	20	10	100	90	10	100	200
Pathology	5	30	10	5	50	45	5	100	200
Microbiology	5	30	10	5	50	45	5		
Dental Materials	10	60	20	10	-	90	10	100	200
Pre-Clinical Prosthodontics	-	-	-	-	-	80*	20	100	100
Pre-Clinical Conservative	-	-	-	-	-	80*	20	100	100
Third Year BDS									
General Medicine	10	60	20	10	100	90	10	100	200
General Surgery	10	60	20	10	100	90	10	100	200
Oral Pathology and Oral Microbiology	10	60	20	10	100	90	10	100	200
Final Year BDS - Part I									
Public Health Dentistry	10	60	20	10	100	90	10	100	200
Periodontology	10	60	20	10	100	90	10	100	200
Orthodontics & Dentofacial Orthopedics	10	60	20	10	100	90	10	100	200
Oral Medicine and Radiology	10	60	20	10	100	90	10	100	200
Final Year BDS - Part II									
Prosthodontics and Crown & Bridge	10	60	20	10	100	90	10	100	200
Conservative Dentistry and Endodontics	10	60	20	10	100	90	10	100	200
Oral and Maxillofacial Surgery	10	60	20	10	100	90	10	100	200
Pediatric and Preventive Dentistry	10	60	20	10	100	90	10	100	200

**60 marks for Practical work and 20 marks for Viva-voce*

***No negative marking for MCQ*



ACADEMIC CALENDAR OF FIRST YEAR BDS 2026-2027*

Activity	Duration
Block I – Working Days: 81 Days	07 October 2026 to 17 January 2027
Commencement of the first term	07 October 2026
First sessional examination	02, 04, 05 January 2027
First Sessional practical examination	06, 07, 08, 09 January 2027
Block - II – Working Days: 82 Days	18 January 2027 to 13 February 2027 and 01 March 2027 to 16 May 2027
Mid Term Vacation	<u>14 February 2027 to 28 February 2027</u>
Commencement of the Second Term	01 March 2027
Second sessional examination	07, 08, 10 May 2027
Second Sessional practical examination	11, 12, 13, 14 May 2027
Block – III – Working Days: 77 Days	17 May 2027 to 17 August 2027
Third sessional examination	06, 07, 09 August 2027
Third Sessional practical examination	10, 11, 12, 13 August 2027
Last working day of the year	17 August 2027
Last date for submission of internal assessment	20 August 2027
University Examination	
University theory examination	30 August, 01, 03 September 2027
University practical examination	06, 07, 08, 09, 10 September 2027
Date for Paper Seeing	<i>11 September 2027</i>
Annual vacation	<u>11 September 2027 to 26 September 2027</u>
Commencement of the next academic year	27 September 2027
Available working days from 07 October 2026 to 17 August 2027	About 240 days I Block: 13 weeks: 81 days II Block: 14 weeks: 82 days III Block: 13 weeks: 77 days

* Subject to change.



LIST OF HOLIDAYS - 2026

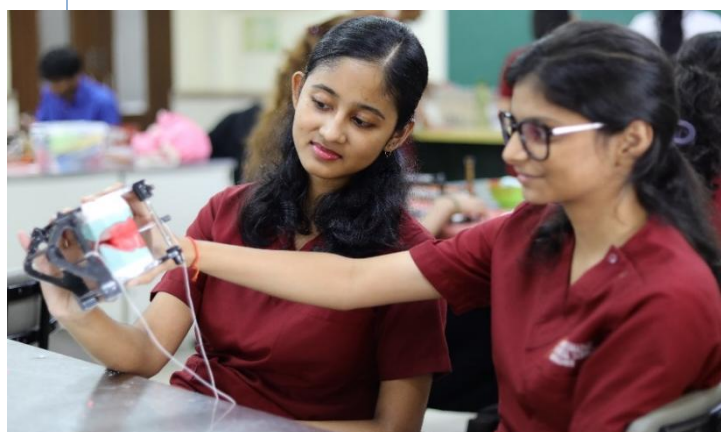
DATE	PROGRAMME	DAY
26.01.2026	Republic Day	Monday
04.03.2026	Holi - Only for students	Tuesday
21.03.2026	Ramzan	Saturday
03.04.2026	Good Friday	Friday
01.05.2026	May Day	Friday
27.05.2026	Bakrid - Only for students	Wednesday
15.08.2026	Independence Day	Saturday
05.09.2026	Krishna Janmashtami	Saturday
14.09.2026	Ganesh Chaturthi	Tuesday
02.10.2026	Gandhi Jayanthi	Friday
20.10.2026	Vijaya Dashami	Tuesday
01.11.2026	Karnataka Rajyothsava	Sunday
09.11.2026	Deepavali	Monday
25.12.2026	Christmas	Friday



TIME-TABLE FOR FIRST BDS

Days		9 am to 11 am	11 am - 12 Noon	12pm-1pm	2.30 pm- 5 pm	
Monday	DA/DH Practical (Batch A)	Physiology Practical (Batch B)	DA/DH Lecture L. H. 2	Biochemistry Lecture L. H. 2	DA/DH Practical(Batch B)	
	Physiology Practical (Batch B)					
Tuesday	DA/DH Practical (Batch B)	Physiology Practical (Batch A)	Dental Materials Lecture L. H. 2	DA/DH Lecture L. H. 2	DA/DH Practical(Batch A)	
	Physiology Practical (Batch A)					
Wednesday	Prosthodontics Practical (Batch A)	Biochemistry Practical (Batch B)	Anatomy Lecture L. H. 2	Physiology Lecture L. H. 2	Dental Materials Lecture L.H.2 (2.30-3.30 pm)	DA/DH Lecture L.H.2 (3.30-4.30 pm)
	Biochemistry Practical (Batch B)					
Thursday	Anatomy Dissection		Physiology Lecture(Demo Room)	Anatomy Lecture L.H.2	Physiology Lecture L. H. 2 (2.30 - 3.30 pm)	Biochemistry Lecture L. H. 2 (3.30 - 4.30 pm)
Friday	Anatomy Dissection		Biochemistry Lecture(Demo Room)	Anatomy Lecture (Demo Room)	DA/DH Practical	
Saturday	Prosthodontics Practical (Batch B)	First term: Dental Materials Practical Second term: Prosthodontics Practical		Physiology Lecture L.H.2 (2.30 - 3.30 pm)	Teacher-Guardian Meeting/ Student Activity (3.30-4.30 pm)	
	Biochemistry Practical (Batch A)					

Note: The venue of the practical classes will be at their respective departments. Theory venues are mentioned in the time table.



CURRICULUM

Manipal College of Dental Sciences, Mangalore has implemented Outcome Based Education system of curriculum delivery for 2020-21 batch. The syllabus for all subjects from first year to final year are provided in this document. Each of the statements are associated with a level of competency in both the cognitive (knowledge) and the psychomotor (practical) domains. The levels are designated based on the Blooms Taxonomy as follows.



COGNITIVE DOMAIN

C1 – Knowledge

- Recall/remember previously learnt information

C2 – Comprehension

- Explain learnt information

C3 – Application

- Use learnt information in another familiar or new situation

C4 – Analysis

- Break information into parts to explore understandings and relationships

C5 – Evaluation

- Judge the value of a decision or course of action

C6 – Synthesis

- Put together parts of learnt information to form new whole

PSYCHOMOTOR DOMAIN

P1 – Perception

- The ability to use sensory cues to guide motor activity

P2 – Set

- The readiness to act

P3 – Guided response

- Observe and imitate action or activity

P4 – Mechanism

- Perform activity or tasks from written or verbal instruction

P5 – Complex overt response

- Perform activity or tasks independently

P6 - Adaptation

- Coordinate and modify activity or tasks to address new situations

P7 – Origination

- Create and execute a new technique or task

The syllabus for the course will be given year-wise at the end of the document in **ANNEXURE 1**.



PERSONALITY AND PROFESSIONAL DEVELOPMENT PROGRAM

Manipal College of Dental Sciences (MCODS) Mangalore conducts a unique program called as the “Personality and Professional Development Program”. This program is coordinated by Dr. Ashwin Rao, Professor, Department of Paediatric and Preventive Dentistry. It has been developed envisioning the holistic development of undergraduate students starting 1st BDS through to 3rd BDS. The program has a two-pronged objective. The first is to help instill confidence into the student through various sessions on personality and life perspectives. This is directed at the 1st and 2nd BDS students. This includes modules on leadership, finance management, promotion of extracurricular skills among others. The second objective is directed at 3rd BDS students to enhance their professional development. Professionally related topics which are not covered in the mainstream dental curriculum are dealt here. These include clinical photography, patient communication and practice management among a host of other relevant topics.

RESULTS

Parents/Guardians can access the University Examination results, sessional examination results and attendance report on the Student portal: (<https://maheslcm.manipal.edu/>): Parents and students can get information, about academic matters, tuition fee (future and dues), hostel dues by accessing this portal using Registration No/Date of Birth. Please also ensure that the Email ID/ Postal address is to be updated whenever there is a change. It is advised for the students and parents to regularly check the portal for updates and information.

DRESS CODE FOR STUDENTS

BOYS:

- Trousers and collared shirt
- Shoes and Socks
- Clean white apron with name tag

PROHIBITED FOR BOYS:

- T. Shirt
- Tight fitting/ dirty jeans
- Chappals/Sports shoes
- Shorts
- Ear rings
- Torn trousers
- Pony tails
- Trousers with more than 4 pockets

GIRLS:

- Formal wear dress like Salwar Kameez, Churidar
- Formal foot wear
- Hair (beyond shoulder length) to be tied up
- Clean white apron with name tag

PROHIBITED FOR GIRLS:

- Tight fitting/ dirty jeans
- Torn trousers, Skirts, Shorts
- Revealing deep tops/Spaghetti top/Sleeveless tops/Shirts /T shirts



STUDENT AFFAIRS

The Administrative Office is situated within the college premises at Light House Hill Road, Mangalore. Students are advised to contact the Administrative Office for all administration related issues, hostel related issues, mess bill payment, etc. They may meet the Dean, Associate Dean, Chief Warden, and Deputy Director -Student Affairs in their respective offices situated in the college premises.

STUDENT WELFARE

The Deputy Director- Student Affairs will provide guidance and assistance to the students in all the activities related to student welfare programme. The student counseling centre is there to help the students in the time of need. Each student is issued an identity card which bears the students name, roll number and other details. This ID card serves as the source of identification of the student at the college campus, in the library, hostel, at University Examination and to avail Medicare facilities in an emergency. It may be used as a tool for identification even outside the college campus.

CONTACT:

Dr. Abhishek Krishna

Deputy Director Student Affairs
(Mangalore Campus),
Assistant Professor, Radiation
Oncology, KMC Mangalore
Office: 0824- 2422271
Mob: +91 9008783820
Email: ddsa.mangalore@manipal.edu



CONTACT:**Dr. Nandita Shenoy**

Assistant Director - Student Affairs
(Mangalore Campus),
Associate Professor, Oral Medicine
and Radiology, MCODS Mangalore
Mob: +91 9901730507
Email: nandita.shenoy@manipal.edu



Therefore, students are required to carry their Identity Card at all times. Students during their professional course might face several situations of physical and psychological stress. In such situations a counsellor can help the students feel more comfortable in the new setup.

The Counselling Centre provides total privacy to the students and all the matters discussed are kept strictly confidential.



Computer Aided Designing and Machining (CAD-CAM)

RAGGING-STRICTLY PROHIBITED

Ragging is a criminal offence as per the Karnataka Educational Act 1983 and Hon'ble Supreme Court of India. MAHE ensures strict compliance on the prevention of Ragging of any form. Ragging is a criminal and Non-bailable offence. Ragging of students in any form is strictly prohibited within and outside the campus. The offenders are liable for punishment with imprisonment of up to three years and fine of up to 2.5 lakhs/-or may be even dismissed. There is an Anti - ragging squad in operation under the overall charge of the Dean. Students are advised to bring cases of ragging (either in the college campus or in the hostel) to the personal notice of the Dean, through the Deputy Director-Student Affairs / Teacher-guardian or through their respective hostel warden. If any incident of ragging comes to the notice of the authorities, the concerned student will be given the liberty to explain, and if his/ her explanation is not found to be satisfactory, he / she can be expelled from the institution.

ANTI-RAGGING COMMITTEE

Dr Ashita S. Uppoor, Dean	Chairperson	9880038082
Col (Dr) Rajat Mitra, Associate Dean	Member/Nodal Officer	9901470120
Dr Srikant N, Associate Dean	Member	9611144234
Dr Abhishek Krishna, Dy. Director, Students Affairs, MAHE, Mangalore Campus	Member	9008783820
Dr Nandita Shenoy, Assistant Director, Students Affairs, MAHE, Mangalore Campus/Warden, Attavar Ladies Hostel	Member	9901730507
Lt Col Ramanatha Shetty, Chief warden, MAHE, Mangalore campus	Member	0824-3535549 9902155882
Hony. Sub Major, Sadananda Krishna Majalikar (Retd) Deputy Chief Security Officer MAHE Mangalore Campus	Member	6005115253
The Head, Legal, MAHE, Manipal	Member	08202922807
Dr Karthik Shetty, Warden, Kaprigudda Boys Hostel	Member	9900008020
Dr Amita Lewis, Associate Professor, Oral Pathology	Member	9886280363
Mr. Vikram Pai, Parent	Member	-----
Mrs. Surbhi Vinay, Parent	Member	-----
Mrs Sheela Kamath, Sr. Executive	Member	9663723303
President, Students Association 2026-27	Member	(will be intimated once elected)
Secretary, Students Association 2026-27	Member	(will be intimated once elected)
I BDS student Class Representative - Male (2026-27)	Member	(will be intimated once elected)
I BDS Student Class Representative - Female (2026-27)	Member	(will be intimated once elected)

ADMINISTRATIVE OFFICE

MS. SHEELA KAMATH

SENIOR EXECUTIVE

Mobile: 9663723303

sheela.kamath@manipal.edu



MS. DEEPA KAMATH

STUDENTS SECTION

Mobile: 9481769787

students.mcodsmlr@manipal.edu

MCODS, Mangalore, Light House Hill Road Ph No: 0824-2428716 (Extn:5604)



MS. ARCHANA

STUDENTS SECTION

Mobile: 8970721244

students.mcodsmlr@manipal.edu

MCODS, Mangalore, Light House Hill Road Ph No: 0824-2428716 (Extn:5604)

The above mentioned can be contacted for matters related to students like maintenance of records, examination-related work, matters related to foreign students, issue of marks cards, certificates etc.



TEACHER -GUARDIAN PROGRAMME

The Student - teacher guardian programme has been implemented for students of first year BDS. It is an efficient process of updating attendance and also having an insight into the various academic and personal issues that a student might face. This programme assigns a member of the teaching faculty to oversee the welfare of a group of students (one teacher guardian for 10 students in a group for I BDS and 25 students in a group for II, III and Final BDS).

Parents are free to contact them periodically to know the performance of the student. The teacher guardian can be approached for advice regarding academics, examination, and personal issues during their stay at Mangalore.



I BDS TEACHER GUARDIAN LIST 2026 BATCH

Sl. No.	Name of the Teacher Guardian	Designation and Department	Email and contact number
1.	Dr. Amitha J. Lewis	Associate Professor, Oral Pathology and Microbiology	amitha.lewis@manipal.edu Mob: 9886280363
2.	Dr. Nidhi Manaktala	Associate Professor, Oral Pathology and Microbiology	manaktala.nidhi@manipal.edu Mob: 8867503355
3.	Dr. Mranali Shetty	Associate Professor, Periodontology	mranali.shetty@manipal.edu Mob: 9611016900
4.	Dr. Shweta Yellapurkar	Associate Professor, Oral Pathology and Microbiology	shweta.y@manipal.edu Mob: 9591955590
5.	Dr. Ann Sales	Senior Lecturer, Prosthodontics	ann.sales@manipal.edu Mob: 9535410083
6.	Dr. Sandipan Mukherjee	Senior Lecturer, Prosthodontics	mukherjee.sandipan@manipal.edu Mob:9008722874
7.	Dr. Archana M.,	Senior Lecturer, Oral Medicine and Radiology	m.archana@manipal.edu Mob :9840322708
8.	Dr. Preetham	Senior Lecturer, Prosthodontics	preetham.kotian@manipal.edu Mob :8431278438

FOREIGN STUDENTS REGISTRATION PROCEDURES

The foreign students with Student Visa are required to register with the Superintendent of Police (SP) in Mangalore, within 15 days of their arrival. They are also required to inform the Superintendent of Police at Mangalore, a week prior to their departure from India. For the convenience of the students, the Office of the Superintendent of Police functions in Mangalore on the afternoons of every Wednesday and Saturday. Students are advised to note this facility and make appropriate use.

STUDENT HEALTH CLINIC

KMC, Hospital, Attavar. Phone No: 0824 2445858.
Casualty Ph. No: 5300 (Ext).
Ambulance Phone No: 9886033730 / 9739863994

The student health clinic is situated at Kasturba Medical College Hospital, Attavar, and Mangalore. All the students of MAHE are covered under MAHE Medicare Plan. This card entitles the bonafide students of MAHE for medical treatment (Out-patient/ In-patient) from the Doctors and the Hospitals under MAHE.

In case of ill health, students should report to Casualty at KMC Hospital, Attavar, Mangalore. Student's need to keep their parents as well as their teacher guardian informed about their health related problems. Students are advised to get treated in our own hospitals and avail the Medicare benefits

Casualty Numbers

KMC Hospital (Ambedkar Circle) 0824 2444777 Extn 5100, 5119
KMC Hospital (Attavar) 0824 2445858 Extn 5300



STUDENT FINANCE

Details of the course fee and hostel fee schedule for general category students of the institution for the academic year 2025-2026 will be displayed on our website www.manipal.edu > Academic > Fee Notification. The students are advised to pay course fee through the payment gateway (Fee Kart) the link of which will be provided through the student portal on the University website. Please note that from the academic year 2018-19, the student has to mandatorily complete the Annual Registration process. The navigation of the same will be <https://maheslcm.manipal.edu/> - login with your student ID > Dues > Annual Registration. Hostel deposit need not be paid again if there is no change in the type of hostel accommodation availed.

THE PAYMENT OF GENERAL CATEGORY FEE HAS TO BE MADE THROUGH ONE OF THE FOLLOWING OPTIONS

- I Option: Online mode through the SLCM Portal – Financial TAB <https://maheslcm.manipal.edu/>
- II Option: RTGS/NEFT by using the MAHE Virtual Bank Account No. This is unique for each student and is available on the Admission Profile TAB on the SLCM portal. IFSC code: ICIC0000106 and Beneficiary: Manipal Academy of Higher Education.

The course fee for the academic year 2025-26 for the senior students and the fee schedule mentioning the due date will be uploaded on the SLCM portal --> student / parent login --> More TAB --> Important documents.

Pradhan Mantri Vidyalaxmi Scheme

The PM Vidyalaxmi Scheme, launched by the Government of India in 2025, provides collateral-free and guarantor-free education loans to meritorious students admitted to top institutions, including MAHE's Manipal College of Dental Sciences, Mangalore. Students can avail loans up to ₹7.5 lakh with a 75% government credit guarantee, along with interest subsidies—3% for families with annual income up to ₹8 lakh, and full subsidy for incomes up to ₹4.5 lakh. Covering tuition, hostel, books, and other academic expenses, the scheme is accessible through a fully digital and transparent application portal.

DETAILS OF THE BANK

MANIPAL ACADEMY OF HIGHER EDUCATION - BANK DETAILS

Name of Beneficiary : Manipal Academy of Higher Education
Address: Manipal Academy of Higher Education Madhav Nagar, Manipal-576104
Karnataka, India.
Phone: +91-820-2571201, 2922767, 2922581
Fax: +91-820-2570065
Beneficiary Bank Details: ICICI Bank Ltd Manipal Branch Kasturba Hospital Complex, Manipal, Karnataka, India
Phone: 0820 257503/54-
Beneficiary Account# (INR A/c): 007201000089 IFSC Code#: ICIC0000072

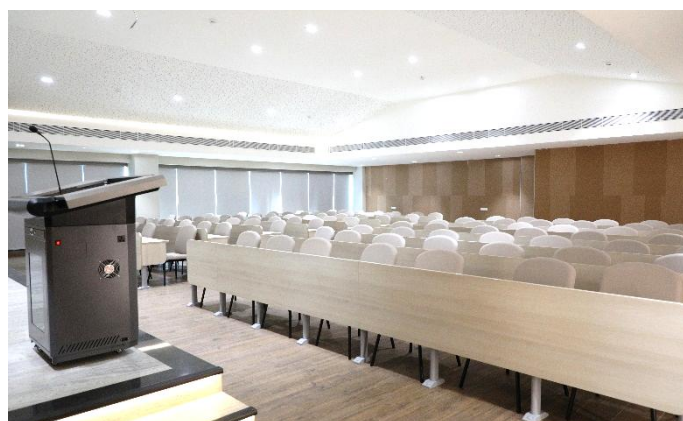


ASSISTANT MANAGER

Ms. Sunanda Hebbar, Assistant Manager Finance department
MCODS, Mangalore, Tel No: 0824-2422271 (Ext: 5515), Mobile: 9448351991,
Email: sunanda.hebbar@manipal.edu

MCODS MANGALORE CONTACT DETAILS

DESIGNATION	ADDRESS	CONTACT NUMBERS
DEAN Dr. Ashita Upoor dean.mcodsmmlr@manipal.edu	Office of Dean,MCODS, Mangalore	0824-2422653 [PI] Cell: 9880038082
ASSOCIATE DEAN Col (Dr). Rajat Mitra	Professor, Orthodontics and Dentofacial Orthopaedics, MCODES, Mangalore	0824- 3535602 Ext. 5602 Cell : 9812490182
ASSOCIATE DEAN Dr. Srikant N.	Professor, Department of Oral Pathology and Microbiology, MCODES, Mangalore	0824-2428716 Cell: 9611144234 Ext.5601
DEPUTY DIRECTOR STUDENT AFFAIRS Dr. Abhishek Krishna	Assistant Professor, Radiation Oncology KMC Mangalore	9008783820
MEDICAL SUPERINTENDENT	KMC Hospitals, Mangalore	0824-2286210
CHIEF SECURITY OFFICER	KMC, Mangalore LHH Road csso.mlr@manipal.edu	0824 2427976 Extn. 5544
SENIOR EXECUTIVE Ms. Sheela Kamath	MCODS, Mangalore, LHH Road sheela.kamath@manipal.edu	0824-2428716, Ext. 5605
ASSISTANT MANAGER-FINANCE Ms. Sunanda Hebbar	MCODS, Mangalore, LHH Road sunanda.hebbar@manipal.edu	0824-2428716, Ext. 5515
STUDENTS SECTION Ms. Deepa Kamath and Ms. Archana	MCODS, Mangalore, LHH Road students.mcodsmmlr@manipal.edu	0824-2428716, Ext. 5604





DETAILS OF HOSTEL WARDENS, MANGALORE

	NAME AND DESIGNATION	CONTACT NO.	EXTN. NO.	EMAIL
CHIEF WARDEN (I/C)	Lt Col Ramanatha Shetty WARDEN	9902155882	0824-3535549	chiefwarden.kmcmr@manipal.edu
BEJAI LADIES HOSTEL	Dr. Ashwin R Rai Assoc Prof. of Anatomy	8197137975	0824-2222763	ashwin.raai@manipal.edu
	WARDEN- Dr. Rashmi K S Assoc Prof. of Physiology	9901729728		rashmi.ks@manipal.edu
	MATRON- Mrs. Chanchala	9481017558	Extn.5879	bejai.ladieshostel@manipal.edu
BEJAI BOYS BLOCK	WARDEN- Dr. Pratik Kumar Chatterjee Assoc Prof. of Physiology	8746010903	0824-2422271 Extn.5861	pratik.chatterjee@manipal.edu
BLOCK SUPERVISOR	Ms. Anitha	9380884075	Extn. 5875	bejai.hostel@manipal.edu



College/ Hostel Timings at Centre for Basic Sciences, Bejai:	
Breakfast (at the mess)	7:30am -9:00am
Academic Schedule	9:00am -1:00pm
Lunch (at the mess)	1:00pm -2:30pm
Academic Schedule	2:30pm -5:00pm
Tea (at the mess)	5:00pm -6:00pm
Dinner (at the mess)	7:30pm -9:00pm
Library	9 :00am -8:30pm
Reporting time to Respective Hostels by 9.00 pm on all days.	
Hostel Landline numbers:	
Boys: 0824 2211768	
Girls: 0824 2222763	



Manipal Academy of Higher Education, Manipal

**Manipal College of Dental Sciences, Manipal
and
Manipal College of Dental Sciences, Mangalore**

**Four Year full time Undergraduate Program
+ 1 year compulsory internship**

Bachelor of Dental Surgery (BDS)



COURSE STRUCTURE

Subject Code	Subject Title	L	T	P	C
First Year					
BDS101	General Human Anatomy including Embryology and Histology	100	8	175	NA
BDS102	General Human Physiology and Biochemistry, Nutrition and Dietetics				
	o General Human Physiology	85	36	60	NA
	o General Human Biochemistry	82	8	40	NA
BDS103	Dental Anatomy, Embryology and Oral Histology	105	22	235	NA
	Subtotal	372	74	510	NA
Second Year					
BDS201	General Pathology and Microbiology				
	o General Pathology	72	03	52	NA
	o General Microbiology	65	03	50	NA
BDS202	General and Dental Pharmacology and Therapeutics	70	NA	20	NA
BDS203	Dental Materials	145	45	227	NA
BDS204	Pre-clinical Conservative Dentistry	32	15	185	NA
BDS24	Pre-clinical Prosthodontics and Crown & Bridge	38	12	200	NA
	Subtotal	422	78	734	NA
Third Year					
BDS301	General Medicine	62	NA	NA	90
BDS302	General Surgery	60	NA	NA	90
BDS303	Oral Pathology and Microbiology	156	10	130	NA
	Subtotal	278	10	130	180
Final Year					
BDS403	Orthodontics & dentofacial orthopaedics	66	7	70	140
BDS404	Oral Medicine & Radiology	145	54	NA	170
BDS408	Paediatric & Preventive Dentistry	72	3.5	23	139.5
BDS402	Periodontology	80	15	NA	200
BDS405	Oral & Maxillofacial Surgery	70	NA	30	270
BDS407	Prosthodontics and Crown & Bridge	113	NA	32	365
BDS406	Conservative Dentistry and Endodontics	116	21	NA	352
BDS401	Public Health Dentistry	60	NA	30	120
	Subtotal	722	100.5	185	1756.5
	Compulsory Rotatory internship	NA	NA	97.5	2280.5
	Total	1794	263	1656.5	4217.5
L= Lectures, T= Tutorials, P=Practicals, C=Clinical work (in hours)					



MANIPAL
ACADEMY of HIGHER EDUCATION
(Institution of Eminence Deemed to be University)

FIRST YEAR BDS

HUMAN ANATOMY INCLUDING EMBRYOLOGY, HISTOLOGY & MEDICAL GENETICS

Course Outcomes (COs):	At the end of the course student should be able to:
CO 1:	Describe the gross and microscopic anatomy of structures in the human body with special emphasis on head and neck region and understand the anatomical basis of disease and injury to the structures as applicable to a dental practitioner. (C2, P2)
CO 2:	Describe the normal development, critical stages of development of embryo and effects of abnormal development, teratogenicity, genetic mutations, environmental hazards affecting the head and neck region as applicable to a dental practitioner (C1, P1)
CO 3:	Apply the knowledge and skills gained in anatomy course, while interpreting pictures of imaging techniques, performing procedures and grow to be an ethical dental professional (C1, P1)
CO 4:	Apply the knowledge and skills gained in anatomy course, while interpreting pictures of imaging techniques, performing procedures and grow to be an ethical dental professional (C2, P2)

Course content and outcomes:	
Content	Competencies
Orientation & Introduction to Anatomy	- Describe the subdivisions of anatomy (C1) - Describe the anatomical terms and planes (C1) - Describe the connective tissue, skin, superficial and deep fasciae (C1)
Introduction to cardiovascular system & lymphatic system	- Define systemic, pulmonary & portal circulations (C1) - Name the types of arteries and veins (C1) - Describe the subdivisions of arteries and veins (C1) - Describe lymphatic system and its subdivisions (C1)
Introduction to Skeletal system	- Define cartilage and bone with its components (C1) - Name the types of cartilages and bones with examples (C1) - Describe the bone growth & types of ossification of bones (C1) - Describe the parts of a developing long bone (C1) - Name the types of epiphyses with examples for each (C1)
Introduction to muscles	- Name the types of muscles with examples (C1) - Describe the innervation of skeletal muscles (C1) - Describe the parts of skeletal muscles-tendons & aponeurosis (C1) - Describe the structure of skeletal muscles (C1)
Introduction to Joints	- Name the classes (types and subtypes) of joints (C1) - Give examples for each type and subtype (C2) - Describe the structure of a typical synovial joint (C1)
Introduction to Nervous system	- Describe the Nervous tissue, neurons and neuroglial cells (C1) - Name the types of neurons (C1) - Give examples for each type (C2) - Describe the process of myelination (C1) - Name the subdivisions of nervous system (C1) - Describe the formation of a typical spinal nerve (C1)
Scalp	- Describe the layers of scalp (C1) - Describe the blood supply, nerve supply and lymphatic drainage of scalp (C1) - Explain the applied anatomy of scalp (C2)
Muscles of facial expression	- Names the muscles of facial expression (C1) - Describe the nerve supply & actions of muscles of facial expression (C1) - Describe the attachments, nerve supply and actions of orbicularis oculi, orbicularis oris and buccinators, platysma (C1)
Blood supply and nerve supply of face Eyelids and lacrimal apparatus	- Describe the arteries and veins of the face (C1) - Describe the nerve supply to the face (C1) - Describe the origin, course, termination, tributaries, connections of facial vein (C1) - Explain the applied anatomy of facial vein (C2) - Describe the origin, course, termination and tributaries of retromandibular vein (C1)



	• Describe the structure of eyelids (C1) • Name the components of lacrimal apparatus (C1) • Describe the lacrimal gland with its nerve supply & blood supply (C1)
Deep fascia of neck	• Describe the layers, attachments and applied aspects of deep fascia of the neck (C1)
Posterior triangle of neck Sternocleidomastoid	• Describe the boundaries, subdivisions and contents of posterior triangle of neck (C1) • Describe the boundaries and contents of occipital triangle (C1) • Describe the boundaries and contents of subclavian triangle (C1) • Describe the formation and branches of brachial plexus (C1) • Explain the applied anatomy of supraclavicular part of brachial plexus (C2) • Describe the origin, course, termination, major relations, tributaries of external jugular vein (C1) • Explain the applied anatomy of external jugular vein (C2) • Describe the attachments, nerve supply and actions of sternocleidomastoid (C1) • Explain the applied anatomy of sternocleidomastoid (C2)
Suboccipital triangle	• Describe the boundaries, contents & clinical anatomy of suboccipital triangle (C1)
Anterior triangle of neck	• Describe the boundaries and subdivisions of anterior triangle (C1) • Describe the boundaries and contents of carotid triangle (C1) • Describe the boundaries and contents of digastric triangle • Describe the boundaries and contents of muscular triangle (C1) • Describe the boundaries and contents of submental triangle (C1) • Describe the mid line structures of neck (C1) • Describe the origin, course, major relations, termination & branches of common carotid artery (C1) • Describe the origin, course, termination, major relations & branches of external carotid artery (C1) • Describe the origin, course, termination, major relations & branches of facial & lingual arteries (C1) • Describe the origin, course, termination, major relations & tributaries of internal jugular vein (C1)
Deep Structures of Neck	• Name the parts of thyroid gland (C1) • Describe the location, capsules, features & relations, blood supply, nerve supply and lymphatic drainage of thyroid gland (C1) • Explain the applied anatomy of thyroid gland (C2) • Describe the location, blood supply, lymphatic drainage of parathyroid gland (C1) • Explain the applied anatomy of parathyroid gland (C2) • Describe the origin, course, relations, distribution of hypoglossal nerve, cervical sympathetic chain (C1) • Explain the applied anatomy of hypoglossal nerve, cervical sympathetic chain (C2)



	- Describe the origin, course, relations, distribution of glossopharyngeal, accessory and vagus nerve (C1) - Explain the applied anatomy of hypoglossal nerve, cervical sympathetic chain (C2) - Name the parts of subclavian artery (C1) - Describe the origin, course, major relations, termination & branches of subclavian artery (C1) - Name the parts of vertebral artery (C1) - Name the parts of internal carotid artery (C1) - Describe the extent, relations, blood supply, nerve supply & lymphatic drainage of trachea & cervical part of esophagus (C1, P1)
Histology	- Describe the types, structure, function & distribution of basic tissues (C1) - Name the types of epithelia (C1) - Describe the types, structure, function & distribution of epithelial tissue (C1)
	- Describe the components of connective tissue (C1) - Describe the different types of connective tissue fibers & cells with their functions (C1)
	- Name the types of cartilages (C1) - Describe the types, structure, function and distribution of cartilages (C1)
	Describe the structure & function of bone (C1)
	- Name the types of muscular tissue (C1) - Describe the differences between skeletal, cardiac and smooth muscles (C1)
	- Describe the microscopic structure of neurons & nerve fibers (C1) - Describe the microscopic structure of spinal & sympathetic ganglia, & optic nerve (C1)
	- Classify the blood vessels (C1) - Describe the microscopic structure different types of blood vessels (C1)
Embryology	Introduction -Parts of Male & Female reproductive organs
	- Describe gametogenesis (C1) - Describe spermatogenesis (C1) - Describe oogenesis (C1) - Describe the ovarian cycle & uterine cycle (C1) - Describe the formation, function & fate of Graafian follicle (C1) - Describe the formation, function and fate of corpus luteum (C1)
	- Describe fertilization (C1) - Describe Cleavage (C1) - Describe formation of blastocyst (C1)
	- Describe the bilaminar and trilaminar germ discs (C1) - Describe the formation, function and fate of trophoblast (C1)



	• Describe the formation, function and fate of prochordal plate and primitive streak (C1) • Describe the formation, function and fate of notochord (C1) • Describe the formation, function and fate of amniotic cavity, chorion (C1) • Describe the extraembryonic mesoderm & coelom (C1) • Describe the formation, subdivisions and fate of intraembryonic mesoderm (C1) • Describe the formation and fate of somites (C1) • Describe the formation and fate of neural tube (C1) • Describe the formation and derivatives neural crest (C1) • Describe the Folding of embryo (C1) • Describe the development, structure & functions of placenta (C1)
Cranial cavity	• Describe the dural folds, dural venous sinuses, blood vessels & nerves of cranial cavity (C1) • Explain the applied anatomy of dural venous sinuses (C2) • Describe the site, size, parts, relations, blood supply, development & applied anatomy of pituitary gland (C1) • Describe the origin, course, branches, distribution of middle meningeal artery & trigeminal ganglion (C1) • Explain its applied aspects (C2)
Orbit	• Describe the boundaries of orbital cavity (C1) • Name the contents of the orbital cavity (C1) • Describe the attachments, nerve supply, actions of muscles of the orbit (C1) • Explain the applied anatomy of muscles of the orbit (C2) • Describe the origin, course, distribution of ophthalmic, oculomotor, abducent, trochlear & optic nerves (C1) • Explain the applied anatomy of ophthalmic, oculomotor, abducent, trochlear & optic nerves (C2) • Describe the site, connections & branches of ciliary ganglion (C1) • Describe the origin, course & branches of ophthalmic artery (C1) • Describe the origin, course & termination of ophthalmic veins (C1)
Parotid region	• Describe the location, coverings, surfaces, borders, relations, nerve supply, blood supply, lymphatic drainage of the parotid gland (C1) • Describe the structures within the parotid gland (C1) • Describe the parotid duct (C1) • Explain the applied anatomy of the parotid gland & duct (C2)
Facial nerve	• Describe the origin, course, termination, relations, branches and distribution of facial nerve (C1) • Explain the applied anatomy of facial nerve (C2)
Infratemporal fossa	• Describe the boundaries of temporal & infratemporal fossae (C1) • Name the contents of temporal & infratemporal fossae (C1) • Name the muscles of mastication (C1)



	- Describe the attachments, nerve supply & actions of muscles of mastication (C1) - Explain the applied anatomy of muscles of mastication (C2) - Describe the origin, course, termination, relations, branches and distribution of mandibular nerve (C1) - Explain the applied anatomy of mandibular nerve (C2) - Describe the location, relations, connections, branches and functions of otic ganglion - Describe the origin, course, termination, parts & branches of maxillary artery (C1)
Pterygopalatine fossa	- Describe the boundaries of pterygopalatine fossa (C1) - Describe the origin, course, termination, relations, branches and distribution of maxillary nerve (C1) - Explain the applied anatomy of maxillary nerve (C2) - Describe the location, relations, connections, branches and functions of pterygopalatine ganglion
Temporomandibular joint	- Name the type and subtype of temporomandibular joint (C1) - Describe the articular surfaces, ligaments, relations, nerve supply, blood supply, movements, and muscles producing each movement of temporomandibular joint (C1) - Explain the applied anatomy of temporomandibular joint (C2)
Submandibular region	- Describe the location, coverings, parts, surfaces, relations, blood supply, nerve supply, lymphatic drainage of the submandibular gland (C1) - Describe the origin course and termination of submandibular duct (C1) - Explain the applied anatomy of the submandibular gland (C2) - Describe the attachments, relations, nerve supply & actions of hyoglossus muscle (C1) - Describe the location, relations, connections, functions and branches of submandibular ganglion (C1) - Describe the attachments, relations, nerve supply & actions of mylohyoid muscle (C1) - Identify digastric muscles (C1, P1) - Describe the attachments, nerve supply, actions of digastric muscles (C1, P1) - Explain the applied anatomy of digastric muscles (C2, P2)
Embryology	- Describe the pharyngeal arches, pouches & clefts (C1) - List the derivatives of pharyngeal arches, pouches & clefts (C1)
	Describe the development of tongue, palate, thyroid gland, tooth & salivary glands (C1)
	- Describe the development of face & palate (C1) - List the anomalies of face, & palate (C1)
	- List the lymphatic organs (C1) - Describe the microscopic structure and function of lymph node, tonsil, thymus and spleen (C1)



Histology	• List the different types of salivary glands (C1) • Describe the microscopic structure of each types of salivary glands (C1)
	• Name the endocrine glands (C1) • Describe the thyroid gland, parathyroid glands, pituitary & adrenal gland (C1)
	• Describe the microscopic structure of lip, epiglottis, trachea and lung (C1)
Genetics	• Describe the basics of medical genetics (C1) • Describe the chromosomes (C1) • Describe the structural & numerical aberrations of chromosomes (C1) • Describe the applied aspects/clinical manifestations of syndromes (C1)
Pharynx	• Name the parts of pharynx (C1) • Describe the extent and internal features of each part of pharynx (C1) • Describe the structure of wall of the pharynx (C1) • Name the muscles of pharynx (C1) • Describe the attachments, nerve supply and actions of muscles of pharynx (C1) • Explain the applied anatomy of pharynx (C2) • Describe the location, relations, blood supply, nerve supply of palatine tonsil (C1) • Explain the applied anatomy of palatine tonsil (C2) • Describe the auditory tube (C1) • Explain the applied anatomy of soft palate & auditory tube (C2)
Palate & auditory tube	• Describe the hard palate (C1) • Describe the soft palate (C1) • Describe the auditory tube (C1)
Nasal cavity and paranasal air sinuses	• Describe the boundaries of nasal cavity (C1) • Describe the features in each wall of the nasal cavity (C1) • Describe the nerve supply & blood supply of the nasal cavity (C1) • Explain the applied anatomy of the nasal cavity (C2) • Name and describe the paranasal air sinuses (C1) • Explain the applied anatomy of the paranasal air sinuses (C2)
Oral cavity and Tongue	• Name the parts of the oral cavity (C1) • Name the parts of the tongue (C1) • Describe the surfaces, features, blood supply, nerve supply, lymphatic drainage of the tongue (C1) • Names the muscles of tongue (C1) • Describe the attachments, nerve supply & actions of muscles of tongue (C1) • Explain the applied anatomy of the tongue (C2)



Larynx	- Name the cartilages of larynx (C1) - Describe the major features of cartilages of larynx (C1) - Name the ligaments / membranes of larynx (C1) - Describe the attachments of ligaments / membranes of larynx (C1) - Name the joints of larynx (C1) - Name the intrinsic muscles of larynx (C1) - Describe the attachments, nerve supply & actions of muscles of larynx (C1) - Name the extrinsic muscles of larynx (C1) - Describe the actions of extrinsic muscles of larynx (C1) - Describe the parts, features, epithelial lining of interior of larynx (C1) - Describe the nerve supply, blood supply & lymphatic drainage of larynx (C1) - Explain the applied anatomy of larynx (C2)
Lymphatic drainage of Head And Neck	Name and describe the lymph nodes related to head and neck region (C1)
Environmental science	- Describe the method of disposal of dissected cadaver, organs and tissues (C1) - Describe the method of disposal of chemicals used in preservation (C1)
Histology	Describe the microscopic structure of tooth and tongue (C1)
	- Name the parts of small intestine (C1) - Describe the microscopic structure of Duodenum & Ileum (C1)
	- Name the parts of Large intestine (C1) - Describe the microscopic structure of Large intestine & appendix (C1)
	Describe the microscopic structure of liver & pancreas (C1)
	- Name the parts of urinary system (C1) - Describe the microscopic structure of kidney, ureter & urinary bladder (C1)
	- Name the parts of male and female reproductive system (C1) - Describe the microscopic structure of ovary & testis (C1)
Introduction & general anatomy	- Describe the anatomical terms, planes and subdivisions (C1, P1) - Discuss the general anatomy of connective tissue, blood vessels, muscles, nerves, bones, joints and lymphatics (C1, P1)
Scalp	- Identify the structures in the scalp (C1, P1) - Describe the structures in the scalp (C1, P1) - Explain the applied anatomy of the scalp (C2, P2) - Identify the features of the norma verticalis of the skull (C1, P1) - Describe the features of the norma verticalis of the skull (C1, P1)
Face	- Identify the structures & muscles in the face (C1, P1) - Describe the muscles in the face (C1, P1) - Explain the applied anatomy of the face (C2, P2)



	• Identify and Describe the arteries and veins of the face (C1) • Describe the nerve supply to the face (C1) • Describe the origin, course, termination, tributaries, connections of facial vein (C1) • Explain the applied anatomy of facial vein (C2) • Describe the origin, course, termination and tributaries of retromandibular vein (C1) • Identify the components of lacrimal apparatus (C1, P1) • Describe the components of lacrimal apparatus (C1, P1) • Explain the applied anatomy of the lacrimal apparatus (C2, P2) • Identify the features of the norma frontalis of the skull (C1, P1)
Posterior triangle of neck	• Identify the boundaries and contents of each of the subdivisions of posterior triangle (C1, P1) • Describe the boundaries and contents of each of the subdivisions of posterior triangle (C1, P1) • Explain the applied anatomy of the posterior triangle and its subdivisions (C2, P2) • Identify the branches of supraclavicular part of brachial plexus (C1, P1) • Describe the formation and branches of brachial plexus (C1, P1) • Explain the applied anatomy of supraclavicular part of brachial plexus (C2, P2) • Identify sternocleidomastoid muscles (C1, P1) • Describe the attachments, nerve supply, actions of sternocleidomastoid (C1, P1) • Explain the applied anatomy of sternocleidomastoid (C2, P2)
Suboccipital triangle	• Identify the boundaries and contents of suboccipital triangle (C1, P1) • Describe the boundaries and contents of suboccipital triangle (C1, P1) • Explain the clinical anatomy of suboccipital triangle (C2, P2) • Identify the features of the norma occipitalis of the skull (C1, P1) • Describe the features of the norma occipitalis of the skull (C1, P1)
Anterior triangle of neck	• Identify the boundaries and contents of each of the subdivisions of anterior triangle (C1, P1) • Describe the boundaries and contents of each of the subdivisions of anterior triangle (C1, P1) • Explain the applied anatomy of the anterior triangle and its subdivisions (C2, P2) • Identify the midline structures of the neck (C1, P1) • Describe the midline structures of the neck (C1, P1)
Deep dissection of neck	• Identify the thyroid and parathyroid glands (C1, P1) • Describe the features, relations and blood supply of thyroid and parathyroid glands (C1, P1)



	• Identify trachea, oesophagus, subclavian artery, Brachiocephalic veins, cranial nerves 9, 10, 11, 12, cervical part of sympathetic trunk (C1, P1) • Describe the extent, relations, blood supply, nerve supply & lymphatic drainage of trachea & cervical part of esophagus (C1, P1)
Cranial cavity	• Identify the features of the cranial cavity (C1, P1) • Describe the features of the cranial cavity (C1, P1) • Identify the dural folds, dural venous sinuses, blood vessels & nerves of cranial cavity (C1, P1) • Describe the dural folds, dural venous sinuses, blood vessels & nerves of cranial cavity (C1, P1) • Explain the applied anatomy of dural venous sinuses (C2, P2) • Identify the pituitary gland (C1, P1) • Describe the location, size, parts, relations, blood supply & development of pituitary gland (C1, P1) • Identify the middle meningeal artery (C1, P1) • Describe the origin, course, relations, and branches middle meningeal artery (C1, P1) • Identify the trigeminal ganglion (C1, P1)
Orbit	• Identify the boundaries of orbital cavity (C1, P1) • Describe the boundaries of orbital cavity (C1, P1) • Identify the contents of the orbital cavity (C1, P1) • Describe the attachments, nerve supply, actions of muscles of the orbit (C1, P1) • Explain the applied anatomy of muscles of the orbit (C2, P2) • Describe the origin, course, distribution of ophthalmic, oculomotor, abducent, trochlear & optic nerves (C1, P1) • Explain the applied anatomy of ophthalmic, oculomotor, abducent, trochlear & optic nerves (C2, P2) • Describe the site, connections & branches of ciliary ganglion (C1, P1) • Describe the origin, course & branches of ophthalmic artery (C1, P1) • Describe the origin, course & termination of ophthalmic veins (C1, P1)
Parotid region Facial nerve	• Identify the surfaces, borders and relations of parotid gland (C1, P1) • Describe the location, coverings, surfaces, borders, relations, nerve supply, blood supply, lymphatic drainage of the parotid gland (C1, P1) • Identify the intraparotid structures (C1, P1) • Describe the intraparotid structures and parotid duct (C1, P1) • Explain the applied anatomy of the parotid gland (C2, P2) • Identify the facial nerve and its branches in the face (C1, P1)



	• Describe the location, relation and branches of facial nerve in the face (C1, P1) • Explain the applied anatomy of the facial nerve (C2, P2)
Infratemporal fossa	• Identify the boundaries & contents of temporal & infratemporal fossae (C1, P1) • Describe the boundaries & contents of temporal & infratemporal fossae (C1, P1) • Identify the muscles of mastication (C1, P1) • Describe the attachments, nerve supply & actions of muscles of mastication (C1, P1) • Explain the applied anatomy of muscles of mastication (C2, P2) • Describe the origin, course, termination, relations, branches and distribution of mandibular nerve (C1, P1) • Explain the applied anatomy of mandibular nerve (C2, P2) • Describe the location, relations, connections, branches and functions of otic ganglion (C1, P1) • Describe the origin, course, termination, parts & branches of maxillary artery (C1, P1) • Identify the features of the norma lateralis (C1, P1) • Describe the features of the norma lateralis (C1, P1) • Identify the features of the norma basalis (C1,P1)
Pterygopalatine fossa	• Identify the boundaries & contents of pterygopalatine fossa (C1) • Describe the origin, course, termination, relations, branches and distribution of maxillary nerve (C1) • Explain the applied anatomy of maxillary nerve (C2) • Describe the location, relations, connections, branches and functions of pterygopalatine ganglion (C1)
Temporomandibular joint	• Identify the parts of temporomandibular joint (C1, P1) • Name the type and subtype of temporomandibular joint (C1, P1) • Describe the articular surfaces, ligaments, relations, nerve supply, blood supply, movements, and muscles producing each movement of temporomandibular joint (C1, P1) • Explain the applied anatomy of temporomandibular joint (C2, P2)
Submandibular region	• Identify the structures in the submandibular region (C1, P1) • Identify the parts of submandibular gland (C1, P1) • Describe the location, coverings, parts, surfaces, relations, blood supply, nerve supply, lymphatic drainage of the submandibular gland (C1, P1) • Describe the origin, course and termination of submandibular duct (C1, P1) • Explain the applied anatomy of the submandibular gland (C2, P2) • Describe the attachments, relations, nerve supply & actions of hyoglossus muscle (C1, P1) • Describe the location, relations, connections, functions and branches of submandibular ganglion (C1, P1)



	• Describe the attachments, relations, nerve supply & actions of mylohyoid muscle (C1, P1) • Identify the features of the mandible (C1, P1) • Describe the features of the mandible (C1, P1) • Describe the attachments, nerve supply and actions of digastric muscles (C1) • Explain the applied anatomy of digastric muscles (C2)
Oral cavity	• Identify the parts of oral cavity (C1, P1) • Identify the parts and papillae of the tongue (C1, P1) • Describe the surfaces, features, blood supply, nerve supply and lymphatic drainage of tongue (C1, P1) • Identify the muscles of tongue (C1, P1) • Describe the attachments, nerve supply & actions of muscles of tongue (C1, P1) • Explain the applied anatomy of the tongue (C2, P2) • Identify the hyoid bone (C1, P1) • Describe the features and attachments of hyoid bone (C1, P1)
Palate	• Identify the hard palate (C1, P1) • Describe the hard palate (C1, P1) • Identify the soft palate (C1, P1) • Describe the soft palate (C1, P1) • Explain the applied anatomy of soft palate (C2, P2)
Nasal cavity and paranasal sinuses	• Identify the boundaries of the nasal cavity (C1, P1) • Identify the features on the walls of the nasal cavity (C1, P1) • Describe the walls of the nasal cavity (C1, P1) • Explain the applied anatomy of the nasal cavity (C2, P2) • Identify the paranasal air sinuses (C1, P1) • Describe the paranasal air sinuses (C1, P1) • Explain the applied anatomy of the paranasal air sinuses (C2, P2)
Pharynx	• Identify the parts and features of the pharynx (C1, P1) • Describe the extent and features of parts of pharynx (C1, P1) • Describe the structure of wall of the pharynx (C1, P1) • Identify the muscles of pharynx (C1, P1) • Describe the attachments, nerve supply and actions of muscles of pharynx (C1, P1) • Explain the applied anatomy of pharynx (C1, P1) • Identify the palatine tonsil (C1, P1) • Describe the location, relations, blood supply, nerve supply of palatine tonsil (C1, P1) • Explain the applied anatomy of palatine tonsil (C2, P2) • Describe the auditory tube (C1, P1) • Explain the applied anatomy of soft palate & auditory tube (C2, P2)
Larynx	• Identify the cartilages of larynx (C1, P1) • Describe the major features of cartilages of larynx (C1, P1)



	• Identify the ligaments / membranes of larynx (C1, P1) • Describe the attachments of ligaments / membranes of larynx (C1, P1) • Identify the intrinsic muscles of larynx (C1, P1) • Describe the attachments, nerve supply & actions of intrinsic muscles of larynx (C1, P1) • Identify the extrinsic muscles of larynx (C1, P1) • Describe the actions of extrinsic muscles of larynx (C1, P1) • Identify the parts and features of larynx (C1, P1) • Describe the features and epithelial lining of interior of larynx (C1, P1) • Describe the nerve supply, blood supply & lymphatic drainage of larynx (C1, P1) • Explain the applied anatomy of larynx (C2, P2)
Histology	• Identify the parts of compound microscope (C1, P1) • Describe the features & function of compound microscope (C1, P1) • Describe the types, structure, function & distribution of basic tissues (C1, P1)
	• Identify different types of epithelia (C1, P1) • Discuss the types, structure, function & distribution of epithelial tissue (C1, P1)
	• Identify the components of connective tissue (C1, P1) • Discuss the types and components of connective tissue (C1, P1) • Identify different types of connective tissue fibers & cells (C1, P1) • Discuss the different types of connective tissue fibers & cells with their functions (C1, P1)
	• Identify different types of cartilages (C1, P1) • Discuss the types, structure, function & distribution of cartilages (C1, P1)
	• Identify the longitudinal and transverse sections of compact bones (C1, P1) • Discuss the structure & function of compact bones (C1, P1)
	• Identify the different types of muscular tissue (C1, P1) • Discuss the structure of different types of muscle tissue (C1, P1) • Identify the differences between skeletal, cardiac and smooth muscles (C1, P1) • Discuss the differences between skeletal, cardiac and smooth muscles (C1, P1)
	• Identify the neurons, nerve fibers & neuroglia (C1, P1) • Discuss the microscopic structure of neurons & nerve fibers (C1, P1) • Identify the spinal & sympathetic ganglia, & optic nerve (C1, P1) • Discuss the microscopic structure of spinal & sympathetic ganglia, & optic nerve (C1, P1)



	- Identify the lymph node, tonsil, thymus and spleen (C1, P1) - Discuss the microscopic structure of lymph node, tonsil, thymus and spleen (C1, P1)
	- Identify different types of salivary glands (C1, P1) - Discuss the microscopic structure of each type of salivary glands (C1, P1)
	- Identify the thyroid & parathyroid glands (C1, P1) - Discuss the microscopic structure of thyroid & parathyroid glands (C1, P1)
	- Identify the pituitary & adrenal gland (C1, P1) - Discuss the microscopic structure of pituitary & adrenal gland (C1, P1)
	- Identify the lip, epiglottis, trachea & Lung (C1, P1) - Discuss the microscopic structure of epiglottis, trachea & Lung (C1,P1)
	- Identify tooth and tongue (C1, P1) - Discuss the microscopic structure of tooth, lip and tongue (C1, P1)
	- Identify the Duodenum & Ileum (C1, P1) - Discuss the microscopic structure of Duodenum & Ileum (C1, P1)
	- Identify the Large intestine & appendix (C1, P1) - Discuss the microscopic structure of Large intestine & appendix (C1, P1)
	- Identify the liver & pancreas (C1, P1) - Discuss the microscopic structure of liver & pancreas (C1, P1)
	- Identify the kidney, ureter & urinary bladder (C1, P1) - Discuss the microscopic structure of kidney, ureter & urinary bladder (C1, P1)
	- Identify the ovary & testis (C1, P1) - Discuss the microscopic structure ovary & testis (C1, P1)
Radiology	Identify the parts of bones of head & neck and paranasal air sinuses in radiographs (C1, P1)
Embryology models	- Discuss general embryology models - Discuss embryology models of Pharyngeal arches, tongue and face nose and palate
Osteology	- Identify and Describe skull with all normas, cervical vertebrae, hyoid bone, - Cranial cavity, different bones like Frontal, parietal, temporal, occipital, maxilla and mandible. - Identify the cervical vertebrae (C1, P1) - Describe the features and attachments of cervical vertebrae (C1, P1) - Identify the foetal skull (C1, P1) - Describe the features of foetal skull (C1, P1) - Explain the applied anatomy of fetal skull (C2, P2)

	- Identify the Sphenoid and Zygomatic bone (C1, P1) - Describe the features and attachments of Sphenoid and Zygomatic bone (C1, P1)
Demonstration of arterial pulsation	- Identify arteries for Arterial pulsations - superficial temporal, facial, carotid, axillary, brachial, radial, ulnar, femoral, popliteal, dorsalis pedis (P1) - Demonstrate the procedure (C1,P1)
Demonstration of lumbar puncture Demonstration of muscles for intramuscular & vessels for intravenous injections	- Identify the site of lumbar puncture, epidural space, intervertebral space between L4 & L5 (P1) - Describe the procedure of lumbar puncture (C1, P1) - Identify the main muscles, bones & joints of upper limb (C1, P1) - Identify the superficial veins (C1, P1) - Describe the origin, course and termination of superficial veins (C1, P1) - Describe the sites of intravenous injections (C1, P1) - Identify the deltoid muscle & gluteal muscles (C1, P1) - Explain the clinical importance of deltoid & gluteal muscles for intramuscular injection and its relation to nerves (C2, P2)
Demonstration of visceral organs, different parts of CNS and limbs	Identify different parts of brain and spinal cord (C1, P1)
	- Identify the heart & lung (C1, P1) - Identify the various structures in upper and lower limbs
	Identify various organs in the abdomen & pelvis (C1, P1)
Environmental science	- Describe the method of disposal of dissected cadaver, organs and tissues (C1, P1) 2. Describe the method of disposal of chemicals used in preservation (C1, P1)

	Recommended Books: 1. B.D. Chaurasia's Human Anatomy- Vol III, 7th Ed, CBS publishers 2. Text book of Histology, 2nd Ed by Latha V. Prabhu, EMMESS 3. Inderbir Singh's Human embryology, 11th Ed by Subhadra Devi, Jaypee 4. B D Chaurasia's General Anatomy, 4th Ed. 5. Textbook of Histology- A student centered approach, 1st Ed by Dr Latha Prabhu, Dr. Mangala and Dr. Lakshmisha Reference Books: 1. Snell's Clinical Anatomy for Medical students, 9th Ed, Wolters Kluwer 2. Gray's anatomy for students, 3rd Ed, Elsevier 3. Langman's Medical Embryology, 13th Ed, Wolters Kluwer 4. Di Fiore's Atlas of histology, 13th Ed by Victor P. Eroschenko, Wolters Kluwer 5. Cunningham's Manual of practical Anatomy- Vol III, 15th Ed by Romanes GJ, Oxford 6. Netter's Atlas of Human Anatomy, 6th Ed, Elsevier 7. Surface & Radiological Anatomy by A Halim, 3rd edition 8. Human Genetics, Gangane, 5th Edition
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Question Paper

Exam Date & Time: 30-Jul-2024 (02:15 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION
FIRST BDS DEGREE EXAMINATION - JULY/AUGUST 2024
SUBJECT: GENERAL ANATOMY INCLUDING EMBRYOLOGY AND HISTOLOGY
(REGULARS)

Marks: 60

Duration: 165 mins.

Answer all the questions.

All questions are compulsory. Write brief, clear, relevant, and legible answers.

Illustrate your answers with diagrams and flow-charts wherever appropriate.

- 1) Describe the boundaries and list the contents of the digastric triangle. (5+5 =10)
- 2) Describe the lateral wall of the nose under the following headings
 - 2A) Features (5)
 - 2B) Blood supply (2)
 - 2C) Nerve supply (2)
 - 2D) Applied anatomy (1)
- 3) **Write Short Notes on the following**
 - 3A) Facial artery (4)
 - 3B) Palatine tonsil (4)
 - 3C) Lateral pterygoid muscle (4)
 - 3D) Cavernous sinus (4)
 - 3E) Describe the stages of spermatogenesis (4)
 - 3F) Describe and illustrate the microscopic structure of hyaline cartilage (4)
 - 3G) Describe the structure of a chromosome (4)
 - 3H) Describe and illustrate the microscopic structure of the liver (4)
 - 3I) Describe the development of the tongue (4)
 - 3J) Illustrate and describe the structure of a typical synovial joint (4)

-----End-----

GENERAL HUMAN PHYSIOLOGY

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Explain the component of the cell and cell membrane, distribution and measurement of body fluids, components of blood and their functions, blood groups and blood transfusion. (C1, C2)
CO 2:	Explain the normal functions of organ systems of the body (like Muscle nerve, Cardio Vascular, Respiratory, Excretory, Central nervous system, Special senses, Endocrine, Reproduction, Renal and Gastro Intestinal system) to facilitate an understanding of physiological basis of health & disease and the interaction of various organ systems (C1, C2)
CO 3:	To perform A. Basic hematology tests (RBC count, WBC count, DLC, blood grouping, ESR, PCV, Test for hemostasis, hemoglobin estimation) (P2) B. Clinical examination of (Pulse, arterial Blood pressure measurement, auscultation of heart sound, Vital capacity, CNS, Respiratory, cardiovascular system examination (P2). C. To Demonstrate ECG recording & CPR (P1)

Course content and outcomes:	
Content	Competencies
BLOOD AND BODY FLUIDS	
1. Transport across the cell membrane	- Define Homeostasis and discuss its basic concept, and feedback mechanisms (C1) - Name the various transport mechanisms across cell membrane (C1). - Describe passive transport mechanisms such as simple diffusion, facilitated diffusion and osmosis with examples (C2) - Explain primary and secondary active transport mechanisms with examples (C2)
2. Body fluid compartments	- Mention the total body water as percentage of body weight and its distribution. (C1) - Give the ionic composition of body fluids (C1)
3. Composition and functions of blood	- List the composition of blood (C2) - List the functions of blood (C1) - Define haematocrit/PCV, ESR & Blood indices (C1). - Explain the morphology of RBCs (C2) - Explain the normal count and variations (C1)
4. Plasma proteins	- Name the different types of plasma proteins (C1) - List the functions of plasma proteins (C1) - Explain the functions of plasma proteins (C2)
5. Erythropoiesis	- Describe the sites of erythropoiesis (C2) - Describe the stages of Erythropoiesis (C2) - Explain the factors regulating Erythropoiesis (C2), - Explain RBC destruction, & classify jaundice (C2)
6. Hemoglobin, anemia	- Mention the normal values of Hemoglobin and its variations (C1) - List the functions of Hemoglobin (C1) - Define Anemia and discuss the classification of anemia (C2)
7. White blood cells	- Classify White Blood Cells (C2) - Mention the normal count and variations of WBCs (C1) - Describe the morphology of various WBCs (C2) - Describe the functions of WBCs (C2) - Mention the types of immunity and explain the role lymphocytes in immunity (C1, C2)
8. Hemostasis	- Mention the morphology of platelets, range of platelets and its variations. Discuss thrombopoiesis. (C1, C2) - List the functions of platelets (C1) - Define Hemostasis (C1) - Describe the various stages involved in hemostasis (C3) - List the clotting factors (C1) - Describe the intrinsic and extrinsic pathways of coagulation (C3) & Fibrinolysis (C1) - Explain Bleeding and clotting disorders (C2) - Classify anticoagulants and give examples (C2)

	- List the functions of Lymph, Edema causes (C1) - List the functions of monocyte macrophage system (C1)
9. Blood grouping	- Describe ABO and Rh systems of blood grouping (C2) - Explain the importance of blood grouping and cross matching (C2) - List the hazards of blood transfusions (C1) - Explain the cause and clinical features of Erythroblastosis fetalis (C3)
	Self-directed learning on Blood Physiology
	Small group teaching on Blood Physiology
	Chapter test
1. Physiology of neuron	- Describe the morphology of neuron (C2) - List the different types of neurons (C1) - Classification of nerve fibres & nerve injury (C1) - Discuss Wallerian degeneration & regeneration (C2)
2. Membrane potential	- Describe Resting Membrane Potential (C2) - Describe Action potential and Propagation of Action Potential (C2) - Describe the ionic basis of action potential (C2) - Describe compound action potential (C2)
3. Skeletal muscle & Smooth muscle	- Mention the differences between skeletal, cardiac and smooth muscle (C1) - Describe the structure of skeletal muscle (C2) - Mention the types of skeletal muscle; Types of contraction and energy source (C1) - Explain neuromuscular transmission in skeletal muscle (C3) - Explain the excitation-contraction coupling in skeletal muscle (C3) - Mention neuromuscular blockers (C1) - Give the cause, symptoms and treatment of Myasthenia Gravis (C1) - Mention the types of smooth muscle (C1)
	Small group teaching on nerve muscle physiology
	Self-directed learning on nerve muscle physiology
	Chapter test
1. Organization of heart	- Describe the structure of heart (C2) - Describe the innervations of heart and blood vessels (C2) - Describe the properties of cardiac muscle (C2)
2. Cardiac cycle	- Define cardiac cycle (C1) - State the normal duration of cardiac cycle (C1) - Explain the various events occurring during a cardiac cycle with the help of graph (C3) - Enumerate the differences between first and second heart sounds (C1)
3. Electrocardiogram	- Define electrocardiogram (ECG) (C1) - Draw a labeled diagram of a normal ECG recorded from limb lead II (C1) - Describe the waves and intervals of ECG (C2) - Mention the uses of ECG (C1)
4. Heart rate	- Mention the normal value and variations of heart rate (C1) - Describe the regulation of heart rate (C2)
5. Cardiac output	Define cardiac output (C1)

	- State the normal value of cardiac output and give Fick's principle of CO measurement (C1) - Mention the variations of cardiac output (C1) - Describe the regulation of cardiac output (C2) - Mention the factors affecting venous return (C1)
6. Blood pressure	- Define blood pressure(BP) (C1) - Give the normal value of BP (C1) - Mention the factors influencing BP (C1) - Mention the variations of blood pressure (C1) - Describe the regulation of arterial blood pressure (C2) - Define circulatory shock (C1) - Classify circulatory shock giving examples (C2) - List Salient features of coronary circulation(C1) - Discuss the Cardio vascular changes during exercise(C1)
	Self-directed learning on CVS
	Small group teaching on CVS
	Chapter test
EXCRETORY SYSTEM	
1. Introduction	- Describe the gross and microscopic structure of kidneys (C2) - List the functions of kidneys (C1) - Draw a labelled diagram of a nephron (C1) - Mention the normal value of renal blood flow (C1) - Explain the peculiarity of renal blood flow (C2) - Explain the structure & functions of JGA, Renin-Angiotensinogen-Aldosterone(C2)
2. Glomerular filtration	- Define glomerular filtration rate(GFR) (C1) - Mention the normal value of GFR (C1) - Explain the factors influencing GFR (C2) - List the substances used for the determination of GFR (C1)
3. Reabsorption and secretion In renal tubules	- Describe tubular reabsorption of sodium, glucose and water (C3) - Define tubular load, renal threshold and tubular/transport maximum (C1) - Mention the normal values for tubular load, renal threshold and tubular/transport maximum (C1) - Outline mechanism of acid base balance by kidney(C2)
4. Mechanism of concentration/dilution of urine	Describe the role of countercurrent multiplier and counter current exchanger in the formation of urine (C3)
5. Physiology of micturition	- Give the nerve supply to urinary bladder and their functions (C2) - Describe the micturition reflex (C2) - Mention abnormal bladders(C1)
6. Skin and temperature regulation	- List the functions of skin (C1) - Mention the normal body temperature (C1) - List the temperature regulating mechanisms on exposure to cold (heat gain mechanism) (C1)

	List the temperature regulating mechanisms on exposure to warmth (heat loss mechanism) (C1)
	Small group teaching on Excretory system
	Self-directed learning on Excretory system
	Chapter test
	Chapter test
	Seminar
RESPIRATORY SYSTEM	
1.Introduction to respiratory system	- Explain the functional anatomy of the respiratory system (C2) - Mention the muscles of respiration (C1) - Describe the mechanism of inspiration and expiration (C2) - Describe the intra-pulmonary and intra-pleural pressure changes during the various phases of respiration (C2)
2. Ventilation	- Define compliance of the lungs. Give its normal value. List the factors determining the compliance(C1) - What is surfactant? Give its composition. Mention the functions of surfactant (C1) - Define pulmonary ventilation. Mention the normal value of pulmonary ventilation (C1) - Define alveolar ventilation. Mention the normal value of alveolar ventilation(C1) - Define dead space. Give its normal value (C1)
3. Lung volumes and capacities	- Draw a labelled Spirogram & explain as a component of PFT(C2) - Define various lung volumes and capacities (C1) - Mention the normal values of lung volumes and capacities (C1) - Define vital capacity (C1) - Mention the significance of vital capacity (C1) - Mention the factors affecting vital capacity (C1) - Describe the timed vital capacity (FEV1) (C2) - Explain the clinical significance of FEV1 (C2)
4. Exchange of gases	- Give the composition of air in atmosphere, inspired air, alveoli (C1) - Describe the structure of respiratory membrane (C2) - Mention the factors affecting diffusion of gases across it (C1)
5.Transport of gases	- Mention the forms in which oxygen is transported in the blood (C1) - Describe the oxygen-hemoglobin dissociation curve (C2) - Mention the factors shifting the oxygen-hemoglobin dissociation curve to the right and to the left (C1) - Mention the forms in which carbon dioxide is transported in the blood (C1) - Describe the mechanism of carbon dioxide transport (C2)
6. Regulation of respiration	- Explain the neural regulation of respiration (C3) - Explain the chemical regulation of respiration (C3)
7. Applied aspects	- Define hypoxia (C1) - Mention the types of hypoxia (C1)

	- Define cyanosis (C1) - Mention the cause of cyanosis (C1) - Define apnea, dyspnea and asphyxia (C1)
	Small group teaching on respiratory system
	Self-directed learning on respiratory system
	Chapter test
	Seminar
CENTRAL NERVOUS SYSTEM	
1. General organization of nervous system	- Outline the organization of nervous system (C1) - Outline the organization of autonomic nervous system(ANS) C1) - Enumerate the functions of ANS (C1) - Mention the functional areas of cerebral cortex and their functions (C1)
2. Receptors	- Classify sensory receptors according to type and location of stimulus, giving examples for each (C2) - Explain the property of receptors
3. Synapse	- Define 'synapse' (C1) - Describe the structure of a synapse & explain the events in synaptic transmission (C2) - List the properties of synapses (C1)
4. Reflexes	- Define reflex and classify reflexes (C1) - Enumerate the components of a reflex arc with the help of a diagram (C1) - Describe the stretch reflex with the help of a diagram (C2) - Describe withdrawal reflex with the help of a diagram (C2) - Explain the importance of withdrawal reflex (C2)
5. Ascending pathways	- Outline the general organization of sensory pathways (C1) - Describe the dorsal column, lateral spinothalamic and anterior spinothalamic tracts with the help of labelled diagrams(C2) - Mention the different sensations that are carried by the above pathways (C1) - Explain referred pain and analgesic system (C2) - Describe the sensory pathways from the face(C2)
6. Descending pathways	- Describe the pyramidal/corticospinal tract with the help of a labelled diagram (C2) - Describe the role of pyramidal tract in movement and in modification of stretch reflexes (C2) - Tabulate the differences between 'upper motor neuron lesion' and 'lower motor neuron lesion (C2)
7. Cerebellum	- Name the functional divisions of cerebellum (C1) - Enumerate the functions of each lobe of cerebellum (C1) - List the clinical features of cerebellar lesion (C1) - Explain the physiological basis for clinical features of cerebellar lesion (C2)
8. Basal ganglia	- Mention the components of basal ganglia (C1) - Enumerate the functions of basal ganglia (C1)

	- Describe the cause and clinical features Parkinson's disease (C2) - Give the basis of treatment of Parkinson's disease (C1)
9. Thalamus and Hypothalamus	- List the different nuclei of thalamus (C1) - Explain the functions of thalamus (C3) - Explain thalamic syndrome (C2) - List the different nuclei of hypothalamus (C1) - Explain the functions of hypothalamus (C2)
10 Cerebrospinal fluid	- Describe the formation, circulation, absorption and functions of CSF (C2) - Mention the method of collection of a sample of CSF and its indications (C1) - Explain the functions of higher centers of brain (C2)
	Small group teaching on CNS
	Self-directed learning on CNS
	Chapter test
SPECIAL SENSES	
1. Vision	- Describe the structure of human eye with the help of a diagram (C2) - Name the photoreceptors (C1) - Mention the functions of photoreceptors (C1) - Draw the visual pathway (C2) - Explain the defects in field of vision due to lesions of visual pathway at different locations (C2) - Define accommodation reflex (C1) - Describe the mechanism of accommodation (C2) - Describe light reflex with the help of a diagram (C2) - Describe the cause and correction for refractory errors of the eye (C2) - Describe dark and light adaptation (C2) - Explain Color Vision and color defects (C2)
2. Hearing	- Describe the structure and functions of external, middle and inner ear; Auditory Pathway, pitch & intensity discrimination (C2) - Describe the mechanism of hearing (C2) - Describe the types of deafness (C2) - Explain the tests for hearing (C2)
3. Smell and taste	- Name the receptors for taste (C1) - Draw the taste pathway (C2) - Mention the location of olfactory receptors (C1) - Describe the structure of the olfactory mucosa using a diagram (C2) and olfactory pathway (C1)
	Small group teaching on Special senses
	Self-directed learning on Special senses
	Chapter test
	Seminar
ENDOCRINE SYSTEM	
1. General principles of Endocrinology	- Name the major endocrine glands and their secretions (C1) - Mention the chemical nature and transport of hormones (C2)

	• Explain the mechanism of action of hormones (C2) • Describe the regulation of secretion of hormones (C2)
2. Pituitary gland	• Outline the connection between hypothalamus and pituitary. List the anterior pituitary hormones (C1) • Describe the actions of growth hormone (C2) • Describe the regulation of secretion of growth hormone (C2) • Describe the cause and clinical features of gigantism (C2) • Describe the cause and clinical features of acromegaly (C2) • Describe the cause and clinical features of dwarfism (C2) • List the hormones of posterior pituitary (C1) • Describe the actions of posterior pituitary hormones including Oxytocin (C2) • Describe the regulation of secretion of ADH (C2) • Describe diabetes insipidus (C2)
3. Thyroid gland	• Describe the actions of thyroid hormones (C3) • Describe the regulation of secretion of thyroid hormones (C2) • Describe the cause and clinical features of hyperthyroidism (C3) • Describe the cause and clinical features of cretinism (C3) • Describe the cause and clinical features of myxedema (C2)
4. Adrenal cortex	• Explain the actions of glucocorticoids (C2) • Describe the regulation of secretion of glucocorticoids (C2) • Explain the cause and clinical features of Cushing's syndrome (C2) • Describe the actions of mineralocorticoids (C2) • Describe the regulation of aldosterone secretion (C2) • Describe the cause and clinical features of Conn's syndrome (C3) • Describe the cause and clinical features of Addison's disease (C3)
5. Adrenal medulla	• List the hormones of adrenal medulla (C1) • Describe the actions of adrenal medullary hormones (C2) • Mention the clinical features of pheochromocytoma (C1)
6. Parathyroid gland	• Give the normal serum calcium level and list its function • Define calcium homeostasis and list the hormones regulating it • Describe the actions of PTH & regulation of secretion of PTH (C2) • Describe the actions of calcitonin and vitamin D3 in regulating calcium homeostasis (C2) • Describe the effects of parathyroidectomy (C3) • Describe the effects of hyperparathyroidism (C3).
7. Endocrine pancreas	• Describe the actions of insulin (C2) • Describe the regulation of secretion of insulin (C2) • Describe the cause and clinical features of diabetes mellitus (C2) • List the actions of glucagon (C1) • Describe the regulation of secretion of glucagon (C2)
	Small group teaching on endocrine Physiology
	Self-directed learning on endocrine physiology
	Chapter test
REPRODUCTIVE SYSTEM	

1. Male reproductive system	• Explain Sex differentiation and Sex determination (C2) • outline the organization of male reproductive system (C1) • Describe the structure and functions of testes (C2) • Explain the different stages and factors effecting spermatogenesis (C2) • Mention the actions of testosterone (C1) • Describe the regulation of secretion of testosterone (C2) • List the functions of sertoli cells
2. Female reproductive system	• outline the structure of female reproductive system (C1) • Explain the actions of estrogen and progesterone (C2) • Define Menstrual cycle. Give its phases(C1) • Describe the ovarian and uterine endometrial, cervix and vaginal changes during menstrual cycle (C2) • Explain the hormonal control of ovarian functions (C2) • Describe the indicators of ovulation (C2)
3. Pregnancy and lactation	• List the functions of placenta (C1) • List the pregnancy tests(C1) • Explain immunological test of pregnancy • Name the hormone lation (C1) • Describe milk ejection reflex & Parturition reflex(C2)
4. Contraceptive methods	• Mention various contraceptive methods in males & females (C1) • Explain the mechanism of action of various contraceptive methods(C2).
	Small group teaching on Reproductive system
	Self-directed learning on reproductive system
	Chapter test
GASTROINTESTINAL SYSTEM	
1. Saliva	• Give the general structure of G.I tract & innervation. (C1) • Mention the composition of saliva (C1) • Explain the functions of saliva (C2) • Describe the regulation of salivary secretion (C2) • List the abnormalities of salivary secretion (C1)
2. Deglutition	• Define mastication and deglutition (C1) • Name and explain the stages of deglutition (C2) • List the components of deglutition reflex (C1) • List the abnormalities associated with deglutition(C2)
3.. Stomach	• Describe the functions of stomach (C2) • Mention the composition of gastric juice (C1) • Describe functions of gastric juice (C2) • Describe the mechanism of secretion of hydrochloric acid (C2) • Describe the regulation of gastric juice secretion (cephalic, gastric and intestinal phases) (C3) • Describe the gastric motility (C3)
4. Liver and biliary system	• List the functions of liver(C1) • Outline the composition of hepatic bile(C1) • Describe the functions of bile(C2) • Describe the regulation of biliary secretion(C2)

	- Enumerate the functions of gall bladder(C1) - What is enterohepatic circulation?
5. Exocrine portion of Pancreas	- Outline the composition of pancreatic juice (C1) - Describe the functions of pancreatic juice (C2) - Describe the neural and hormonal regulation of pancreatic juice (C2)
6. Small intestine and large intestine	- Explain different types of small intestinal movements and their significance(C2) - List the functions of large intestine(C1); - Explain the defecation reflex(C2) - Explain briefly digestion and absorption of proteins, fats and carbohydrates (C2)
	Small group teaching on GIT
	Self-directed learning on GIT
	Chapter test
	Seminar
PRACTICAL	
	Orientation to practicals
<u>Haematology experiments</u>	Describe the parts of microscope, haemocytometer & pipettes (P2)
	Perform the red blood cell count (P2)
	Perform the leucocyte count (P2)
	Perform the estimation of Haemoglobin (P2)
	Prepare the blood smear and identify different types of leucocytes (P2)
	Determine the relative proportions of WBC s in the prepared smear (P2)
	Measure the PCV and identify different layers in a given blood sample (P2)
	Measure ESR from the given blood sample (P2)
	Perform blood grouping (P2)
	Perform the tests for hemostasis (Bleeding time & clotting time) (P2)
<u>Clinical experiments</u>	Perform the clinical examination of Pulse (P2)
	Determine the arterial blood pressure (P3)
	Determine the Vital Capacity (P3)
	Perform the clinical examination of CVS system (P2)
	Perform the clinical examination of Respiratory System(P2)
	Perform the clinical examination of CNS (P2)
	Demonstrate the ECG & CPR (P1)

Reference Material	Recommended books • Text book of Human Physiology for dental students-Indu Khurana – II edition • Text book of Human Physiology for dental students- A K Jain Text book of Human Physiology for dental students-Sarkar S
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GENERAL HUMAN BIOCHEMISTRY

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Explain the chemistry and metabolism of proteins, carbohydrates, lipids, nucleic acids, porphyrins and their associated disorders with details of digestion and absorption of macronutrients.
CO 2:	Illustrate the role of enzymes in metabolism with emphasis on their applications in clinical practice.
CO 3:	Interpret the variations of biochemical parameters in blood to assess acid base balance, diabetes mellitus, liver and renal functions.
CO 4:	Summarize the principle of nutrition, balanced diet, role of vitamins, minerals and associated disorders Summarize the principle of nutrition, balanced diet, role of vitamins, minerals and associated disorders .

Course content and outcomes:	
Content	Competencies
CLINICAL ENZYMOLOGY , CHEMISTRY, DIGESTION & ABSORPTION, METABOLISM OF PROTEINS, CARBOHYDRATES & LIPIDS	
Introduction and Orientation	• Orientation of the students about the subject.
PROTEIN CHEMISTRY	• Classification of amino acids based on chemical nature), nutritional essentiality, metabolic products (C1, C3) • Classification of proteins based on function, chemical nature (Composition), based on shape (C1, C3) • Describe the four levels of structural organization of proteins- briefly (C1) Define denaturation of proteins (C1) • Explain formation of peptide bond. List two important examples of biologically important peptides. (C1) Explain isoelectric point of proteins (C2) • Classify the plasma proteins based on separation by electrophoresis (C3) • List the functions of Albumin (C1) • Brief description of structure & functions of immunoglobulins (C1)
PROTEIN Digestion & absorption	• Explain the process of digestion of dietary proteins in the GI tract (C2) • Illustrate the process of zymogen activation in the GI tract (C2) • List the transporters involved in the absorption of amino acids (C1)
PROTEIN metabolism	• General metabolism of amino acids - Define Transamination, deamination & Transmethylation with the examples. (C2) • Explain Ammonia metabolism - urea cycle (C2) • List of important compounds derived from- Glycine, phenylalanine, tyrosine & tryptophan (C1) • Identify the biochemical defect and clinical manifestations associated with Phenylketonuria, Alkaptonuria, Homocystinuria & Albinism (C1)
ENZYMOLGY	• Define enzyme, coenzyme, cofactors & active site (C1). • Classify enzyme with examples (C1) Illustrate activation of proenzymes (C2) • Define enzyme specificity with examples - Group, Absolute, Optical specificity (C1, C2) • Explain factors affecting enzyme activity. Give significance of K_m (C2) • Describe the features of competitive inhibition, and its application in medicine, features of non-competitive inhibition (C1, C3)



	• Distinguish between competitive & non-competitive inhibition (C2) • Comprehend the various mechanisms by which enzyme activity is regulated, viz., Allosteric regulation, Covalent modification and regulation by induction/repression (C1, C2) • Isoenzyme - Definition, different forms, clinical importance with respect to LDH & CPK (C1, C2) • Give the diagnostic use of clinically important enzymes- AST, ALT, CPK, ALP, ACP (C2)
CARBOHYDRATE Chemistry and digestion, absorption	• Definition, classification with examples (C2) • Sources of important carbohydrates, Sugar & Derivatives (C1) • Explain the structural & optical isomerism exhibited by sugars. (C2) • Illustrate different types of isomerism (C1) Give suitable examples for epimers, anomers, D&L sugars (C1, C2) • Define mutarotation, Inversion (Invert sugar), Aldose, Ketose isomerism. (C1, C2) • Define Heteropolysaccharides. Give the functions of Mucopolysaccharides with examples and functions. (C1, C2). • Explain the process of digestion of dietary carbohydrates in GI tract and mechanism of absorption of glucose (C2) • List the types of Glucose Transporters. Explain the associated disorders- lactose intolerance (C2)
CARBOHYDRATE metabolism	• Describe Glycolysis under the following headings: Definition, site, subcellular site, Reactions, calculation of energetics & significance (C2) • Sketch the Rapaport Leubering shunt & give its importance, Regulation of glycolysis (C2, C3) • Describe the Citric acid cycle: Other names given to this pathway, site, subcellular site, reactions, energetics, regulatory enzymes. (C2, C3) • Explain why TCA cycle is the final common pathway for metabolism (C2, C3) • Describe gluconeogenesis - Definition, significance Reactions & recognize the importance of Cori's cycle (C1) • Illustrate steps of glycogenesis and glycogenolysis – Significance, Describe glycogen storage disorders (Von Gierke's disease, McArdle's disease only) (C2, C3) • Describe the HMP shunt pathway; Site & subcellular site, Reactions of only the Oxidative phase of HMP



	shunt pathway, Importance of this pathway including G-6-PD deficiency. (C1, C2) • Formation of glucuronic acid (C1, C2) • Explain the mechanism of hormonal regulation of blood sugar (C2) • Describe the signs, symptoms, metabolic derangements, complications seen in diabetes mellitus - a disorder associated with blood glucose regulation (C3) • Interpret the evaluation of glycemic status - HbA1c, GTT (C2,C3)
LIPIDS chemistry & digestion, absorption	• Definition, biological importance, classification of lipids with examples (C1) • List out the functions of phospholipids (C2) • Describe the ring structure of cholesterol- List the biologically important products formed (C1) • Name the Bile salts and their function (C2) • Explain the process of the digestion of lipids, importance of emulsification, formation of micelles, role of bile salts & the mode of absorption of lipids. Action of lipase in the process of digestion (C3) • Sketch the Enterohepatic circulation of bile acids. Explain steatorrhea - the associated disorder & Mention the causes (C1)
LIPIDS metabolism	• Explain the process of oxidation of palmitic acid and its energetics (C2) • Explain the metabolism of Ketone bodies - Formation, Utilization. Record the conditions when ketosis occurs (C1, C2) • Generalize the process of fatty acid synthesis (requirement, 1 step, fatty acid synthase complex) (C2) • Describe the steps involved in the process of lipolysis & lipogenesis in adipose tissue (C1) • Generalize Cholesterol biosynthesis (till mevalonate in detail) (C2) • List any two hypocholesterolemic drugs (C1, C2) • Definition, Classification, composition, & functions of lipoproteins. (C2, C3) • Relate the causes for atherosclerosis & CHD (C1) • Memorize of the important lipid storage disorders and the biochemical defect associated (Niemann Pick disease, Gaucher's disease, Tay Sach's disease only). (C1) • Explain the fluid mosaic model of Membrane structure and function (C2) • Describe the various transport systems available (C2)



BIOLOGICAL OXIDATION, ACID BASE BALANCE, PORPHYRINS, NUCLEIC ACID METABOLISM	
Biological oxidation	• Describe the organization of ETC, sources of electrons (C1) • List the electron carriers in sequence as present in the ETC (C1) • Give the basis for the arrangement of carriers in the ETC (C2) • Name the sites of ATP synthesis & inhibitors and example of one inhibitor at each of the sites (C1) • Define Oxidative phosphorylation & High energy compounds (C1) • List 3 high energy compounds (C1)
PORPHYRINS	• Describe the structure & function of Hemoglobin (C1) • Define Hemoglobinopathies ○ Identify the biochemical abnormality/defect in HbS & β thalassemia (C2) • Explain the synthesis of heme – site, subcellular site and steps involved in the synthesis of heme (1st step and ferrochelatase step only) (C2) • Describe the steps in the degradation of heme (C2) • Explain the transport, uptake, conjugation & secretion of bilirubin; Formation & fate of urobilinogen (C2) • Classify jaundice, Give the Causes for the different types of jaundice (C3) • Interpret the Biochemical tests which aid in the differential diagnosis of jaundice (C2).
LFT & Detoxification	• List the various tests used in the assessment of liver function (C1) • Interpret the important liver function tests which are done routinely (C2) • Describe Plasma protein pattern & serum enzyme levels (C2,C3) • Explain the two phases of detoxification : Mention the 4 mechanisms with 1 example each (C2)
NUCLEIC ACIDS Chemistry	• Give the sources of carbon and nitrogen of purine ring (C1) • Outline the steps of formation of uric acid, Describe the clinical symptoms and the biochemical defect in Gout (C2, C3)
NUCLEIC ACID Metabolism	• Illustrate the process of replication, transcription & translation. List two inhibitors for each of them. Mention the action of antifolate drugs. (C2, C3) • Record the salient features of the genetic code (C2) • Define Mutation and list the effects of mutation (C2) • Describe the missense effect caused by HbS in detail (C2, C3)



CANCER	• Define cancer & name the causative factors (C1) • Give two examples of carcinogenic viruses that promote cancer (C1) • Define oncogenes and predict their role in the causation of cancer. (C2)
ACID BASE BALANCE	• List the blood buffers present in the body & their mode of action • Explain the role of lungs, & the renal mechanisms in maintaining acid base homeostasis (C2, C3) • List the disorders associated with 2 examples each (C2) • Define anion gap and mention its significance in the evaluation of acid base imbalance (C1, C3)
NUTRITION, VITAMINS, MINERALS, HORMONES, STRUCTURAL COMPONENTS	
NUTRITION	• Define Calorimetry – BMR, respiratory quotient specific dynamic action (C1) • Give the energy requirements and its calculation in a normal individual (C2, C3) • Summarize the nutritional aspects of carbohydrates, lipids and proteins (C2) • Define, nitrogen balance, essential amino acids and fatty acids, dietary fibers (C1, C2) • Define balanced diet, State the components of a balanced diet (C2) • Describe protein calorie malnutrition, causes, & biochemical changes seen (C2)
VITAMINS	• Define the term vitamin, pro-vitamin, & antivitamin (C1) • Compare the differences between fat soluble and water soluble vitamins (C2). Explain the chemistry, absorption biochemical functions, deficiency manifestations, dietary sources, & RDA for Vitamins A, D, E & K (C2, C3) • Define Oxygen toxicity, types of free radicals and antioxidants (C1, C2) • Discuss the chemistry, biochemical functions, deficiency manifestations, dietary sources, & RDA for B complex Vitamins & vitamin C (C1, C2)
MINERALS	• Discuss the metabolism of Calcium, phosphorus, Iron, Fluoride under the following headings – Sources, RDA, uptake, functions, disorders. (C1, C2) • State the role of other trace elements (C1)



	• Give a brief introduction to thyroxine synthesis. (C2)
HORMONES Second messengers	• Give an overview of hormones (C1, C2) • Define second messengers & list the various second messengers- cyclic AMP, calcium ions, Inositol triphosphate (C2) • Describe the mechanism of action of steroid hormones. (C2, C3).
RFT	• Name the qualitative tests done for Routine urine analysis (C1) • Mention the estimation of serum urea& creatinine (C1) • Define clearance, Procedure for doing the creatinine & urea clearance test, calculation (C2,C3) Define proteinuria and tests used to diagnose it (C2, C3)
STRUCTURAL COMPONENTS	• Describe the structure & function of the connective tissue proteins Collagen and elastin (C1, C2) • Identify the disorders associated with abnormal collagen structure (C1, C2)
PRACTICAL	
GENERAL REACTIONS of Proteins, amino acids ,NPN substances, carbohydrates	• Perform Colour reactions of amino acids with the protein solution (C3,P2)
	• Perform Reactions of NPN substances (C2,P2)
	• Identify the NPN substances(C3,P3)
	• Perform Reactions of Monosaccharides(Glucose & Fructose) (C2, P2)
	• Perform Reactions of Disaccharides -Lactose & Sucrose)
	• Perform Reactions of Polysaccharides -Starch, dextrin
COLORIMETRY	• Estimate total protein & albumin by colorimetry (C3,P3)
	• Estimate urine creatinine by colorimetry (C3,P3)
	• Estimate blood Glucose by colorimetry (C3, P3)
ANALYSIS OF BIOLOGICAL FLUIDS	• Analysis of Normal Urine (C3,P1)
	• Analysis of abnormal urine (C3,P1)
	• Analysis of saliva (C2)
ELECTROPHORESIS (DEMO)	• Serum protein electrophoresis (C2, P2)
SPOTTERS (CHARTS)	• GTT charts (C2,P1)
	• Serum lipid profile- MI charts(C2,P1)
	• Jaundice – Charts (C2,P1)
	• Thyroid function tests- Charts(C2, P1)
	• Acid Base disorders- spotters (P1)
	• Parathyroid function tests(C2,P1)



Reference Material	Recommended books • Essentials of Biochemistry, U Satyanarayana, 3rd edition • Textbook of Biochemistry for Dental students, DM Vasudevan and Sreekumari, 3rd edition • Lippincott's illustrated Reviews, 5th edition: Biochemistry Reference Books: Essentials of Biochemistry, 2nd edition by Pankaja Naik
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Question Paper

Exam Date & Time: 01-Aug-2024 (02:15 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION
FIRST BDS DEGREE EXAMINATION - JULY/AUGUST 2024
SUBJECT: GENERAL HUMAN PHYSIOLOGY AND BIOCHEMISTRY

Marks: 60

Duration: 165 mins.

SECTION A -GENERAL HUMAN PHYSIOLOGY

Answer all the questions.

Write brief, clear and legible answers.

Illustrate your answers with diagrams and flow charts wherever appropriate

- 1A) Give the normal serum calcium level. Name the hormones that regulate serum calcium level.
Explain the action of any ONE in detail $(\frac{1}{2}+1\frac{1}{2}+3 = 5)$
- 1B) Draw and explain oxygen dissociation curve. Mention the TWO factors that shift the curve to the right and ONE factor to left $(2+2+1 = 5)$
- 2) **Write short notes on:**
- 2A) Explain the cause and symptoms of Erythroblastosis foetalis $(2+2 = 4)$
- 2B) Give the nerve supply to the urinary bladder and explain micturition reflex (4)
- 2C) Enumerate the functions of each lobe of cerebellum. List any Two clinical features of cerebellar lesion. $(2+2 = 4)$
- 2D) Describe the functions of middle ear (4)
- 2E) Define deglutition. Name the stages of deglutition. Explain the second stage of deglutition $(1+1+2 = 4)$

SECTION B- BIOCHEMISTRY

Answer all the questions.

- 3A) Explain factors affecting enzyme activity with suitable graphs (5)
- 3B) Write in detail the site, subcellular site and steps of beta oxidation of palmitic acid. (5)
- 4A) Explain the features of DNA structure with a neat labelled diagram (3)
- 4B) Define BMR and explain the FOUR factors affecting it (3)
- 4C) Write ONE biochemical reaction where niacin is used as coenzyme. Write a note on its deficiency manifestation (3)
- 4D) Explain the mechanism of action of steroid hormones with the help of a diagram. (3)
- 5A) Describe the missense effect caused by mutation in HbS (2)
- 5B) Define high-energy compounds and list TWO examples. (2)
- 5C) Explain the action of hormone sensitive lipase (2)
- 5D) Classify monosaccharides based on the functional group and write ONE example for each class (2)

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DENTAL ANATOMY, EMBRYOLOGY AND ORAL HISTOLOGY

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Describe the development, morphology and histologic structure of the hard and soft tissues of the oral cavity along with the normal physiologic changes associated with them. (C1, C2, C3)
CO 2:	Recognize the eruption pattern, chronology and illustrate the morphology of deciduous and permanent teeth. (C1, C2, C3)
CO 3:	Relate the knowledge of the basic tissues in future clinical practice. (C3)
CO 4:	Reproduce the anatomical morphology of the crown and root of permanent central incisor, lateral incisor, canine, premolars and first and second molars. (P3)

Course content and outcomes:	
Content	Competencies
ORAL HISTOLOGY INCLUDING EMBRYOLOGY	
Introduction and Orientation	1. Orientation of the students about the subject.
Development of face	• Explain the development of branchial arches (C2) • List the derivatives of branchial arches. (C1) • Summarize the clinical implications of development of dental arches (C3) • Describe the formation of face. (C2) • Explain the formation of palate and tongue. (C2) • Explain the development of maxilla and mandible. (C2) • Relate the clinical implications of development of tongue and palate. (C3) • Relate the developmental anomalies related to development of maxilla and mandible. (C3)
Revision	•
Development of teeth	• Illustrate the histology of bud, cap, bell and advanced bell stages of tooth (C2, P2) • Explain types of Dental Lamina (C2) • Explain the histology of Root formation (C2) • Describe the transient structures present in cap stage (C1) • Illustrate the histo-physiological process in tooth development along with clinical considerations(C3) • Explain reciprocal induction that occur in tooth development (C2)
Revision	
Enamel	• List the physical properties and chemical composition of enamel. (C1) • Explain the ultrastructure of enamel (C2) • Illustrate the light microscopic structures in enamel namely incremental lines, cross striations, enamel lamellae, enamel tufts, enamel spindle, gnarled enamel, Hunter Schreger bands (C2, P2) • Explain the hypocalcified and surface structures of enamel (C2) • Illustrate the clinical significance of the hypocalcified structures of enamel (C3) • Explain changes in enamel seen with age (C2) • List the different stages in the life cycle of ameloblasts (C1) • Summarize the process of amelogenesis (Formation of enamel matrix, mineralization and maturation). (C2)



	• Relate stages of life cycle of Ameloblasts with corresponding development of teeth (C3) • Relate the clinical considerations with the structure of enamel (C2)
Revision	•
Dentin	• List the physical and chemical properties of dentin (C1) • Explain the histological structure of dentin (C2) • Distinguish the various types of dentin (C2) • Illustrate dentinogenesis (C2) • List the age changes in dentin (C1) • Explain the theories of dentinal hypersensitivity (C2) • Relate the microscopic structures of dentin with their clinical significance (C2) • Distinguish normal structures of dentin under microscope (C3, P2)
Pulp	• Identify the different types of dental pulp. (C1) • Name the origin of dental pulp (C1) • Describe the formation of dental pulp. (C2) • Explain the anatomy of pulp chamber. (C2) • Illustrate the Histological zones of the dental pulp. (C2, P2) • Summarize the functions of dental pulp. (C2) • Describe different types of pulp stones. (C2) • Relate the clinical considerations of pulp. (C3)
Revision	
Cementum	• List the physical characteristics and chemical composition of cementum (C1) • Describe cementogenesis. (C2) • Compare cellular and acellular cementum. (C2, P2) • List the different types of cementum. (C1) • Illustrate the types of cemento-enamel junctions. (C2, P2) • Describe the functions of cementum (C2) • Explain hypercementosis (C2) • Compare the changes seen in cementum due to various external/internal influences. (C2)
Periodontal ligament	• List the components of periodontal ligament (C1) • Explain the orientation, composition and functions of principal fibers of periodontal ligament (C2, P2) • Describe Sharpey's fibres (C1) • Describe cementicles (C1) • Illustrate the functions of periodontal ligament (C2) • Summarize the age changes of periodontal ligament (C2)



	• Relate the clinical considerations of periodontal ligament with the histology (C3)
Revision	
Alveolar bone	• Describe the histological features of alveolar Bone proper (C2, P2) • Explain the process of bone remodelling(C2) • Relate the microscopic structures bone remodelling of alveolar bone with their clinical significance (C2)
Revision	•
Saliva + Salivary glands	• Classify salivary glands. (C1) • Summarize the physical properties and chemical composition of saliva. (C2) • Describe the functions of saliva. (C2) • Illustrate the structure of serous, Mucous and Mixed salivary gland. (C2, P2) • Describe the ductal system in salivary glands. (C2) • Illustrate the histology of myoepithelial cells.(C2) • List the functions of myoepithelial cells. (C1) • Explain the formation of saliva. (C2) • Summarize the ductal modifications of saliva. (C2) • Relate the clinical considerations of salivary glands. (C3)
Revision	
Temporomandibular joint	• Comprehend the anatomy of TMJ and its relations. (C2) • Explain the histology of Temporomandibular joint. (C2) • Illustrate the biomechanics of the joint at rest and movement. (C2)
Maxillary sinus	• Describe the development of maxillary sinus (C2) • Describe the developmental anomalies of maxillary sinus (C1) • Describe the boundaries of maxillary sinus (C1) • Explain the histology of maxillary sinus (C2) • Describe the functions of maxillary sinus (C1) • Relate the clinical considerations of maxillary sinus with its anatomy and histology (C3)
Revision	
Oral mucosa	• List the types of oral mucosa (C1) • Describe the functions of oral mucosa (C2) • Describe the location, clinical and histological characteristics of keratinized, nonkeratinized and Specialized Oral Mucosa. (C2, P2) • Explain the structure, functions and clinical considerations of basement membrane (C3) • Describe the characteristics of non-keratinocytes (C2)



	• Comprehend the histological variations and characteristics of oral mucosa of gingiva, hard palate, soft palate, buccal mucosa, labial mucosa, tongue, floor of the mouth and the vermillion zone. (C2, P2) • Illustrate the clinical significance of the histological variations of Hard Palate and Gingiva. (C3) • Explain the differences in the histology of the non-keratinized and keratinized epithelium. (C2) • Describe the types of gingival fibers. (C2) • Illustrate the clinical significance of the histological appearance of Vermilion zone. (C3) • Explain the histology of taste bud. (C2) • Illustrate the development and shift of dentogingival junction. (C3) • Comprehend the concept of attachment epithelium and epithelial attachment. (C2) • Explain the various changes in oral mucosa that occur with aging. (C2) • Comprehend the functions of the intra cytoplasmic components of keratinocytes. (C2)
Revision	
Tooth eruption	• List the sequence of eruption of primary and permanent teeth (C1) • Describe the theories of eruption of teeth (C2) • Relate the tooth eruption with their clinical significance (C2)
Shedding of deciduous teeth	• Describe the mechanism of exfoliation of teeth. (C1) • Describe the morphology and function of Odontoclasts (C1) • Relate the mechanism of exfoliation with their clinical significance (C2)
Revision	
Preparation of tissue for histologic study	• Describe the steps in tissue processing (C2) • Explain decalcification (C2)
Waste management and paraffin wax disposal	• Describe the process of safe segregation and disposal of biomedical wastes like chemicals (including formalin, Xylene, Alcohol, caustic acids), reagents (including stains, dyes, mordants, paraffin wax) (C2)
Revision	
DENTAL ANATOMY INCLUDING OCCLUSION	
Nomenclature and Tooth Numbering System, Land marks and Morphology of permanent incisors and canines	• Name the dental formulae of human primary and permanent dentition. (C1) • Illustrate the concept and process of Zigmond's Palmer, FDI and Universal tooth numbering systems. (C2) • Identify a tooth or group of teeth by any tooth numbering system. (C1)



	- Describe the landmarks with examples on primary and permanent teeth. (C2, P2) - List the chronology of primary and permanent dentition(C1)
Revision	
Permanent maxillary central incisors	Describe the morphology of the permanent central incisor. (C2)
Permanent maxillary lateral incisors	- Describe the morphology of the permanent maxillary lateral incisor (C2) - Illustrate the differences between central and lateral incisors. (C2)
Revision	
Permanent Mandibular central and lateral incisors	- Describe the morphology of the permanent mandibular central and lateral incisor (C2) - Illustrate the differences between mandibular central and lateral incisor. (C2)
Revision	
Permanent maxillary canines	Describe the morphology of the permanent Maxillary canine. (C2)
Permanent Mandibular canine	- Describe the morphology of the permanent mandibular canine. (C2) - Illustrate the differences between the permanent maxillary and mandibular canine. (C2)
Revision	
Permanent maxillary 1 st and 2 nd premolars	- Describe the morphology of the maxillary 1st and 2nd premolars. (C2) - Illustrate the morphological differences between the maxillary 1st and 2nd premolar. (C2)
Revision	
Permanent Mandibular 1 st and 2 nd premolars	- Describe the morphology of the mandibular 1st and 2nd premolars. (C2) - Illustrate the morphological differences of the mandibular 1st, two cusp and three cusp type of the mandibular 2nd premolar. (C2)
Revision	
Permanent maxillary 1 st molars	- Describe the morphology of the permanent maxillary 1st molar. (C2) - Illustrate the difference between the Permanent Maxillary 1st molar and the deciduous maxillary second molar (C2)
Permanent Mandibular 1 st molars	Describe the morphology of the permanent mandibular 1st molar. (C2)



	Illustrate the difference between the Permanent Mandibular 1st molar and the deciduous Mandibular second molar (C2)
Revision	
Permanent maxillary 2 nd and 3 rd molars	- Describe the morphology of the permanent maxillary 2nd and 3rd molar. (C2) - Illustrate the differences between the permanent maxillary 1st and 2nd molar. (C2)
Permanent Mandibular 2 nd and 3 rd molars	- Describe the morphology of the permanent mandibular 2nd and 3rd molar. (C2) - Illustrate the differences between the permanent mandibular 1st and 2nd molar. (C2)
Revision	
Occlusion	- Describe the occlusal and proximal contact relation of the permanent dentition. (C2) - Describe the interarch relationships of teeth in deciduous and permanent dentition. (C2) - Explain the spacing seen in the arches of deciduous and mixed dentition. (C2) - Describe the compensating curves of the permanent arches. (C2) - Describe the contact relation of interarch dentition during movement of jaws. (C2)
Deciduous dentition	- Describe the morphology of the deciduous dentition. (C2) - Compare the morphology of the deciduous and permanent incisors, canines and molars. (C2)
Revision	
Differences between permanent and deciduous dentitions	Illustrate the differences in the physical characteristics, morphological features, histological features and sequence of eruption in deciduous and permanent dentition. (C2)
Estimation of age on casts	Estimate the age of the cast based on the teeth present using chronology of tooth eruption (C3)
Revision	
ORAL PHYSIOLOGY	
Calcium and phosphorus metabolism	- List the functions of Calcium and Phosphorous in human body. (C1) - Comprehend the factors influencing the calcium availability in the blood. (C2) - Explain the role of Vitamin D, Calcitonin and Parathormone in regulation of blood calcium levels. (C2)
Mineralization	- List the theories of mineralization. (C1) - Explain the Booster, Seeding and Matrix vesicle theories of Mineralization (C2)



	Comprehend the various theories/mechanisms of mineralization in the formation of enamel, dentin, cementum and alveolar bone. (C2)
Revision	
Mastication	- Recognize the structures involved in mastication. (C1) - Explain the origin, insertion and function of the muscles of mastication. (C2) - Illustrate the phases of mastication and the functions of the structures associated. (C3) - Explain the Jaw Reflexes. (C2)
Deglutition	- Recognize the structures involved in deglutition. (C1) - Explain the theories of deglutition.
Revision	
Physiology of speech	- List the components of speech. (C1) - Describe the muscles of larynx involved in speech. (C1) - Recognize the types of sounds and structures involved. (C1) - Describe the mechanism of speech. (C2)
Physiology of taste	- List the various papillae of tongue and taste sensations. (C1) - Describe the structure of tastebuds. (C1) - Explain the gustatory pathway. (C2)
Revision	
PRACTICAL	
Carving	Know to manipulate carving wax (P3)
	Reproduce the morphology of permanent maxillary and mandibular incisors (P3)
	Reproduce the morphology of permanent maxillary and mandibular canines (P3)
	Reproduce the morphology of permanent maxillary and mandibular premolars (P3)
	Reproduce the morphology of permanent maxillary and mandibular molars (P3)
Basic histology	- Know the basic histology of cells of epithelium and connective tissue (P1) <u>Cells:</u> - Fibroblasts, fibrocytes and endothelial cells - Fat cells, muscle cells, chondroblasts and chondrocytes - Osteoblasts and osteocytes, osteoclasts - Giant cells and macrophages, lymphocytes and plasma cells - Goblet cells Tissues - Pseudostratified ciliated columnar epithelium - Stratified squamous epithelium



Development of teeth • Bud stage • Cap Stage*: Early cap stage#, Late cap stage# • Early bell stage • Advanced Bell stage – Incisor#, Molar # • Root Formation	• Differentiate the various morphological stages of tooth development microscopically (P1)
Enamel • Enamel rods* • Striae of Retzius • Enamel Lamellae • Enamel Spindles, Enamel tufts, DEJ* • Neonatal line • Hunter Schreger bands • Gnarled enamel	• Distinguish normal structures of enamel under microscope (P1)
Dentin • S- Shaped dentinal tubules • Y-Shaped terminal branches of dentinal tubules • Interglobular dentine, • Tome's Granular Layer • Dead Tracts • Contour lines of Owen • Transverse section of dentine	• Distinguish normal structures of dentin under microscope (P1)
Pulp • Normal Pulp, • Free false pulp stones • Attached false pulp stones# • Diffuse calcification#	• Know the normal histology of the pulp (P1) • Distinguish different types of pulp stones under microscope (P1)
Cementum • Acellular Cementum and Cellular Cementum, • Sharpey's Fibres # • Cemento enamel junction# • Cementoenamel Junction Gap*, Overlap*, End to end joint *	• Show the differentiating features between them cellular and acellular cementum under the microscope(P1) • Distinguish between various types of cement-enamel junctions (P1)
Periodontal Ligament • Principal fibres of periodontal ligament • Sharpey's Fibres # • Transeptal Fibres*	• Point out different Periodontal ligament fibres under the microscope (P1)
Salivary glands • Mucous, Serous and Mixed Salivary glands	• Illustrate various types of salivary glands under the microscope (P2)



Oral mucosa • Gingiva, • Buccal mucosa • Hard palate* • Soft Palate* • Vermillion border of lip • Papillae: a) Circumvallate, b) Fungiform, c) Filiform	• Illustrate different types of oral mucosa, and tongue papillae by identifying under the microscope (P1)
#: histology slides discussed at Manipal College of Dental Sciences, Manipal *: histology slides discussed at Manipal College of Dental Sciences, Mangalore Note: elements without annotation are discussed in both the units	
Deciduous dentition	• Identify deciduous teeth (P1) • Distinguish between deciduous and permanent teeth (P1) • Point out the age of the mixed dentition cast based on chronology (P2)
Special stains	• Distinguish different structures seen using special stains (P1) • Van Giesen's stain • Periodic Acid Schiff stain • Toluidine blue stain
Waste management and paraffin wax disposal	Show the storage, manipulation and safe/legal method of biomedical waste management in the laboratory. (P1)

Reference Material	Recommended books 1. Oral Histology: Orban's Oral Histology and Embryology (14th/15th Edition) by G.S. Kumar 2. Dental Anatomy: Wheeler's Dental Anatomy, Physiology and Occlusion (9th/10th Edition) by Major M Ash Jr. 3. Oral Physiology: Applied Oral Physiology (2nd Edition) by Christopher B. Lavelle Reference Books: 1. Development Oral Histology and Embryology (4th/ 5th Editions) by A. R. Ten Cate 2. Ten Cate's Development, Oral Histology and Embryology (6th Edition) by A. Nanci A Color Atlas & Textbook of Oral Anatomy by Berkovitz
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Question Paper

Exam Date & Time: 03-Aug-2024 (02:15 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION
FIRST BDS DEGREE EXAMINATION - JULY/AUGUST 2024
SUBJECT: DENTAL ANATOMY, EMBRYOLOGY AND ORAL HISTOLOGY
(REGULAR BATCH)

Marks: 60

Duration: 165 mins.

Answer ALL questions.

Draw diagrams wherever necessary

1. What are the Morphological stages of tooth development? Describe the transitory structures formed during tooth. Describe in detail the histological changes in the cap stage of tooth development. Add a note on clinical relevance on deviation of normal tooth development
(2+2+4+2 = 10 marks)
2. Describe the morphological features labial, lingual, mesial, distal and occlusal aspects of the Permanent Mandibular First premolar. Add a note on the chronology of the tooth.
(8+2 = 10 marks)

Answer all the questions.

3) **Write short notes on:**

- 3A) List the various hypocalcified structure of enamel (4)
- 3B) Enumerate the various functions of periodontal ligament (4)
- 3C) Describe the histology of serous acini (4)
- 3D) Describe Infantile swallowing (4)
- 3E) Langerhan's cell (4)
- 3F) Enumerate the functions of maxillary sinus (4)
- 3G) Describe in detail histology of primary dentin (4)
- 3H) Define Ridges and grooves with examples (4)
- 3I) Describe the labial aspect of the Permanent Maxillary Canine (4)
- 3J) A 14 years old patient complained of pain concerning 46. On examination brownish discoloration was observed on the occlusal aspect. Which system of dental notation applied, in this case, which is the tooth and various grooves, fossa which would have been affected on the occlusal aspect (4)

-----End-----

SECOND YEAR BDS

GENERAL PATHOLOGY

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Understand and explain the basic concept of etiopathogenesis, morphological changes, clinical features, prognosis and complications involved in the cellular adaptation, cell injury and cell death, inflammation, repair, immunity, hemodynamic disorders and neoplasia with relevant examples. (C2)
CO 2:	Describe the etiopathogenesis, clinical features, gross and microscopic findings, differential diagnosis, lab investigations and complications of common infectious diseases; bone, lymph node, salivary gland and oral cavity lesions. (C1)
CO 3:	Describe the etiopathogenesis, clinical manifestation, pathological features, lab investigations and complications of common medical diseases which includes diabetes mellitus, nutritional disorders, hematological and cardiovascular diseases. (C1)
CO 4:	Illustrate the role of pathology laboratory in the diagnosis and control of the diseases. (C2)
CO 5:	Describe, perform and interpret the basic hematological and clinical pathology tests performed routinely in the medical laboratories. (C2,P1)

Course content and outcomes:

<i>Content</i>	<i>Competencies</i>
Introduction to Pathology	• Describe normal cell structure and functions. (C1) • Define etiology, pathogenesis, morphology (gross, microscopy), prognosis. (C1)
Cell injury	• Define hypertrophy, hyperplasia, atrophy, metaplasia. (C1) • Describe the mechanisms of physiological and pathological adaptations with examples. (C1) • Explain cell injury and cell death. (C2) • List the causes of cell injury with examples. (C1) • Describe morphologic alterations in – reversible & irreversible cell injury. (C1) • Describe cell death, types, necrosis versus apoptosis. (C1) • Define necrosis. Describe the morphology of different patterns of necrosis (coagulative, liquefactive, gangrenous, caseous, fat, fibrinoid) with examples. (C1, C2) • Explain the mechanisms of cell injury. Examples of clinically significant cell injury and necrosis-ischemic and hypoxic injury, ischemia reperfusion injury, chemical toxic injury. (C2) • Define apoptosis and describe the physiological & pathological causes of apoptosis with examples. (C1, C2) • Explain the mechanisms of intracellular accumulation with examples - lipids, proteins, glycogen, hyaline change. (C2) • Define amyloidosis and explain physical and chemical nature of amyloid. (C1, C2) • Describe classification and morphology of various organs in amyloidosis. (C1) • Enumerate the special stains used to demonstrate amyloid. (C1) • Define pathologic calcification and describe • morphology of different types with examples, dystrophic versus metastatic calcification. (C1, C2)
Inflammation	• Define inflammation. (C1) • Explain characteristics of inflammation described by Celsus, i.e. the cardinal signs. (C2) • Describe reaction of blood vessels in acute inflammation- changes in vascular flow, caliber, permeability, response of lymphatic vessels. (C1) • Explain patterns of responses to inflammation, like immediate transient response. (C2) • Describe reaction of leucocytes in acute inflammation including margination, leucocyte adhesion, transmigration, chemotaxis and phagocytosis. (C1) • Enumerate the chemical mediators of inflammation and explain their modes of action- both cell derived and plasma protein derived mediators. (C1)

	• Explain the role of adhesion molecules in inflammation. (C2) • Describe the morphologic patterns of acute inflammation. (C1) • Describe disorders of leukocyte dysfunction. (C1) • Explain the concept of chronic inflammation. (C2) • Describe the function of cells involved in chronic inflammation. (C1) • Enumerate the causes of chronic inflammation. (C1) • Describe the morphologic features of chronic inflammation. (C1) • Define granulomatous inflammation and explain the pathogenesis of granuloma formation. (C1, C2) • Enumerate the causes of granulomas. (C1) • Describe different types of granulomas - immune and foreign body type. (C1) • Explain the systemic effects of inflammation and sequelae. (C2)
Repair	• Define labile tissues, quiescent tissues and permanent tissues, with examples for each. (C1, C2) • Define stem cells, embryonic stem cells, adult (somatic) stem cells. (C1) • Describe healing by scar formation and fibrosis. (C1) • Describe cutaneous wound healing -healing by first intention, healing by second intention and wound strength. (C1) • Describe fracture healing. (C1) • Describe local and systemic factors that influence wound healing. (C1) • Describe pathological aspects, complications of repair and fracture healing. (C1)
Immunity	• Describe innate and adaptive immunity. (C1) • Describe cells of immune system. (C1) • Explain role of MHC in adaptive immunity. (C2) • Describe mechanisms of types of hypersensitivity reactions with examples. (C1, C2) • Explain the concept of autoimmune diseases with examples. (C2) • Describe the etiology, pathogenesis and antibody spectrum of systemic lupus erythematosus (SLE). (C1) • Describe the morphology and clinical features of SLE. (C1) • Describe structure and life cycle of HIV. (C1) • Explain pathogenesis and mechanism of immunodeficiency. (C2) • Enumerate AIDS defining opportunistic infections and neoplasms. (C1)
Infectious disease	• Describe the epidemiology, causative organism and transmission of TB. (C1) • Explain tuberculin test. (C2) • Explain the pathogenesis of TB. (C2) • Describe the natural history and clinical features of TB. (C1) • Describe the morphology of organ(s) in different types of

	tuberculosis– Primary TB, Ghon focus, Ghon complex, Progressive primary TB, Secondary TB, Miliary TB, Isolated organ TB, intestinal TB. (C1) • Describe the methods of diagnosis of TB. (C1) • Describe the incidence, mode of transmission and causative organism of leprosy. (C1) • Describe pathogenesis, classification and stains used in leprosy. (C1) • Describe the clinical features and morphology of lesions in individual types of leprosy. (C1) • Explain differences between TT & LL leprosy. (C2) • Describe briefly the causative organism, morphology of lesions, stains and pathogenesis of syphilis. (C1) • Describe briefly the causative organism, morphology lesions, diagnostic criteria and pathogenesis of typhoid. (C1) • Describe causative organisms, types, symptoms, morphology, pathogenesis and diagnostic criteria of actinomycosis. (C1) • Describe causative organism, pathogenesis, morphology, diagnostic criteria and opportunistic infections of HIV. (C1) • Describe causative organisms, pathogenesis, morphology and diagnostic criteria of viral hepatitis. (C1)
Hemodynamic disorders	• Define edema and describe factors influencing fluid transit across capillary walls. (C1) • List differences between transudate and exudate. (C1) • Describe the pathophysiological categories of edema and mechanisms. (C1) • Define hyperemia and congestion. (C1) • Enumerate differences between hyperemia and chronic venous congestion (CVC). (C1) • Describe mechanism and morphology of liver, spleen and lung in CVC. (C1) • Explain sequence of events in hemostasis at the site of vascular injury, role of endothelium in injury, antithrombotic properties, prothrombotic properties. (C2) • Explain role of platelets in injury including platelet – endothelial cell interactions. (C2) • Describe coagulation cascade: Clotting and Fibrinolytic pathway. (C1) • Explain Virchow's triad, Antiphospholipid syndrome briefly. (C2) • Describe morphology of thrombus. (C1) • Describe differences between arterial and venous thrombus. (C1) • List and explain the fate of a thrombus. (C1, C2) • Describe clinical consequences of venous, arterial and cardiac thrombi. (C1) • Describe differences between ante-mortem and postmortem clot. (C1) • Define embolism. (C1) • Explain pathophysiology and examples of pulmonary, systemic, fat

	and marrow, air and amniotic fluid embolism. (C2) • Describe Caisson disease. (C1) • Define infarction. (C1) • Describe the types of infarcts - red and white infarcts with examples, septic and bland infarcts with examples. (C1) • Describe the characteristics of infarctions- ischemic coagulative necrosis. (C1) • Explain factors influencing development of an infarct. (C2) • Define shock and describe causes of shock. (C1) • Explain pathogenesis of septic shock. (C2) • Describe stages of shock, with morphology of end organs and clinical consequences. (C1)
Nutritional disorders	• Describe causes, Pathology and clinical features of Vitamin A deficiency. (C1) • Describe causes, Pathology and clinical features of Vitamin B deficiency. (C1) • Describe causes, Pathology and clinical features of Vitamin C deficiency. (C1) • Describe causes, Pathology and clinical features of Vitamin D deficiency. (C1)
Hypertension	• Definition, classification, pathophysiology and effects in various organs. (C1)
Diabetes mellitus	• Define and classify diabetes mellitus (DM). (C1, C3) • Describe the diagnosis of DM. (C1) • Describe pathogenesis of each subtype. (C1) • Describe the pathogenesis of complications. (C1) • Describe the morphology of DM and its complications. (C1) • Describe the clinical features of DM. (C1)
Neoplasia	• Define neoplasia. (C1) • Explain nomenclature of tumors. (C2) • Describe differences between benign and malignant tumors. (C1) • Explain molecular basis of cancer including Normal cell cycle, self-sufficiency in growth – protooncogenes, oncogenes, RAS, MYC, oncoproteins, tumor suppressor genes, RB, p53, APC, Microsatellite instability, DNA repair defects. (C2) • Describe invasion and metastasis, metastatic cascade and pathways of spread. (C1) • Explain carcinogenesis – chemical, radiation, microbial. (C2) • Describe precancerous lesions. (C1) • Describe features of a few common benign and malignant tumors. (C1) • Describe the laboratory diagnosis of cancer. (C1)
Hematology- I (RBC disorders)	• Describe normal maturation of RBC precursors in bone marrow and normal morphology of RBCs in peripheral blood. (C1) • Define and classify (Morphologic & Etiologic) Anemias. (C1, C3)

	• Describe the mechanism of normal Iron metabolism. (C1) • Describe the etiology, clinical features and laboratory diagnosis of iron deficiency anemia. (C1) • Describe the mechanism of absorption and metabolism of Vit. B12 and folic acid. (C1) • Describe causes, clinical features, lab diagnosis of • megaloblastic anemia. (C1)
Hematology- II (WBC disorders)	• Describe WHO classification of acute and chronic, myeloid and lymphoid leukemia. (C1) • Describe morphology, clinical features and laboratory diagnosis of AML, ALL, CML and CLL. • (C1)
Hematology- III (Bleeding disorders)	• Describe etiopathogenesis, clinical Features and lab diagnosis of ITP. (C1) • Describe clinical Features and lab diagnosis of Hemophilia and vWD. (C1) • Describe etiopathogenesis, clinical features and lab • diagnosis of DIC. (C1)
Lymph nodes	• Describe WHO classification of Lymphoid neoplasms. (C1) • Describe clinical features & classification of Hodgkin Lymphoma (HL), Reed Sternberg cell and its variants. (C1) • Describe morphology of Nodular sclerosis and Mixed cellularity HL. (C1) • List the current classification of non- Hodgkin lymphoma (NHL). (C1) • Explain clinical staging of HL and NHL. (C2) • Describe morphology, clinical features and immunophenotype of Burkitt Lymphoma. (C1)
Oral cavity, Skin	• List and Describe the premalignant lesions of oral cavity - leukoplakia, erythroplakia, submucosal fibrosis. (C1) • List and describe the lesions of oral cavity - lichen planus, stomatitis, dentigerous cyst. (C1) • Enumerate the etiological factors and discuss the pathogenesis of Squamous cell carcinoma (SCC). (C1) • Describe the favored location, morphology & prognosis of SCC of the oral cavity. (C1) • Describe the morphology and clinical features of • ameloblastoma. (C1) • Basal cell carcinoma
Salivary gland	• Describe the clinical features and morphology of sialadenitis. (C1) • List the WHO Classification of tumors of salivary gland. (C1) • Describe the clinical features and morphology of pleomorphic adenoma, Warthin tumor, mucoepidermoid carcinoma, adenoid

	- cystic - carcinoma. (C1)
Bone	- Define and classify osteomyelitis. (C1, C3) - Describe the etiopathogenesis, morphology, clinical features, complications of pyogenic osteomyelitis. (C1) - Define and describe the causes and clinical manifestations of rickets, osteomalacia and osteoporosis. (C1) - Describe the Morphology, Radiological features, and Clinical course of Fibrous dysplasia, Aneurysmal bone cyst. (C1) - Classify bone tumors. (C3) - Describe the pathogenesis, morphology, radiological features, clinical course and prognosis of osteosarcoma, osteblastoma, Ewing's sarcoma. (C1)
Cardiovascular system	- List the causes of cardiac failure and its clinical features. (C1) - Classify Congenital heart disease – cyanotic vs acyanotic with examples. (C1, C3) - Describe the features in brief of ASD, VSD, PDA. (C1) - Describe Tetralogy of Fallot with reference to the four cardinal features, morphology and clinical features. (C1) - Define Ischemic heart disease (IHD) and discuss the associated clinical syndromes – Myocardial Infarction (MI), Angina pectoris, Chronic ischemic heart disease, Sudden cardiac death. (C1) - Define MI and describe the pathogenesis, myocardial response, differentiate transmural vs subendocardial infarction. (C1, C2) - Describe the Morphology, Clinical features, - Laboratory diagnosis and Complications of MI. (C1) - Define Infective Endocarditis (IE). (C1) - Discuss the types, Etiopathogenesis, Morphology, Clinical features, Lab diagnosis and Complications of IE. (C1) - Define atherosclerosis, arteriosclerosis, and arteriolosclerosis. (C1) - Explain the constitutional and modifiable risk factors, additional risk factors for Atherosclerosis. (C2) - Describe the pathogenesis, gross and microscopy - of atherosclerosis. (C1)
Environmental sciences	Show the disposal of human tissues and reagents used (P1)
Histopathology	Identify and describe the stages of tissue processing and staining. (C1,P1)
Cell injury	- Identify and describe the following: (C1, P1) - Gross specimens: Fatty liver, Kidney amyloidosis - Slides: Fatty liver
Inflammation	- Identify and describe the following: (C1, P1) - Gross: Acute Appendicitis, Lobar pneumonia, Madura foot, Ghon lesion, Fibrocavitary tuberculosis, Tuberculosis: Intestine and Lymph nodes, Miliary tuberculosis - Slides: Granulation tissue, Acute Appendicitis, Lobar pneumonia, Actinomycosis, Rhinosporidiosis,

	• Tuberculosis: Lung and Lymph nodes
Hemodynamic disorders	• Identify and describe the following: (C1, P1) • Specimens: Chronic venous congestion Liver, Infarction spleen, Dry gangrene hand, Dry gangrene foot • Slides: Chronic venous congestion liver and lung
Neoplasia	• Identify and describe the following: (C2, P1) • Specimens: Follicular Adenoma, Squamous cell carcinoma foot, Squamous papilloma, Basal cell carcinoma, Melanoma with secondaries in lymph node, Melanoma secondaries in rib, Malignant Melanoma • Slides: Follicular Adenoma, Squamous cell carcinoma, Squamous papilloma, Basal cell carcinoma, Malignant Melanoma, Metastatic carcinoma in lymph nodes
Urine	• Perform biochemical tests and dipstick tests for the identification of following components in urine and interpret the results: Sugar, Albumin, Ketone bodies, Blood, Bile salts, Bile pigments. (P1,P5)
Hematology	• Observe and interpret the following tests (P1, P4): Haemoglobin Estimation (Sahli's method), Total cell count, Packed cell volume, Erythrocyte sedimentation rate, Peripheral smear staining • Perform differential leukocyte counts on peripheral smear. (P5)
Coagulation	• Observe and interpret the following tests (P1, P4): Bleeding Time, Clotting Time • Perform blood grouping test and interpret results. • (P4,P5)
Clinical pathology and Instruments	• Identify the following instruments (P1): Sahli's hemoglobinometer, RBC and WBC pipette, Westergren tube instrument, Bone marrow aspiration needle, Vacutainers, Urine dipstick instrument.
Oral cavity	• Identify and describe the microscopy of Ameloblastoma (C1,P1)
Salivary gland	• Identify and describe the microscopy of pleomorphic adenoma. (C1,P1)
Bone	• Identify and describe the following: (C1 P1) • Specimens: Osteosarcoma, • Osteoclastoma • Slides: Osteoclastoma, Osteosarcoma and Fibrosarcoma

Reference Material	1. Robbins Basic pathology.9th edition. Vinay Kumar, Abul K. Abbas, John C Aster 2. Robbins pathologic basis of disease 3. Anderson's pathology.10TH edition. Ivan Damjanov, James Linder Wintrobe's Clinical hematology.13th edition. John.P.Greer, A. Arber, Bertil Glader, Alan. F. List.
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GENERAL MICROBIOLOGY

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Describe the etiological agents of infectious diseases including their morphology and pathogenesis of infectious diseases (C1, C2)
CO 2:	Describe the methods of acquisition of drug resistance and its detection.(C1, C2,C3)
CO 3:	Describe the role of immunology in health and disease. (C2)
CO 4:	Apply principles of asepsis and infection control. (C3)
CO 5:	Illustrate the role of Microbiology laboratory in diagnosis, prevention and control of Infectious diseases (C3)

Course content and outcomes:	
Content	Competencies
GENERAL MICROBIOLOGY	
Introduction to Medical Microbiology & History	- Classify Bacteria based on Gram's reaction and morphology (C1) - State the scope and significance of microorganisms (C2) - List the contributions to microbiology by the following scientists: (C1) - Anton Van Leeuwenhoek - Louis Pasteur - Robert Koch and Koch's postulates - Alexander Fleming, Joseph Lister, Edward Jenner (in Brief)
Morphology and physiology of bacterial cell	- Explain the bacterial cell structure with the help of a labelled diagram (C2) - Explain the structure and functions of cell wall, envelope, capsule, bacterial flagella, pili, and spore with examples, Intracellular storage granules, nuclear material (C2)
Sterilization and Disinfection (with special reference to dental equipment) Physical methods	- Define sterilization (C1) - Classify sterilization methods (C2) - List the methods of sterilization by dry heat and moist heat (C1) - Describe the hot air oven and autoclave under the following headings (C1) - Working principle - Holding time and temperature - Articles sterilized - List the controls of sterilization with examples (C1) - List the methods of sterilization by filtration & radiation (C1) - List the chemicals used for sterilization & their uses - Explain the significance of aseptic practices in dentistry and the role of CSSD (C3) - Define the term disinfectants (C1) - Classify disinfectants based on their mode of action with examples (C3)
Chemical methods	
Anaerobic culture methods	- Define the term anaerobe (C1) - Differences between aerobes & anaerobes. (C3) - Describe the principles & methods used for creating anaerobiosis like exclusion of oxygen, displacement of oxygen with other gases, absorption of oxygen with chemicals or biological means and reduction of oxygen (C1) - Collection & transport of samples for diagnosis of anaerobic infection (C1, P1) - List the Culture media used for growing anaerobes (C1)
Bacterial growth & nutrition	Classify bacteria based morphology, temperature, oxygen requirement, nutritional requirement with examples (C2)

	• Explain bacterial growth curve based on physiological and functional metabolism (C2)
Bacterial Genetics And Drug Resistance	• Describe the nature of genetic elements in bacteria (C1) • Explain the mechanism of transfer of genetic elements (transformation, transposition transduction and conjugation) in bacterial cells with emphasis on their significance associated with drug resistance. (C3)
Infection	• Explain the sources and modes of transmission of infectious diseases with examples (C2) • List the types of infections (C1) • Explain the significance of various virulence mechanisms of bacteria (C2) • List the differences between bacterial exotoxins and endotoxins (C3)
IMMUNOLOGY	
Structure and functions of immune system	• List the primary and secondary lymphoid organs (C1) • Explain the functions of the following cells of the immune system: (C2) a. Phagocytes b. Natural killer cells c. Eosinophils d. T lymphocytes e. B lymphocytes • Enumerate the important cytokines with their functions (C1)
Immunity	• Define immunity (C1) • Classify immunity with examples (C2) • Describe the features and components of innate and acquired immunity (C2)
Antigens & Antibodies	• Define antigens, haptens and immunoglobulins (C1) • Explain the role of adjuvants (C2) • Explain the properties and biological functions of different classes of immunoglobulins (C2)
Complement	• Explain the classical and alternative pathways of complement activation (C2)
Immune response: Humoral & Cell mediated immune response	• Explain the mechanism of humoral immune response (C2) • Explain the mechanism of cell mediated immune response (C2)
Antigen-Antibody reactions Immunohematology	• Classify antigen antibody reactions (C1) • Define and classify precipitation reactions with examples (C1) • Define and classify agglutination reactions with examples (C1) • Explain complement fixation test, Immunofluorescence, ELISA (C2)
Hypersensitivity	• Define hypersensitivity (C1) • Classify hypersensitivity reactions based on mechanism of pathogenesis (Coomb's and Gel classification) (C3) • Explain the mechanisms involved in the hypersensitivity reactions with examples for each type (C2)
Autoimmunity	• Explain the mechanism of autoimmune diseases with examples (C2)

Immunodeficiency diseases	• Classify immunodeficiency diseases. (C3) • List out the common immunodeficiency diseases (C1) • Explain immunodeficiency associated with common diseases (C2)
Transplantation immunity & malignancy	• Explain the types of grafts and their processes involved in allograft rejection (C2) • Describe the tumour associated antigens with their significance (C1) • Explain immunological surveillance (C2)
SYSTEMATIC BACTERIOLOGY	
Staphylococcus	• List the general properties and classification of Genus Staphylococcus. (C1) • Describe the pathogenicity, pathogenesis, clinical symptoms of infections caused by <i>S. aureus</i> (C1) • Describe the toxin mediated diseases caused by <i>S. aureus</i> (C1) • Describe the Lab. Diagnosis of <i>S. aureus</i> infections (C1) • Describe the prevention, drug resistance and treatment of <i>S. aureus</i> infections. (C1) • Describe the properties and clinical significance of Coagulase negative Staphylococci and MRSA (C1)
Streptococci including cariogenic streptococci & Oral microbial flora	• Describe the general properties and classification of Genus Streptococcus (C1) • List the general properties of Group A Streptococcus, Group B Streptococcus, Viridans Streptococci, <i>S. pneumoniae</i> and Enterococci (C1) • Describe the pathogenesis, clinical symptoms of infections caused by various streptococci and post streptococcal diseases. (C1) • Describe the Lab. Diagnosis of infections caused by various streptococci (C1) • Describe the prevention and treatment of streptococcal infections. (C1) • Describe the role of Viridans group of Streptococcus in dental caries (C1) • Pathogenesis of dental caries (C1) • Describe the various organisms present in the oral cavity as normal flora and their significances (C1, P1)
Neisseria (<i>N.gonorrhoeae</i> & <i>N.meningitidis</i>)	• Describe the general properties and Classification of Genus Neisseria (C1) • Understand pathogenesis and laboratory diagnosis of <i>N.meningitidis</i> and <i>N. gonorrhoeae</i> (C2) • Understand the epidemiology, aetiology, pathogenesis, lab diagnosis and treatment of Gonorrhoea and Meningitis. (C1) • Prevention and control of Gonorrhoea and Meningitis (C1)
<i>Corynebacterium diphtheriae</i>	• Describe the epidemiology, aetiology and pathogenesis of diphtheria (C1) • Properties and classification of Corynebacterium, diphtheria toxin and its role in pathogenesis (C1) (P1) • Lab diagnosis of diphtheria, Prevention and treatment of diphtheria (C1)

	Brief note on diphtheroids (C1)
<i>Clostridium perfringens</i>	- Enumerate the different species of Clostridia and briefly explain the morphological differences between the different species of Clostridia (Shape & location of spores), classification of medically important Clostridia (C1) - Describe the pathogenesis, clinical features and Laboratory diagnosis of gas gangrene. (C1) (P1)
<i>Clostridium tetani</i>	- Describe the pathogenesis, clinical features and Laboratory diagnosis of tetanus (C1). - Describe the prophylaxis of tetanus (Pre exposure, post exposure) (C1, P1)
Clostridial food poisoning	- Enumerate the different species of Clostridia causing food poisoning. (C1) - Explain the food poisoning caused by <i>C. perfringens</i> type A, pathogenesis, clinical features, Lab diagnosis (C1) - Briefly explain the pathogenesis, Lab diagnosis, treatment and prophylaxis of Botulism caused by <i>C. botulinum</i> (C1)
Nonsporing anaerobes	- Describe the Classification, and properties of nonsporing anaerobes (C1) - Explain Pathogenesis, clinical findings, Lab diagnosis (C1, P1) - Explain anaerobic culture methods (C2, P2) - Briefly explain treatment and prevention of infections caused by nonsporing anaerobes (C2)
Mycobacteria	- Describe the aetiology, transmission, pathogenesis and clinical manifestations of pulmonary and extra pulmonary tuberculosis (C1) - Describe the laboratory diagnosis of pulmonary and extra pulmonary Tuberculosis (C1, P1) - Explain Prophylaxis of tuberculosis including BCG vaccine (C2)
Atypical Mycobacteria and <i>Mycobacterium leprae</i>	- Describe the Classification, properties, pathogenesis and laboratory diagnosis of Atypical Mycobacteria (C1) - Classify leprosy based on immune status of the host (C3) - Explain the pathogenesis, laboratory diagnosis, treatment, prophylaxis and epidemiology of leprosy (C2)
Spirochetes-Syphilis and Borrelia (Vincent's angina)	- Explain the Classification and general characteristics of Spirochetes. Pathogenesis, clinical stages, clinical features syphilis (C1) - Describe the Laboratory diagnosis of syphilis (C1, P1) - Briefly explain treatment and prevention of syphilis (C1, P1) - Explain the predisposing factors, pathogenesis, clinical findings and laboratory diagnosis of Vincent's angina (C1)
Actinomyces	- Describe the aetiology, pathogenesis and clinical features of Actinomycosis and Nocardia (C1) - Explain the laboratory diagnosis and treatment (C1)
PARASITOLOGY	
Introduction to Parasitology. Classification and general properties of Protozoa	Give a brief introduction to Parasitology. Classify parasites and explain the general properties of Protozoa (C1)

<i>Entamoeba histolytica</i> and oral protozoan parasites	- Describe the morphology, life cycle, pathogenesis (C1) - Outline the intestinal and gastrointestinal manifestations caused by <i>Entamoeba histolytica</i> (C2) - Briefly explain laboratory diagnosis, treatment and prophylaxis of <i>Entamoeba histolytica</i> - Oral protozoan parasites (C1)
Malaria	- List the various species of Plasmodium (C1) Differentiate between <i>P.vivax</i> and <i>P.falciparum</i> (C1). - Describe life cycle, pathogenesis, laboratory diagnosis, clinical features, complications, treatment and prevention of <i>Plasmodium falciparum</i> and <i>P. vivax</i> (C1)
General properties and classification of nematodes <i>Ascaris</i>	Describe the Classification and general characteristics of Nematodes, Describe morphology, life cycle, pathogenesis, clinical features, laboratory diagnosis, treatment and prophylaxis of <i>Ascaris lumbricoides</i> (C1)
Ancylostoma	- Describe of morphology, Life Cycle, Pathogenesis, Clinical Features, Laboratory Diagnosis of <i>Ancylostoma duodenale</i> (C1) - Briefly about treatment and Prophylaxis of <i>Ancylostoma duodenale</i> (C1)
Filariasis	- Describe the morphology, Life Cycle, Pathogenesis, Clinical Features, Laboratory Diagnosis of <i>Wuchereria bancrofti</i> (C2) - Briefly about treatment and Prophylaxis of <i>Wuchereria bancrofti</i> (C1)
MYCOLOGY	
Introduction to Mycology	- Compare and differentiate fungi and bacteria and classify fungal infections (C3) - Classification of fungi based on Morphology & Sporulation (C3) - Describe clinical and Systematic infection, Reproduction and Sporulation - Different types of spores; Sexual & Asexual, Lab diagnosis of fungal infection: Specimen Collection, Direct Microscopy, Culture and Detection of antigen (C3) - Explain on the General Characters and Lab diagnosis of fungi (C3)
Candidiasis and oral lesions of systemic mycoses	Describe the epidemiology, aetiology, clinical features, pathogenesis and lab diagnosis of Candidiasis and oral lesions of systemic mycoses (C1)
VIROLOGY	
Introduction to virology	- Classify viruses based on their genome and morphological characteristics. (C4) - Describe the steps involved in viral replication. (C1) - Explain the laboratory diagnosis of viruses under the following headings. (C2) a. Microscopy with special reference to staining and detection of different inclusion bodies b. Detection of viral antigens c. Cultivation of viruses and detection of viral growth d. Serology

	Describe the treatment and prophylaxis of viral infection with special reference to antiviral agents, interferon, viral vaccines (C1)
Bacteriophage	- Describe the structure of bacteriophage, illustrate with a diagram (C1) (C2) - Explain the life cycle of bacteriophage (C2) - Explain the uses and clinical significance of bacteriophage (C2)
Viruses causing oral lesions	- Explain the general properties herpes viruses and illustrate with a diagram of Herpes virus. (C2) - Classify human herpes viruses. (C4) - Explain the transmission, pathogenesis, clinical features (with special reference to oral lesions) and laboratory diagnosis of HSV-1, VZV and EBV infections. (C2) - Describe the transmission, pathogenesis, clinical features (with special reference to oral lesions), laboratory diagnosis and prophylaxis of: (C1) - a Mumps - b Measles - c Rubella
Hepatitis viruses	- List Hepatitis viruses (C1) - Describe the structure of Hepatitis B virus and illustrate with a diagram. (C1) (C2) - Explain the transmission, pathogenesis, clinical features, laboratory diagnosis (application of serological markers in diagnosis) and prophylaxis of Hepatitis B virus infections. (C2) (C3) - Describe the transmission, clinical features, laboratory diagnosis and prophylaxis of infections by following viruses:(C1) - HAV - HCV - HDV - HEV
Human Immunodeficiency Virus	- Illustrate the structure of the HIV with a diagram. (C2) - Explain the transmission, pathogenesis, clinical features, laboratory diagnosis and prophylaxis of Human Immunodeficiency virus infections. (C1) - List the opportunistic infections in AIDS with special reference to AIDS defining diseases. (C1)
PRACTICAL	
Microscopy	- Enumerate the different types of microscopes and the use in microbiology (C1, P1) - Demonstrate the use of compound microscope (C2, P2)
Staining methods	- Enumerate the different types of staining methods (C1, P1) - Uses of staining methods (C2,P2)
Culture media and culture techniques	- Identify the types of culture media with examples and state their uses (C1, P1) - Display different culture media & methods used in the microbiology laboratory (C2, P2) - Describe their applications (C1, P1)

	- Following culture media with & without growth is shown to the students: - Display of the media like: Nutrient agar, Blood agar, Chocolate agar, Tellurite blood agar, Mac Conkey agar, Lowenstein Jensen medium, Loeffler's serum slopes RCM, BHI, Sabouraud's Dextrose agar (P2)
Selection, collection, transport and processing of specimens	- Describe the methods of specimen collection for microbiological processing and transport of the collected specimen & how they are processed in the laboratory (C1, P1) - Display of Cotton swab, Inoculation loop & Gas Pak system (P2)
Identification of bacteria	- Enumerate the commonly used biochemical reactions in the identification of bacteria (C1, P1) - Display the following biochemical tests (C2, P2) a. Catalase test b. Oxidase test c. Indole test d. H₂S production e. Urease test f. Citrate test g. Sugar fermentation reactions h. Chromogenic bacteria on Nutrient agar plate
Antibiotic sensitivity methods (AST)	- Explain the disc diffusion method of Kirby Bauer with display of the disc diffusion method (C2, P2) - Differentiate between antibiotic susceptibility and resistance (C2, P2) - State the significance of laboratory control of antimicrobial therapy (C2, P2)
Gram's staining	- Explain the procedure of gram staining (C2, P2) - Observe & stain the given smear by Gram staining (P3) - Differentiate between Gram positive and Gram negative bacteria (P1)
Revision of Gram staining	- Recapitulate the procedure of Gram staining. (C1, P1) - Repetition of Gram staining technique on the given smear (P3) - Differentiation between Gram positive and Gram negative bacteria (P1)
Albert's staining	- Explain the procedure of Albert's staining (C2, P2) - Stain the given smear by Albert's staining and note the characteristics of the bacilli (P2)
Revision of Albert's staining	- Recapitulate the procedure of Albert's staining. (C1, P1) - Repetition of Albert's staining technique on the given smear (P3) - Observation of the characteristic of the bacilli (P1)
Antigen - Antibody Reactions In The Laboratory	Explain the principle of the following serological tests with their applications and examples (C2, P2) Agglutination (Widal test), precipitation (RPR), ELISA.
Revision of all exercises	- Recapitulation of Grams staining, Albert's staining procedures (C1, P1) - Recapitulation of characteristics of different culture media, & other spotters shown in earlier classes (C1,P1)

Bacteriology Acid Fast Bacilli (AFB) staining	• Explain the procedure of Acid fast staining (C2, P2) • List different types of Acid Fast staining methods (C1) • Observe & stain the given smear by Gabbet's method (P3) • Differentiate between Acid fast bacilli & non-acid pus cells (P1)
AFB staining revision	• Recapitulate the procedure of AFB staining. (C1, P1) • Repetition of AFB staining technique on the given smear (P3) • Differentiation between AFB and pus cells (P1)
Applied exercise /case	• A case of syphilis is described along with the relevant investigations. Demonstrate the correct diagnosis and answer the questions given at the end related to the case (C1, P1) • A case of dental caries is described along with the relevant investigation. Demonstrate the correct diagnosis and answer the questions given at the end related to the case (C1, P1) • A case of diphtheria is described along with the relevant investigations. Demonstrate the correct diagnosis and answer the questions given at the end related to the case (C1, P1) • A case of Actinomycosis is described along with the relevant investigations. Demonstrate the correct diagnosis and answer the questions given at the end related to the case (C1, P1) • A case of Vincent's angina is described along with the relevant investigations. Demonstrate the correct diagnosis and answer the questions given at the end related to the case (C1, P1) • Plaque demonstration; Students will be collecting the dental plaque with the help of sterile swab. Prepare smear from the plaque, staining by Grams method & observe for different types of bacteria present (C2, P2)
Parasitology Spotter & applied exercise	• A case of Malaria is described along with the relevant investigations, Demonstrate the correct diagnosis and answer the questions given at the end related to the case (C1, P1) • Spotter of Microfilaria: Identify the preserved specimen with two points and mention its clinical significance (C1, P1) • Spotter of <i>Ascaris lumbricoides</i>: Identify the preserved specimen with two points and mention its clinical significance (C1, P1) • Spotter of <i>Ancylostoma duodenale</i>: Identify the preserved specimen with two points and mention its clinical significance (C1, P1)
Mycology Spotter & applied exercise	• Spotter slide of Candida: Identify the slide with two points and mention its clinical significance (C1, P1) • An oral case of Candidiasis is described along with the relevant investigations. Demonstrate the correct diagnosis and answer the questions given at the end related to the case (C1, P1)
Virology applied exercise	• A case of Herpes labialis is described along with the relevant investigations. Demonstrate the correct diagnosis and answer the questions given at the end related to the case (C1, P1) • A case of Hepatitis B is described along with the relevant investigations. Demonstrate the correct diagnosis and answer the questions given at the end related to the case (C1, P1)

	• A case of HIV/AIDS is described along with the relevant investigations. Demonstrate the correct diagnosis and answer the questions given at the end related to the case (C1, P1)
Revision of all practical exercises	

Reference Material	1. Text book of Microbiology - R. Ananthanarayan and C.K. Jayaram Panikar 2. Medical Microbiology - David Greenwood <i>et al</i> 3. Review of medical microbiology and immunology WarrenLevinson 4. Medical parasitology - C.K. Jayaram Panikar 5. Textbook of Microbiology for Dental Students - C.P.Baveja Textbook of Microbiology for Dental Students - D.R.Arora & Hima Arora
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Question Paper

Exam Date & Time: 05-Jan-2024 (02:15 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION
SECOND BDS DEGREE EXAMINATION - JANUARY 2024
SUBJECT: GENERAL PATHOLOGY AND MICROBIOLOGY
(REGULAR BATCH)

Marks: 60

Duration: 165 mins.

SECTION A - GENERAL PATHOLOGY (30 MARKS)

Answer all the questions.

Draw diagrams wherever necessary

- 1) Define Necrosis. Describe the morphology of any 4 types of necrosis with suitable examples.
(2+8 = 10 marks)
- 2) **Short Answer Questions:**
 - 2A) Lab diagnosis of Chronic myeloid leukemia (4)
 - 2B) Tumor suppressor gene (4)
 - 2C) Chronic viral hepatitis (4)
 - 2D) Morphology of primary tuberculosis (4)
 - 2E) Pathways of metastasis (4)

SECTION B - MICROBIOLOGY (30 MARKS)

Answer ALL questions.

Draw diagrams wherever necessary.

- 3) Describe the pathogenesis and laboratory diagnosis of syphilis
(5+5 = 10 marks)
- 4) **Write short notes on:**
 - 4A) Microfilariae (4)
 - 4B) Four differences between T and B lymphocytes (4)
 - 4C) Bacteriophage (4)
 - 4D) Transmission and laboratory diagnosis of Herpes simplex virus-1 (HSV-1) (4)
 - 4E) Koch's postulates (4)

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GENERAL AND DENTAL PHARMACOLOGY AND THERAPEUTICS

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs in general and in dentistry in particular
CO 2:	List the indications, contraindications; interactions, and adverse reactions of commonly used drugs with reason
CO 3:	Integrate rational drug therapy in clinical pharmacology
CO 4:	Appreciate adverse reactions and drug interactions of commonly used drugs.
CO 5:	Prescribe drugs for common dental and medical ailments.

Course content and outcomes:	
Content	Competencies
General Pharmacology: Introduction	• Definition of Pharmacology and its subdivision (C1) • Source of drug information, sources of drugs with examples and naming of drugs (Chemical, generic, official and trade name) (C1)
Pharmaceutical phase	• List routes of drug administration (C1) • Explain the factors that determine the selection (C2) • Advantages and disadvantages of enteral, parenteral routes (C2) • Explain Inhalational and transdermal route of drug administration, drug dosage forms (C2)
Pharmacokinetics	• Describe membrane transport mechanism (C2) • Define Bioavailability (C1) • Explain factors affecting Bioavailability (C2) • Explain factors influencing drug distribution (C2) • Define Biotransformation (C1) • List the sites of Biotransformation (C1) • List phases of biotransformation (C1) • Explain factors influencing biotransformation (C2) • List major routes of drug excretion (C1) • Explain factors affecting renal excretion and drug clearance (C2) • Define biological half-life (C1) • Explain the clinical importance of half-life (C2) • Illustrate dose response and steady state concentration (C2).
Pharmacodynamics	• Describe different types of mechanism of drug action (C2) • Explain factors that modify drug action (C2) • Explain combined effect of drugs (C2)
Safety margin and drug toxicity	• Definition of adverse drug effect (C1) • Explain importance of therapeutic index (C2) • General principles of management of drug toxicity, drug interactions (C2)
Autonomic Nervous System: Introduction	• Describe anatomical and functional organization (C1) • Name neurotransmitter and receptors involved (C1) • Explain specificity, major effects of sympathetic and parasympathetic activation (C2)
Cholinergic system	• Explain biosynthesis and metabolism of acetylcholine (C2) • Name the locations of different cholinergic receptor (C1) • Explain transmitter effects on the receptors (C2) • Classify cholinergic agonist (C3) • Explain the therapeutic uses and adverse effects of cholinergic agonists (C2)
Antimuscarinic drugs	• Classify antimuscarinic agents (C3) • Explain the mechanism of action, major effects, therapeutic uses of atropine (C2) • List adverse effects of atropine (C1) • Explain uses of atropine substitutes (C2)

Skeletal muscle relaxants	- Classify skeletal muscle relaxants (C3) - Explain mechanism of action, therapeutic uses skeletal muscle relaxants (C2) - List side effects of Skeletal muscle relaxants (C1)
Adrenergic drugs	- Explain biosynthesis and metabolism of noradrenaline (C2) - Name the Adrenergic receptors – types, distribution and effects (C1) - Classify adrenergic agonists (C3) - Explain major effects of catecholamines and their uses (C2) - List side effects of catecholamines (C1) - Describe Vasopressor agents (C1) - Explain receptor specificity and therapeutic uses of non-catecholamines (C2)
Adrenergic receptor antagonists	- List of alpha and beta receptor antagonists (C1) - Explain the pharmacological actions of alpha and beta receptor antagonists (C2) - Mention therapeutic uses and contraindications of adrenergic receptor antagonist (C1) - List adverse effects of adrenergic receptor antagonists (C1)
Drugs acting on Cardiovascular System: Drug therapy of hypertension	- Define hypertension (C1) - Explain factors that affect cardiac output and peripheral resistance (C2) - Classify antihypertensive drugs (C3) - Explain the mechanism of action and clinical indication of antihypertensive drugs (C2) - List adverse effects of antihypertensive drugs (C1)
Drugs for congestive cardiac failure	- Explain the pathophysiology of congestive cardiac failure (C2) - List drugs used in congestive cardiac failure (C1) - Explain the mechanism, pharmacological actions and used of drugs used in CCF (C2) - List adverse effects of cardiac glycosides (C1)
Drugs for angina pectoris	- Classify drugs used in angina (C3) - Explain the pharmacological actions, uses and adverse effects of nitrates, beta blockers and calcium channel blockers (C2)
Diuretics	- Explain the renal physiology – secretion and reabsorption of sodium, potassium, bicarbonate, chloride ions and water in nephron. (C2) - Explain the site and mechanism of action of – loop diuretics, thiazides, potassium sparing diuretics, osmotic diuretics and carbonic anhydrase inhibitors, uses, side effects and interactions of diuretics (C2) - Describe Antidiuretics – vasopressin (C1)
PRACTICALS	
Dispensing Pharmacy and Types of dispensed preparations	Enumerate and identify dosage formulations (C1,P1)

Dosage Calculation Exercise	• Calculate the dosage of drugs for an adult and child • Calculate drip rate for infusion of drugs (C1, P2)
Pharmacy Exercise	• Enumerate the ingredients and indications of mouthwash, gum paint, toothpaste, toothpowder and root canal disinfectant (C2,P1)
Prescription Writing	• Describe parts of a prescription (C2) • Write a rational, correct and legible prescription for a) dental ailments and b) medical ailments including emergencies related to autonomic and cardiovascular system (C3, P1)
Problem Solving Exercises	• Select appropriate drugs for treatment of dental and medical ailments related to autonomic and cardio vascular system (C3, P1) • Identify adverse drug reactions to drugs used for treatment of cardiovascular diseases (C1)
Spotters	• Explain the pharmacokinetics and pharmacodynamics of commonly used drugs in general and in dentistry (C2, P1) • List the indications, contraindications and adverse reactions of commonly used drugs affecting autonomic nervous system and cardiovascular system (C2,P1)
Central Nervous System: Sedatives and hypnotics	• Classify drugs with examples (C3) • Explain the pharmacological effects, uses and side effects of benzodiazepines and barbiturates (C2) • Explain conscious sedation (C2) • Explain pharmacological actions and toxicities of Alcohol (C2)
General anesthetics	• Define general anesthesia (C1) • Classification of anesthetics and their physical characteristics (C3) • Explain the effects of inhaled anesthetics on respiration, bronchial smooth muscles, bronchial secretion, CVS, eye and skeletal muscles (C2) • Explain factors influencing the induction and depth of anesthesia (C2) • Describe characteristic features of IV general anesthetics (C1) • Explain preanesthetic medication (C2)
Local anesthetics	• Define local anesthetics (C1) • Classification of local anesthetics (C3) • Explain the pharmacological actions of local anesthetics on CNS and CVS (C2) • Describe the mechanism of action of local anesthetics (C1) • Explain the untoward effects of local anesthetics (C2) • Explain the techniques of local anesthesia (C2)
Analgesics	1. Non – opioid analgesics – • Give the classification of Non-opioid analgesics (C3)

	• Explain the pharmacological actions, uses and adverse effects of aspirin as a prototype (C2) • Explain other NSAIDS – their advantages and limitations (C2) 2. Opioid analgesics – • Classify opioid analgesics (C3) • Explain the action, uses and adverse effects of morphine as a prototype (C2) • Explain the management of opioid poisoning and opioid dependence (C2) • Summarize limitations and advantages of pethidine, pentazocine, buprenorphine, fentanyl over morphine (C2)
Antiepileptics	• Classify antiepileptic drugs (C3) • Explain the therapeutic indications and adverse effects of antiepileptic drugs (C2)
Psychopharmacological agents: Antipsychotic drugs	• Mention the pharmacological actions, uses and adverse effects of prototype - chlorpromazine (C1) • List of antidepressants and anti-anxiety drugs, uses and adverse effects (C1)
Pharmacotherapy of Respiratory Disorders	• Classify drugs used in bronchial asthma (C3) • Explain the mechanism, mode of administration, limitation of their use and their untoward effects of antiasthmatic agents. (C2) • Mention drugs used in cough (C1) • Explain the mechanism of action and indications of pharyngeal demulcents, expectorants and cough suppressants (C2)
Pharmacotherapy of Gastrointestinal Disorders	• Classify drugs used in peptic ulcer (C3) • Mention the mechanism of action, untoward effects and limitations of drugs used in peptic ulcer (C1) • Classification, mechanism, indication and side effects of Purgatives (C3) • Classification, site and mechanism of action and side effects of Antiemetics (C3) • Classification based on mechanism and their limitations of Antidiarrheal agents (C3)
Autacoids	• List antihistamines or H₁ blockers (C1) • Explain the uses and side effects of antihistaminics (C2) • Enlist the pharmacological actions and uses of Prostaglandins and its analogues (C1)
Haematinics, Coagulants, Anticoagulants, Fibrinolytics Antifibrinolytics	• Mention Iron preparations (C1) • List indications and adverse effects of Iron preparations. (C1) • List Vitamin B₁₂ and folic acid preparations (C1) • Describe the indications, adverse effects and mode of administration of Vitamin B₁₂ and folic acid preparations (C1) • Classify coagulants and local haemostatics (C3) • Explain the mode of action of coagulants and local haemostatics (C2) • Classify anticoagulants (C3) • Explain the mode of action, uses and adverse effects of anticoagulants (C2)

	- Explain the uses and mechanism of action of antiplatelets, fibrinolytics and antifibrinolytics (C2). - Explain treatment of shock (C2)
PRACTICALS	
Prescription Writing	Write a rational, correct and legible prescription for a) dental ailments and b) common respiratory, haematological and central nervous disorders c) treatment of common toxicities of drugs (C3, P1)
Problem Solving Exercises	- Identify and treat adverse reactions to drugs used for treatment of haematological and central nervous disorders (C1, P1). - Select appropriate drugs for treatment of central nervous system disease (C3, P1)
Spotters	List the indications, contraindications, and adverse reactions of commonly used drugs affecting respiratory, gastrointestinal and central nervous system, blood and blood formation (C2, P1)
Chemotherapy: Introduction	- Define the following terms examples – Chemotherapy, antibiotics, bactericidal, bacteriostatic, spectrum of activity (C1) - Classification of antimicrobial drugs (C3) - Explain the indications and limitations for antimicrobial combinations (C2) - Describe the disadvantages of antimicrobial therapy (C1) - Define chemoprophylaxis (C1) - Explain the indications for chemoprophylaxis (C2)
Sulfonamides	- Classify Sulfonamides (C3) - Explain the mechanism of action, spectrum of activity, clinical uses and adverse effects of Sulfonamide (C2). - Summarize the advantages and uses of Sulfonamide and trimethoprim combination (C2)
Penicillins and Cephalosporins	- Tell the classification of Penicillins and Cephalosporins (C3) - Explain the mechanism of action, spectrum of activity, therapeutic uses of each class (C2) - List side effects of Penicillins and Cephalosporins (C1)
Aminoglycosides	- List of aminoglycosides (C1) - Mention the common features, mechanism of action, spectrum of activity, indications and adverse effects of aminoglycosides (C1)
Broad spectrum and miscellaneous Antibiotics	- Tetracyclines and chloramphenicol – - List of tetracyclines (C1) - Explain the mechanism of action, spectrum of activity, pharmacokinetics and uses of tetracyclines (C2) - Mention the spectrum of activity, uses and side effects of chloramphenicol (C1) - Macrolides – - List macrolides (C1) - Explain the mechanism, spectrum, uses and adverse effects of macrolides (C2) - Metronidazole –

	- Describe the clinical uses and adverse effects of metronidazole (C1). - Fluroquinolones - List fluroquinolones (C1) - Explain the mechanism, uses and side effects of fluroquinolones (C1)
Antifungal and Antiviral agents	- Classify antifungal agents (C3) - Explain the mechanism, indication, and side effects of antifungal agents (C2) - Classify antiviral agents (C3) - Explain the mechanism, uses and side effects of antiviral agents (C2)
Drugs for tuberculosis and leprosy	- List of drugs used in tuberculosis and leprosy (C1) - Mention the route of administration and side effects of antitubercular and antileprotic agents (C1)
Anticancer drugs	- Classify Anticancer drugs (C3) - Describe general toxicities of anticancer drug (C1)
Endocrine Pharmacology: Corticosteroids, anabolic steroids	- Explain physiological and pharmacological actions of glucocorticoids (C2) - List synthetic glucocorticoids (C1) - List uses and side effects of glucocorticoids. (C1) - List anabolic steroids (C1) - Mention the actions, uses of anabolic steroids (C1)
Antidiabetic drugs	- Explain the physiological actions of insulin (C2) - List preparations of insulin (C1) - Explain clinical indications and side effects of insulin (C2) - Mention classification of oral antidiabetic drugs (C1) - Explain the mode of action, indications and side effects of oral antidiabetic agents (C2)
Calcium Metabolism	- Mention the hormones that affect calcium metabolism (C1) - Explain role of parathormone, calcitonin and Vitamin D in calcium homeostasis and their clinical uses (C2)
Thyroid hormones and antithyroid drugs	- Explain the physiological and pharmacological actions and uses of thyroid hormones (C2) - Classify antithyroid drugs (C3) - Mention the uses and adverse effects of antithyroid drugs (C1)
Dental Pharmacology	Describe the following terms with examples: Dentifrices, obtundents, mummifying agents, astringents, anticaries agents, bleaching agents, antiseptics, disclosing agents (C2)
Vitamins	Explain the pharmacological actions and uses of Vitamins A, C,E and B-complex (C2)
Chelating agents	- Describe chelating agents (C1) - List the pharmacological role of BAL, EDTA and Desferrioxamine as a chelating agents (C1)
Medical emergencies in dental practice	Explain the pharmacotherapy of emergencies in dental practice (C2)
PRACTICALS	

Prescription writing	Write a rational, correct and legible prescription for a) dental ailments and b) common bacterial, viral, fungal infections, diabetes mellitus and vitamin deficiency (C3, P1)
Problem solving exercises	- Identify and treat adverse reactions to drugs used for treatment/prophylaxis of infections and drugs affecting endocrine system (C1, P1) - Identify and explain drug interactions (C2)
Spotters	- List the indications, contraindications, and adverse reactions of commonly used antimicrobials and drugs used in endocrine disorders (C1, P1) - Identify adverse drug reactions (C1, P1) - List drugs used in dental practice (C1)
Critical analysis of drug advertisement	Evaluation of drug promotional literature (C3,P1)

Reference Material	- Essentials of Pharmacology for Dentistry. KD Tripathi. - Textbook of Dental Pharmacology. HL Sharma, KK Sharma, DK Gupta. - Pharmacology and Pharmacotherapeutics. RS Satoskar, SD Bhandarkar, Nirmala N Rege. Pharmacology and Therapeutics for Dentistry. John A Yagiela, Frank J Dowd, Enid A Neidle.
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Question Paper

Exam Date & Time: 01-Jan-2024 (02:15 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION
SECOND BDS DEGREE EXAMINATION - JANUARY 2024
SUBJECT: GENERAL AND DENTAL PHARMACOLOGY AND THERAPEUTICS
(REGULAR BATCH)

Marks: 60

Duration: 165 mins.

Answer all the questions.

Essay Questions

- 1A) Enumerate FOUR classes of drugs used in congestive cardiac failure with an example. (4)
1B) Explain the mechanism of action, pharmacological actions and specific adverse effects of cardiac glycosides. (2+2+2 = 6 marks)
- 2A) Mention FOUR classes of penicillins with suitable examples and describe their mechanism of action. (4+2 = 6 marks)
2B) Explain TWO uses and TWO specific adverse effects of any one class of penicillin. (2+2 = 4 marks)
- 3A) Explain phase I and Phase II reactions of biotransformation with suitable examples. (4)
3B) Discuss in detail the FOUR factors that modify drug action with examples. (4)
3C) Name FOUR classes of adrenergic agonists based on therapeutic use with ONE example each. (4)
3D) List FOUR beta-blockers and enlist FOUR indications of the same. (4)
3E) Explain FOUR medicinal uses of ethanol. (4)
3F) Write the rationale for combining adrenaline with lidocaine. Write a note on conduction block Anesthesia (4)
3G) Describe the mechanism of action of pharyngeal demulcents and expectorants. (4)
3H) Enumerate FOUR objectives of using antimicrobial combinations with one example each. (4)
3I) Mention THREE types of insulin preparations with suitable examples. Enlist TWO adverse effects of insulin. (4)
3J) Explain the pharmacotherapy of status epilepticus caused during a dental procedure. (4)

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DENTAL MATERIALS

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Describe the general classes of materials and the various physical, chemical, mechanical, principle of adhesion and biological properties of dental materials with the emphasis given to dental applications
CO 2:	Describe the classifications, requirements, composition, setting reaction, properties, technical considerations, recent advances and uses of auxiliary dental materials, direct restorative materials and indirect restorative materials
CO 3:	Relate the knowledge of the basic material sciences in future dental practice
CO 4:	Manipulate the gypsum products, impression materials, direct and indirect restorative materials used in dental practice

Content	Competencies
FIRST YEAR PORTION	
Gypsum products and die materials	- Define cast, die, model, gypsum, gypsum products, setting expansion, balanced stone, synthetic plaster, soluble plaster, nuclei poisoning. (C1) - Classify gypsum products. (C1) - Explain the manufacture of gypsum products. (C2) - Give the setting reaction of gypsum products. (C2) - Illustrate the mechanism of setting in gypsum products (C2) - Define Initial setting time & Final setting time in gypsum products. (C2) - List the factors affecting setting time. (C2) - Explain measurement of setting time in gypsum products. (C2) - Define Normal Setting Expansion (NSE) & Hygroscopic Setting Expansion (HSE). (C1) - Explain the factors affecting setting expansion in gypsum products. (C2) - Distinguish between NSE & HSE. (C2) - List the accelerators & retarders used in gypsum products. (C1) - Explain their role in setting time, setting expansion and strength of gypsum products. (C2) - Define wet strength & dry strength. (C1) - Explain the factors affecting strength in gypsum products (C2) - Illustrate the manipulation of gypsum products. (C2) - Explain the uses, composition advantages and disadvantages of Impression plaster, Dental Plaster, Dental stone, Die Stones. (C2) - Distinguish between dental stone & dental plaster. (C2) - List the ideal requirements and classification of die materials. (C1) - Illustrate on electroformed dies. (C2)
Requirements and classification of impression materials	- Define impression, impression materials (C1) - Classify impression materials. (C1) - Give the ideal requirements of impression materials. (C2)
Impression compound	- Explain the types, composition & uses of impression compound. (C2) - Define Flow. (C1) - Illustrate the measurement of flow, interpret its significance (C2) - List the factors affecting flow in impression compound. (C2) - Explain the manipulation of impression compound. (C2)
Zinc oxide eugenol impression pastes	- Explain the composition & uses of ZOE impression pastes. (C2) - Illustrate the setting reaction & list the factors affecting setting time of ZOE impression pastes. (C2) - Define initial setting time & final setting time in ZOE impression pastes (C1) - Explain the manipulation of ZOE impression pastes. (C2)

	Summarize the modifications in ZOE impression pastes. (C2)
Agar Hydrocolloids	- Define gelation, imbibition, syneresis, hysteresis, gel strength (C1) - Relate why agar is considered a reversible hydrocolloid (C2) - Give the dispensing of reversible hydrocolloids. (C1) - Explain the composition, mechanism of gelation & uses of reversible hydrocolloids (Agar impression materials). (C2) - Explain the manipulation of reversible hydrocolloids. (C2) - Summarize the failures in agar impression materials interpreting their causes & remedies (C2)
Alginate hydrocolloids	- Explain the composition & uses of irreversible hydrocolloids. (C2) - Give the mechanism of gelation & list the factors affecting gelation time in irreversible hydrocolloids. (C2) - Explain the manipulation of alginate impression materials. (C2) - Summarize the failures in alginate impression materials interpreting their causes & remedies (C2) - Describe the laminate technique of impression making in hydrocolloids (C2) - Discuss the modified alginate (C2)
Elastomers	- Classify elastomers. (C1) - Define condensation & addition silicones impression materials. (C1) - Summarize the types, composition, properties, advantages, disadvantages, uses of Polysulfide impression materials /condensation polysilicone impression materials/ Addition silicone impression materials (or poly vinyl siloxane) / Polyether impression material (C2) - Describe the auto mixer. (C2) - Describe light activated polyether impression materials. (C2) - Explain the measurement of working & setting time in elastomers (C2) - Compare the double mix impression techniques in elastomers. (C2) - Summarize the failures in non-aqueous elastomeric impressions interpreting their causes & remedies (C2)
Mechanical properties of dental materials	- Define stress and strain. (C1) - Mention the types of stress and strain. (C1) - Describe stress-strain graph with diagram. (C3) - Define ultimate tensile strength, compressive strength, and shear strength. (C1) - Explain with Dental example the mechanical properties - Proportional limit, Elastic limit, Yield strength, Modulus of elasticity, resilience, Flexibility, Toughness, Flexural stress, Diametral tensile strength, Impact strength, Fatigue strength, Brittleness, Malleability and Ductility. (C3) - Define hardness. (C1) - Describe hardness testers: Brinell, Knoop, Vickers, Rockwell, Moh's scale, Shore – A Durometer and Barcol hardness tester. (C2)
Physical properties of solids	Define flow and creep. (C1)

	• Explain Newtonian and non-Newtonian fluid behaviour with example. (C2) • Explain viscosity with dental significance (C2) • Describe thixotropic/pseudo plastic and viscoelastic behaviour of dental materials. (C2) • Explain the dental significance of coefficient of thermal conductivity, thermal diffusivity and expansion. (C2) • Explain colour parameters, its measurement and Munsel colour coordinate system. (C2) • Mention colour matching techniques. (C1) • Define metamerism, isomerism, fluorescence (C1)
Structure of matter and principles of adhesion	• Classify the interatomic bonds (C1) • Classify solids based on atomic arrangement (C1) • Explain interatomic bond distance (C2) • Explain types of adhesion with dental example. (C2) • Describe adhesion, surface energy, surface tension, wettability and contact angle with dental significance. (C2)
Biocompatibility	• Classification of materials from perspective of biological compatibility • Explain adverse effects from exposure to dental materials and occupational hazards for dental personnel (C2) • Explain the different levels of biocompatibility tests (C2)
Standards for Dental Materials	• Explain the various test standards for dental materials (C2)
Chemistry of synthetic resins	• State classification of polymers. (C1) • Distinguish between condensation and addition polymerization. (C2) • Explain copolymers and cross-linked polymers. (C2) • Describe the stages of free radical addition polymerization. (C1) • Compare internal and external plasticizers. (C2)
Denture base resins	• State the classification of denture base resins. (C1) • List the requirements of denture base resins. (C1) • Describe the composition, uses, manipulation, properties, merits and demerits of heat cure and self- cure acrylic resins. (C2) • Explain Compression molding, injection molding & fluid resin techniques. (C2) • Explain the causes and remedies for fabrication defects of denture. (C2) • Explain the recent advances in denture base resins (C2)
Miscellaneous denture base related resins and techniques	• Define denture relining and rebasing. (C1) • Distinguish between hard reliners, soft reliners and tissue conditioners with examples. (C2) • List the differences between acrylic and porcelain teeth (C1) • List the ideal requirements of maxillofacial materials (C1) • Explain the various maxillofacial materials (C2) • Name the agents used as denture cleansers with their merits and demerits (C1)
Dental burs	• Classify bur (C1)

	• Explain steel and Tungsten carbide bur and diamond bur (C2) • Describe bur head design (C2) • Explain factors affecting rate of cutting (C2)
Abrasion and polishing agents	• Define abrasion and polishing (C1) • Give the ideal characteristics of abrasive agents (C2) • Explain the factors affecting rate of abrasion (C2) • Explain types of abrasive (C2) • Define truing and dressing (C1) • List the types of abrasive and polishing agents with their application (C2) • Explain electrolytic polishing and burnishing (C2) • Describe the composition of dentifrices. (C1)
SECOND YEAR PORTION	
Dental cements	• State the classifications of dental cements. (C1) • List the requirements of dental cements for cementation, restoration, lining and bases. (C1) • Explain the types, composition, setting reaction, properties, manipulation, merits, demerits, and uses of: Zinc oxide eugenol cements, zinc phosphate cement, silicate cement, zinc polycarboxylate cements, Glass ionomer cements, resin cements and their modification (C2) • Classify cement bases (C1) • Distinguish between cavity varnish, liner & base. (C2) • Explain the composition, uses, merits, and demerits of cavity varnish, calcium hydroxide and MTA (C2)
Composite resins and bonding agents	• State the classification of dental composites. (C1) • Explain the composition, chemistry, properties, manipulation, merits and demerits of various types of dental composites. (C2) • Distinguish between chemically cured and light cured composites. (C2) • Describe the acid etch technique and enamel & dentin bonding. (C1)
Physical metallurgy	• Describe structure, behaviour, the process of solidification, mechanism of crystallization of metals (C2). • Explain Crystal defects, cast metals, wrought metals, work hardening and annealing (C1) • Classify alloys (C1) • Describe Solid solutions, equilibrium phase diagrams, Eutectic alloys, Peritectic alloys, Solid state reaction and other binary system (C2) • Explain the significance of coring, homogenization and heat treatment (C2)
Tarnish and corrosion	• Define tarnish and corrosion (C1) • Explain tarnish with example (C2) • Classify corrosion (C2) • Describe various types of dental corrosions and methods to minimize them (C2)
Dental amalgam	• State the classification of amalgam alloys. (C1)

	• Explain the composition, manufacture, amalgamation reaction, pros and cons of low copper and high copper dental amalgam. (C2) • Explain properties of amalgam: Dimensional stability, strength, creep, ditching, corrosion and other properties (C3) • Explain Manipulation of amalgam - Selection of alloy, proportioning, mechanism of trituration, condensation, carving & finishing (C3) • Explain the mercury hazards and safety precautions. (C2)
Direct filling gold	• State the classification of direct filling gold. (C1) • Explain types, uses, manipulation, properties, merits and demerits of direct filling gold. (C2)
Dental casting alloys	• Classify dental casting alloys (C1) • State the desirable properties of dental casting alloys (C2) • Explain the composition, uses, properties of High noble, Noble and Base metal alloys (C2) • Describe the heat treatment of gold alloys (C2)
Dental waxes	• State the classification of dental waxes. (C1) • Describe the desirable properties, composition, and uses of different types of dental waxes. (C2) • Explain the methods of preparation and the causes and remedies of distortion of wax pattern. (C2)
Investment materials	• List the ideal requirements of investment materials. (C1) • Explain the composition, properties, uses, merits and demerits of investment materials. (C2)
Principle of casting and defects	• Explain the casting procedure and functions of sprue, casting ring liner, casting ring, reservoir, Investing, Wax elimination, casting machines, crucible, Recovery, Pickling, Finishing and Polishing (C2) • Classify casting defects (C1) • Explain the causes and remedies of the various casting defects. (C2)
Soldering and welding	• Define soldering, welding, fluxes and anti-fluxes (C1) • Give the composition of Gold solder, Silver solder, Flux and Antiflux (C2) • Describe soldering and welding techniques (C1)
Orthodontic wires	• Define steel and stainless steel (C1) • List the ideal requirements of orthodontic wires (C1) • Explain the composition, properties, advantages and disadvantages of different types of orthodontic wires (C2)
Implant materials	• State the classification of implant materials (C1) • List the ideal requirements of implant materials (C1) • Summarize the various implant materials with their merits and demerits. (C2)
Dental ceramics	• State the classification of dental ceramics (C1) • Explain the composition of ceramics (C2) • Describe the method of fabrication of porcelain jacket crown (C1)

	- List the ideal requirements for alloys and ceramics for metal ceramic restorations. (C1) - Describe the steps in fabrication of a metal ceramic restoration. (C1) - Summarize the types of bonds and failures and factors affecting metal ceramic bonding. (C2) - Explain the methods of Strengthening techniques in ceramics (C2) - Compare various metal ceramic and all ceramic restorations. (C2) - List the methods used for fabrication of all-ceramic restorations. (C1)
Revision	- Revise the topics related to 1st, 2nd and 3rd sessional examinations - Review the contents related to composition, properties, technical considerations and uses of various dental materials
PRACTICAL	
Gypsum products	- Demonstrate manipulation of the following gypsum products (P2) - Plaster of Paris - Dental Stone - Fabricate cube, cuboid and pyramid blocks of different dimensions using Dental plaster (P3) - Record results of setting time of gypsum products with and without the addition of accelerators and retarders (P3) - Prepare casts using the given impression free of bubbles and voids (P3) - Trim the blocks and casts using different grades of sand paper (P3) - Demonstrate the fabrication of die using dies stone (P2)
Impression Compound	- Demonstrate manipulation of impression compound for recording the metal die impression (P2) - Record the impression of the metal die using impression compound and prepare the model free of bubbles or voids (P3)
Zinc oxide eugenol impression pastes	- Demonstrate manipulation of zinc oxide eugenol impression pastes for recording secondary impression (P2) - Manipulate zinc oxide eugenol impression pastes for recording secondary impression and prepare the cast free of bubbles (P3) - Record results of the consistency of zinc oxide eugenol impressions pastes of varying base/reactor ratios (P3)
Alginate hydrocolloids	- Demonstrate the impression of metal die with alginate using specially prepared perforated tray (P2) - Manipulate alginate hydrocolloids for recording the metal die using specially prepared perforated tray and prepare the cast free of bubbles (P3) - Demonstrate the recording of the impression of dentulous cast with alginate using perforated tray (P2) - Manipulate alginate hydrocolloids for recording the impressions of both maxillary and mandibular dentulous casts and prepare the cast free of bubbles (P3) - Record the results of the gelation time of alginate hydrocolloids (P3)

Elastomers	• Demonstrate the manipulation of elastomeric impression material for recording the impression of single tooth (P2)
	• Manipulate elastomeric impression material (Light or medium viscosity) for recording the impression of a single tooth die using specially prepared tray and prepare the die free of bubbles (P3)
Dental waxes	• Demonstrate the manipulation of base plate wax (P2)
	• Fabricate the rectangular blocks of different dimensions using baseplate wax (P3)
Denture base resins	• Demonstrate the processing of heat cure acrylic resin by compression molding technique (P2)
	• Know the features of acrylic powder under microscope (P2) • Fabricate the rectangular block of acrylic resin by compression molding technique using the following steps (P3) ○ Investing the prepared wax block in the dental flask using Dental Plaster in a two-pour technique ○ Dewaxing the wax block in the dewaxing bath ○ Application of separating media in the mold ○ Packing the dental flask with clear heat cure acrylic resin ○ Bench curing ○ Curing the acrylic block using short curing cycle ○ Deflasking and retrieving the acrylized block ○ Finishing and polishing the acrylic block
	• Demonstrate the mixing and curing of self-cure acrylic resins (P2)
Dental cements	• Show the manipulation of dental cements for luting consistency (P2)
	• Manipulate zinc phosphate cement for luting consistency (P3) • Manipulate zinc polycarboxylate for luting consistency (P3) • Manipulate Type I glass ionomer cement for luting consistency (P3)
	• Show the manipulation of dental cements for base consistency (P2)
	• Manipulate zinc phosphate cement for base consistency (P3) • Manipulate the zinc polycarboxylate cement for base consistency (P3)
	• Show the manipulation of dental cements for restorative consistency (P2)
	• Manipulate unmodified zinc oxide eugenol cement for restorative consistency (P3) • Manipulate Type II Glass ionomer cement for restorative consistency (P3) • Manipulate Type IX glass ionomer cement for restorative consistency (P3)

	• Show the manipulation of zinc oxide eugenol cement (P2) • Show the manipulation of calcium hydroxide (P2)
	• Demonstrate the measurement of properties of dental luting cements (P2)
Silver amalgam	• Demonstrate the hand trituration and mechanical trituration of dental amalgam (P2) • Distinguish between lathe cut and spherical amalgam under microscope (P1)
Dental casting alloys	• Demonstrate the fabrication of simple inlay/crown using the lost wax casting technique using the following steps (P2) ○ Preparation of the inlay wax pattern ○ Attachment of sprue to the pattern ○ Investing the wax pattern in the casting ring using suitable investment material ○ Wax burn out and heating the mold ready for casting ○ Casting the alloy using suitable casting machine ○ Divesting the cast restoration from the mold ○ Finishing and polishing of the cast restoration
Dental ceramics	• Demonstrate the fabrication of metal ceramics (P2)
Spotter Materials	• Identify and know the uses and technical considerations of the following materials • Gypsum products, non – elastic and Elastic impression materials, Heat cure and self-cure acrylic resins, Separating media, Permanent and Temporary soft reliners, Dental luting cements, Dental composite resins, Dental amalgam, Dental casting alloys, Dental waxes, Investment materials, Orthodontic wires, Dental solders, Abrasion and Polishing materials, Dental ceramics (P3)
Waste management	• Show the storage, and safe/legal method of biomedical waste management in the laboratory (Gypsum products, Dental amalgam) (P2)
Revision	• Practice the long and short experiments (P3)

Reference Material	1. Anusavice KJ, 1 st South Asian edition “Philips’ Science of Dental Materials” 2014 Craig RC 13 th edition “Restorative Dental Materials” 2012
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Question Paper

Exam Date & Time: 03-Jan-2024 (02:15 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION
SECOND BDS DEGREE EXAMINATION - JANUARY 2024
SUBJECT: DENTAL MATERIALS
(REGULAR BATCH)

Marks: 10

Duration: 165 mins.

Answer all the questions

- 1A) Define ductility, malleability and brittleness. With the help of a stress-strain diagram depict the distinct difference in the behaviour of ductile and brittle materials under tensile load. (3+1 = 4 marks)
- 1B) With suitable examples, explain the clinical significance of ductile or brittle behaviour of dental materials with respect to the following (2+2+2 = 6 marks)
- i) Burnishability Index;
 - ii) Swaging Technique;
 - iii) Fabrication of orthodontic appliances
- 2A) Classify dental composites based on the filler size and mode of curing (2+2 = 4 marks)
- 2B) Explain the significance following aspects of fillers and their effect on the properties of dental Composites (1+1+1+1 = 4 marks)
- i) Filler size and distribution;
 - ii) Filler loading;
 - iii) Refractive index
 - iv) Radiopacity
- 2C) Justify the reasons for using fibrous fillers in condensable composites. (1+1 = 2 marks)
- 3) **Write Short notes on:**
- 3A) Explain the effect of rake angles and clearance angles on the cutting efficiency of dental burs (2+2=4 marks)
- 3B) Explain the following aspects of Investment soldering technique: (1+1+1+1 = 4 marks)
- i) Type of investment to be used
 - ii) Part of the flame used for soldering
 - iii) Gap between the parts to be maintained at the time of investing
 - iv) Need for the use of flux during soldering
- 3C) Explain in detail about setting of gypsum products based on the differences in the solubility of hemihydrate and dihydrate. What is effect of boiling water on the rate of setting of gypsum products (3+1 = 4 marks)
- 3D) Explain various methods used to measure setting times of gypsum products (4)
- 3E) Describe the composition and setting reaction of polyether impression materials (2+2 = 4 marks)
- 3F) Compare heat activated and chemically activated acrylic denture base resins (4)
- 3G) Explain the following properties of Glass ionomer cement along with its clinical significance
- i) Bonding to the tooth structure
 - ii) Early moisture sensitivity

(2+2 = 4 marks)

Page 1 of 2

- 3H) Describe the method used for the manufacturing of lathe-cut amalgam alloy powder (4)
- 3I) Explain the mechanism, causes and remedies for the localized shrinkage porosity and hot spot porosity in dental castings (4)
- 3J) Explain various methods used to strengthen the dental ceramics by Interruption of crack propagation (4)

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PRECLINICAL CONSERVATIVE DENTISTRY

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Classify and identify dental caries and have a knowledge of various nomenclature. (C3, P1)
CO 2:	Demonstrate the basic knowledge and skills of tooth preparation (C2, P2)
CO 3:	Display skills and knowledge about the use of various instruments. (C2, P2)
CO 4:	Demonstrate the skills in performing restorative procedures on anterior and posterior teeth. (C3, P3)
CO 5:	Demonstrate the ability to manage deep carious lesions.(C3)

COURSE LEARNING OUTCOME		
BLOCK 1: Taken in II-year BDS (32 hours)		
THEORY		
	CONTENT	COMPETENCIES
PRE CLINICAL CONSERVATIVE DENTISTRY		
	Introduction to the study of operative dentistry	- Define operative dentistry (C1) - List the indications for operative procedures (C1) - Describe the aims of operative dentistry (C1)
	Classification of cavity designs & Nomenclature	- Describe the various Tooth numbering systems (C1) - Explain the FDI System (C2) - List the various walls in the cavity preparation (C1) - List the various angles in the cavity preparation (C1) - Classification of cavity designs by Dr G V Black (C2)
	Principles of cavity preparation	- List the factors affecting tooth preparation (C1) - List the objectives affecting tooth preparation (C1) - Explain outline form (C1) - Define resistance and retention form (C1) - Explain the stages of tooth preparation (C2)
	Class I cavity preparation for silver amalgam	- List the rotary instruments used for cavity preparation. (C1) - Explain the techniques for preparing the tooth for a conservative Class I amalgam restoration. (C2) - Summarize the modifications of Class I cavity. (C2) - Describe the technique of restoring the prepared cavity (C1)
	Class II cavity preparation for silver amalgam	- Explain the technique of preparing Class II amalgam restoration involving one proximal surface, and Class II amalgam restoration involving both proximal surfaces (C2). - Summarize the modifications of Class II cavity preparations (C2). - Describe the technique of restoring the prepared cavity (C1)
	Dental caries	- Describe the etiology and theories of dental caries. (C1) - Explain the role of various factors in development of dental caries (C2) - List the microflora in dental caries (C1) - Summarize the prevention and treatment of dental caries. (C3) - Explain the histopathology of dental caries (C2)



		• Distinguish between infected and affected caries(C2)
	Deep caries management	• Describe a deep carious lesion and significance of remaining dentin thickness (C1) • List the objectives, indications, contraindications and materials used for pulp capping (C1) • List the steps for indirect and direct pulp capping (C1)
	Base, sub-base, cavity varnish and liner	• List the classification of bases (C3) • Explain the uses of base (C2) • Explain the uses of varnish and liners(C2)
	Hand instruments	• List the parts of an instrument, instrument formula, classification, advantages and disadvantages of hand cutting instruments. (C1) • Describe instrument nomenclature, instrument design and individual instruments. (C1) • Summarize the methods of sterilization of hand instruments (C2) • Explain the hand instrument sharpening procedures (C2)
	Instrumentation in operative dentistry	• Describe Rests, Guards & Grasps (C1) • List the various operating positions (C1) • Describe the hand instrumentation techniques of each instrument.(C1)
	Caries activity tests and Caries vaccine and caries prevention	• Explain the principle and interpretation of caries activity tests. (C2) • Recognize the principles involved in Caries vaccine. (C2)
	Rotary cutting instruments	• List the classification of rotary instruments(C3) • List speed ranges and their uses (C1) • Describe the common features of rotary instruments and bur design (C1) • Relate factors affecting cutting efficiency of dental burs to bur design (C1) • Explain materials used, manufacturing process, shapes and cutting mechanism of abrasive instruments (C2).
	Biologic considerations of cutting instruments	• Describe the type of injuries happening with operative instruments on biological tissues(C1) • Explain the pulpal reaction to cavity preparation(C2) • List the factors influencing pulpal response to dental restorative material.(C1)
	Silver Amalgam material aspect	• Define Silver amalgam. List the classification, composition, advantages and disadvantages of



		amalgam. Explain effect of constituent metals on the properties of amalgam. (C1, C2) • Explain the setting reaction of silver amalgam. (C2) • Compare between high copper and low copper amalgam. (C4) • Summarize bonded amalgam restorations. (C2) • Discuss the advantages of gallium alloy over amalgam. (C2)
	Failure of amalgam restorations	• List the causes for failure of amalgam restorations (C1) • Summarize the clinical symptoms of a failing amalgam restoration. (C2)
	Amalgam technical considerations	• Define and explain trituration of silver amalgam (C2) • Describe the method of burnishing (C1) • Explain the importance of finishing and polishing of silver amalgam restorations
	Mercury toxicity	• Summarize the hazards of mercury toxicity (C2) • Explain the steps to be taken to prevent mercury toxicity in dental clinics (C2)
	Contacts and contours	• Describe the terminologies related to contacts and contours (C1) • Summarize the hazards of faulty reproduction of contacts and contours (C2) • List the procedures for formulation of proper contacts& contours (C1)
	Matrices	• Define matrices (C1) • List the classification, functions and requirements of matrices (C1) • Explain universal matrix system. (C2) • Describe various matrix systems for individual cavity preparation (C1)
	Wedges and separators	• Define wedges (C1) • List the classification, functions of wedges (C1) • Explain various wedging techniques (C2) • Describe the types, methods of tooth separation and the different types of separators (C1)
	Intermediary restorations in operative dentistry(materials and method)	• list the classification of intermediate restorations. (C3) • List the ideal requirements of an intermediate restorative material. (C1) • Describe the indications of use.(C1)



	Inlays and Onlays	• Define inlay and onlay. List the indications, contraindications, advantages and disadvantages of inlay. (C1) • Describe the basic concept of cavity design for inlay and onlay. (C1) • List the differences between amalgam and inlay cavity preparation. (C1) • Explain the various types of bevels. (C2) • List the differences between onlay and inlay cavity preparation. (C1)
	Composites (Cavity Preparation, material aspect, Polymerization shrinkage, Recent advances)	• Compare the cavity designs for amalgam and composite restorations (C2) • Describe the different designs of cavity preparation for composite restoration (C1) • Illustrate the tooth preparations for the following cavities to be restored with composite: class I, II, III, IV, V, VI (C2) • List the composition, classification of composite resin, and types of curing lamps (C1) • List the various causes for failure of composite restorations (C1) • Explain the mechanism of polymerization, types, manipulation and properties of various composites (C2) • Explain polymerization shrinkage (C2) • List the factors affecting polymerization shrinkage (C1) • Describe the sandwich technique of restoration (C1) • Write in detail about the recent advances in composite materials. (C3) • Describe the placement techniques of pit and fissure sealants (C1)
	Tooth coloured restorative materials(GIC)/(Silicate cements)	• Classify glass ionomer cement with uses. Give its composition, setting reaction and bonding with tooth structure. (C2) • Write in detail about the recent advances in glass ionomer cement. (C3) • Silicate cement. (C1) • Explain the role of fluoride releasing restorative materials in caries prevention.(C2)



Main Reference	• Preclinical Manual of Conservative Dentistry and Endodontics, 2nd edition, 2015 by Gopi Krishna • Phillips Science of Dental Materials: 1st South Asian Edition, 2014. • Sturdevant's Art and Science of Operative Dentistry: 1st South Asian edition, 2013.
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PRECLINICAL PROSTHODONTICS

Course Outcomes (COs)	On successful completion of this course, students will be able to
CO 1:	Identify anatomical landmarks and have a knowledge of various nomenclature. (C3, P1)
CO 2:	Demonstrate the basic knowledge and skills of manipulation dental materials required for fabrication of removable complete denture. (C2, P2)
CO 3:	Display skills and knowledge about the use of various instruments. (C2, P2)
CO 4:	Demonstrate the skills in performing restorative procedures for completely edentulous patients. (C3, P3)
CO 5:	Demonstrate the ability to manage completely edentulous patients .(C3)

COURSE LEARNING OUTCOME		
BLOCK 1: To be Taken in II year BDS (38 hours)		
THEORY		
	CONTENT	COMPETENCIES
PRE CLINICAL PROSTHODONTICS		
	Introduction to Prosthodontics	- Define Prosthodontics(C1) - List the Branches of Prosthodontics. (C1) - Explain the biomechanics of edentulous state. (C2)
	Diagnosis and treatment planning	- Define diagnosis, Prognosis and treatment plan. (C1) - Explain the method of recording case history (C2) - Discuss the sequence of extra-oral and intra-oral clinical examinations (C2) - List and Relate the factors affecting the oral edentulous condition. (C1) (C2) - Classify types of patients based on psychology (C2) - Explain the role of diagnostic casts. (C2) - Choose the type of radiography for a complete denture patient and explain their relevance. (C1) (C2) - Outline the sequence in treatment planning (C1)
	Biologic consideration of maxillary and mandibular impressions	- List the maxillary and mandibular Supporting structures. (C1) - List the maxillary and mandibular Limiting structures. (C1) - Explain the anatomy and it's the clinical significance .(C2)
	Improving patients denture foundation and ridge relations	- What to observe during the Preoperative examination? (C1) - List the different denture related pathoses & deformities. (C1) - Explain the various non-surgical and surgical techniques for improvement of denture foundation. (C2) - Choose and describe methods used for Ridge augmentation.(C1)(C2)
	Impressions	- Define impressions. List the types. (C1) (C2) - Define Impression trays, identify and classify them. (C1) (C2) - List the Impression materials used, identify and discuss the composition, properties, uses of them. (C1)(C2) - List the recent advances with clinical applications of the same. (C1) - List the objectives of impression making. (C1) - Discuss in detail the factors affecting retention, stability and support. (C2) - Classify Impression procedures. (C1) - Discuss Theories of impression making. (C2) - Cite the materials used for primary impression, Border molding and final impression procedure.(C1)
	Articulator	- Define articulator. (C1) - Analyse it's requirements, function and its uses. (C3) - Classify articulators. (C2) - List its limitations. (C1)

	Identify the type and parts of an articulator.(C3)(C1)
Occlusal rims and Transfer bases	- List the synonyms for transfer base. (C1) - Identify and list the materials used for the fabrication of transfer base and occlusal rims. (C1) - Discuss the advantages of transfer base and occlusal rims.(C2)
Biologic consideration in Jaw relations & mandibular movements	- List the types of jaw relation. (C1) - Identify and explain instrument used to record orientation jaw relation. (C2) - Interpret the importance of recording orientation jaw relation. (C2) - Classify & Discuss the types of horizontal jaw relation. (C2) - Define the centric relation and list its significance. (C1) - List and explain methods used for recording centric relation. (C1), (C2) - Define and classify Vertical jaw relation. (C1) (C2) - List & explain methods used for determining vertical jaw relations. (C1), (C2) - Discuss the effects of increased and decreased vertical jaw relations.(C2)
Selection of artificial teeth-	- List the clinical considerations in anterior and posterior teeth selection. (C1) - Explain dentogenic concept. (C2) - Classify Posterior teeth based on cuspal inclination. (C2) - Discuss the difference between acrylic and porcelain teeth.(C3)
Arrangement of teeth:	- Discuss principles of teeth arrangement. (C1) - Identify the differences in the arrangement in class 1 relation, class 2 relation and class 3 relation.(C3)
Occlusion in complete dentures	- Discuss the different occlusal schemes for complete denture occlusion. (C1) - Define Balanced Occlusion in dentures. (C1) - Discuss the factors affecting balanced occlusion.(C2)
Speech considerations in complete dentures	Explain factors that affect speech in complete denture patients.(C2)
Try in and Posterior palatal seal	- Explain the Appearance and functional harmony of denture bases. (C2) - Define posterior palatal seal. (C1) - Discuss the anatomical consideration in posterior palatal seal. (C2) - List the Importance of recording palatal seal. (C1) - Explain the Methods of recording posterior palatal seal.(C2)
Permanent denture base materials	- List & discuss the materials used for permanent denture base materials. (C1) (C2) - List the recent advances in denture base materials.(C1)
Processing of Complete denture	- Explain the procedure of wax up of polished surfaces. (C2) - List the material considerations for denture bases. (C1) - Explain the Processing methods. (C2)

		- Discuss the relevance of curing cycles. (C2) - Explain the procedure of remounting and its importance. (C2)
Complete denture insertion.		- Recall & Discuss the instructions regarding use, care and maintenance of complete dentures, - Post insertion checkup and follow up appointment. (C1)(C2)
Post insertion problems		- List the problems associated with dentures. (C1) - Discuss the clinical management of the same. (C2)
Immediate dentures		- Define immediate dentures. (C1) - Discuss the importance, advantages and disadvantages. (C2) - Describe the method of fabrication. (C2)
Single complete dentures		- Definite single complete dentures. (C1) - What is the importance, compare the advantages and it's disadvantages. (C2) - Discuss methods of fabrication. (C2)
Relining, rebasing		- Discuss the treatment rationale of relining and rebasing. (C2) - Explain the clinical procedures and laboratory steps in relining and rebasing. (C2)
Repair		- List the material considerations - And explain the laboratory procedures involved in repair. (C1)
Revision		

PRACTICAL			
Block I I	Pouring of master casts. Adaptation of transfer base with baseplate wax & heat cure acrylic resin. Fabrication of occlusal rims. Mounting on articulator. Arrangement of teeth. Wax up and carving.	Follow steps in adaptation of transfer bases , fabrication of occlusal rim, articulation ,arrangement of teeth and waxing and carving on plaster models (C2)(P3) Identify the anatomical landmarks and recall and demonstrate their clinical significance.(C1)(P2) Identify the articulator and various hand instruments used demonstrate its use. (C1,P2)	50
	First Sessional (Block exam)	OSPE, Teeth arrangement, Viva	3
Block III	Fabrication of occlusal rims. Mounting on articulator. Arrangement of teeth. Wax up and carving.	Demonstrate proficiency in adaptation of transfer bases, fabrication of occlusal rim, articulation, arrangement of teeth and waxing and carving on plaster models. (C3)(P3) Identify the anatomical landmarks and recall and demonstrate their clinical significance. (C1) (P2) Identify the articulator and various hand instruments used demonstrate its use. (C1,P2)	70
	Second Sessional (Block exam)	OSPE, Teeth arrangement , Viva	3



Block IV	Fabrication of occlusal rims. Mounting on articulator. Arrangement of teeth. Wax up and carving. Fabrication of permanent complete denture. Finishing & Polishing.	1. Demonstrate proficiency in adaptation of transfer bases, fabrication of occlusal rim, articulation, arrangement of teeth and waxing and carving on plaster models. (C3)(P3) 2. Reproduce the skills in teeth arrangement on articulated model in a specified time (C3)(P3) 3. Demonstrate proficiency by fabricating the permanent prosthesis. (C3)(P3)	75
	Third Sessional	OSPE Teeth arrangement, , Viva	3
	University Exam	OSPE, Teeth arrangement , Viva	
	TOTAL PRACTICAL HOURS		204

Main Reference	• Phillips Science of Dental Materials: 1st South Asian Edition, 2014. • Phillips' Science of Dental Materials 12th Edition. Elsevier • Zarb Hobkirk - Prosthodontic treatment for edentulous patients; 13th edition CV Mosby Company, 2004. • Zarb Hobkirk - Prosthodontic treatment for edentulous patients; South Asian Edition Elsevier, 2017. • Essentials of Complete denture Prosthodontics - Sheldon Winkler, 2nd edition 1996
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THIRD YEAR BDS

GENERAL MEDICINE

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Summarize aetiology, pathophysiology, and principle of diagnosis and management of common medical ailments. (C1)
CO 2:	Apply the information obtained from case history to perform relevant clinical examination. (C3, P2,)
CO 3:	Choose, order and interpret appropriate investigations keeping in mind of their relevance to provide diagnosis of ailment. (C3,)
CO 4:	Identify various ailments that requires further evaluation, management & refer such patients to expertise. (C1, P1)
CO 5:	Demonstrate ethical principles and maintain proper etiquette in communication with patients, relatives and other health personals. (C3, A3,)

General Medicine:		Learning outcomes		
Third Year BDS				
Block	Sl. No	Content	Learning Outcomes	
I		Infectious Diseases		
	GM 1	A) Enteric fever	• Explain aetiopathogenesis , clinical features diagnosis and treatment of enteric fever (C2)	
		B) HIV infection and AIDS	• Illustrate the aetiopathogenesis, clinical features diagnosis and treatment ,post exposure ,Oral manifestations of AIDS(C2)	
		C) Herpes simplex, Herpes, zoster,chicken pox	• Outline the aetiology, clinical features, diagnosis and treatment (C1)	
		D) Syphilis ,diphtheria	• Describe the clinical features, diagnosis and treatment (C2)	
		E) Infection mononucleosis, mumps, measles ,rubella, malaria	• Outline the etiology, clinical features ,diagnosis and treatment (C1)	
		Gastrointestinal Diseases		
	GM 2	A) Stomatitis , gingival hyperplasia dysphagia	• Explain the various features of stomatitis, gingival hyperplasia and dysphagia (C2)	
		B) Acid peptic diseases	• Illustrate the etiopathogenesis, clinical features, diagnosis and treatment of acid peptic diseases. GERD, Upper GI bleeding(C2)	
		C) Jaundice	• Describe the etiopathogenesis, clinical approach and investigations(C2)	
		D) Acute and chronic hepatitis	• Discuss the etiopathogenesis ,clinical features ,diagnosis and treatment(C2)	
		E) Cirrhosis of liver	• Describe the etiopathogenesis, clinical features and diagnosis of cirrhosis. Explain the treatment of Ascites(C2)	
		F) Diarrhoea, Dysentery, Amoebiasis, malabsorption	• Discuss important aspects of diarrhea, dysentery, Amoebiasis and malabsorption(C2)	
		CVS disorders		
	GM 3	A)Acute Rheumatic fever	• Discuss the etiopathogenesis clinical features diagnosis and treatment(C2)	



		B) Congenital heart disease, Rheumatic heart disease (Mitralstenosis, Mitralregurgitation, Aortic stenosis,aortic, Regurgitation)	• Mention the important congenital heart diseases. Describe the aetiology, clinical features and diagnosis and treatment of various rheumatic valvular diseases (C1)
		C) Infective endocarditis	• Describe the etipathogenesis clinical features diagnosis, treatment and prevention. (C2)
		D) Hypertension	• Discuss the Etiology , Risk factors, diagnosis and management (oral effects of antihypertensive drugs)(C2)
		E) Ischemic heart disease: angina pectoris, myocardial infarction	• Describe the symptoms, signs,diagnosis and treatment(C2)
		F) Common arrhythmias AF (Atrial Fibrillation)	• Mention the aetiologies, clinical features and treatment(C1)
		G) Congestive cardiac failure	• Discuss the etipathogenesis, clinical features diagnosis and treatment(C2)
		Respiratory Disorders	
	GM 4	A) Pneumonia	• Enumerate the pathophysiology symptoms, signs, diagnosis and management (C1)
		B) COPD	• Discuss the pathophysiology, symptoms, signs diagnosis and management(C2)
		C)Bronchial Asthma	• Describe the Pathophysiology,symptoms,signs, diagnosis and management(C2)
		D) Pulmonary tuberculosis	• Discuss the Pathophysiology symptoms, signs, diagnosis and management(C 2)
		E)Bronchiectasis and Lung abscess	• Describe the Pathophysiology symptoms,signs, diagnosis and management.(C2)
		F) Pleural effusion and pneumothorax	• Enumerate the Pathphysiology, symptoms, signs, diagnosis and management(C1)
		G) Lung cancers	• Mention the etiology ,risk factors, symptoms and signs diagnosis and management(C1)
		Haematological disorders and their oral manifestatons	
	GM 5	A)RBC disorders: Anemias	• Describe the definition, classification, symptoms, signs, diagnosis of anemia and describe the management iron deficiency anemia (C2)
		B)Megaloblastic anemia	• Enumerate the Pathophysiology, symptoms, signs, diagnosis and management(C1)



		C) Hemolytic anemias	• Discuss the pathophysiology ,symptoms, signs, diagnosis and management (C 2)
		D) Leukemias	• Enumerate the definition, classification, symptoms, signs, diagnosis and management(C1)
		E) Aplastic anemia and Agranulocytosis	• Mention the definition, symptoms, signs, diagnosis and management(C1)
		F) Bleeding and clotting disorders	• Describe classification, symptoms, signs, diagnosis and management (C2)
		G) Lymphomas: Hodgkin's and Non-Hodgkin's	• Enumerate the Pathophysiology, symptoms, signs, diagnosis and management(C1)
		H) Generalized lymphadenopathy and splenomegaly	• Discuss the definition and differential diagnosis (C2)
Renal Disorders			
	GM 6	A)Acute Nephritis	• Discuss the pathophysiology symptoms, signs, diagnosis and management (C2)
		B)Nephrotic syndrome	• Describe the Pathophysiology, symptoms, signs, diagnosis and management (C2)
		C) Renal failure	• Discuss the Pathophysiology, symptoms, signs, diagnosis and management; Discuss the prescription in renal failure patients(C2)



Nutritional Disorders		
GM 7	A)Nutrition	Describe balanced diet and PEM(C2)
	B) Fat soluble vitamins: A,D,E & K	Enumerate the deficiency states, clinical manifestations, diagnosis and management(C1)
	C) Water soluble vitamins: B,C	Mention the deficiency states: clinical manifestations, Diagnosis and management(C1)
Central Nervous system disorders		
GM 8	A) Epilepsy	Describe the Pathophysiology, Symptoms, Signs, Diagnosis and Management(C2)
	B)Trigeminal Neuralgia	Enumerate the symptoms, signs, diagnosis and management. (C1)
	C) Migraine	Describe the Pathophysiology, Symptoms, Signs, Diagnosis and Management(C2)
	D)Facial Palsy	- Enumerate UMN and LMN palsy and syndromes associated with facial palsy (C1)
	E)Meningitis	D Pathophysiology, classification, clinical manifestation Diagnosis and Management escribe (C2)
	F)Comatose Patient	Discuss approach (C2)
ENDOCRINE DISORDERS		
GM 9	A)Diabetes Mellitus	Describe the Pathophysiology, classification, clinical manifestation diagnosis and treatment. (C1)
	B)Thyroid gland disorders	Discuss Hypothyroidism, thyrotoxicosis: clinical manifestation diagnosis and treatment. (C2)
	C) Parathyroid gland disorders	Describe Hypo and hyper Parathyroidism-effect on calcium metabolism clinical manifestations, diagnosis and treatment. (C1)
	D)Acromegaly	Enumerate: Pathophysiology, classification, clinical manifestation diagnosis and treatment. (C 1)
	E)Addison's disease; Cushing's syndrome	Enumerate the clinical manifestations diagnosis and treatment; patients on long term steroid therapy. (C 1)
Critical Care		
GM 10	A) syncope	Describe the Pathophysiology, clinical manifestation, Diagnosis and treatment. (C 2)
	B)Cardiac arrest and CPR	Discuss Causes and management of cardiac arrest. (C2)
	C)Shock	Describe the Pathophysiology, clinical features and management. (C2)
	D)Acute LVF;ARDS	Discuss causes, clinical features and management. (C2)

CLINICAL TRAINING				90 Hrs	
		COMPONENTS	OBJECTIVES		
		HISTORY TAKING	1) Demonstrate history taking, examine a medical patient, recording of clinical signs and symptoms and presenting a comprehensive patient history(C3, P4, A3,) 2) Demonstrate analytical and critical thinking using existing data and resources to diagnose common medical disorders and to outline their management(C3,P4, A3).		
		PHYSICAL EXAMINATION			
		CASE PRESENTATION			
		DISCUSSION OF CASE			
		TOPICS			
		EXAMINATION OF GIT	• Oral ulcers, Gum hypertrophy, Hepatosplenomegaly, Ascites, Cirrhosis of Liver		
		EXAMINATION OF RESPIRATORY SYSTEM	• COPD, Asthma, Bronchiectasis, Lung abscess, Tuberculosis, Pleural effusion, pneumothoraxMalignancy		
		EXAMINATION OF CVS	• Rheumatic fever, Valvular heart diseases, Infective endocarditis, congenital heart diseases, Hypertension, Congestive cardiac failure		
		GENERAL EXAMINATION	• Anaemia, Jaundice, Lymphadenopathy		

REFERENCE BOOKS	Davidson's Principles and Practice of Medicine
	Hutchison's clinical Methods



Question Paper

Exam Date & Time: 13-SEP-2023 (02:15 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

THIRD BDS DEGREE EXAMINATION - SEPTEMBER 2023

SUBJECT: GM 3101T – GENERAL MEDICINE

(REGULAR BATCH)

Marks: 60

Duration: 165 mins.

Answer all the questions.

Read the questions carefully and answer to the point.

Use line diagrams, flow charts and tables where appropriate.

Long questions.

- 1) Discuss the etiology, clinical features, management and complications of cirrhosis of liver.
(2+3+3+2 = 10 marks)
- 2) Discuss the etiology, clinical features and management of acute myocardial infarction. Add a note on precautions during dental treatment in a case of recent myocardial infarction. (2+3+3+2 = 10 marks)
- 3) **Write short notes on:**
 - 3A) Mention any FOUR drugs used in treatment of diabetes mellitus. (4)
 - 3B) Migraine. (4)
 - 3C) Oral manifestations in HIV infection. (4)
 - 3D) Clinical features and management of bronchial asthma. (4)
 - 3E) Etiology and clinical features of acute glomerulonephritis. (4)
 - 3F) Differential diagnosis of generalized lymphadenopathy. (4)
 - 3G) Scurvy. (4)
 - 3H) Megaloblastic anemia- clinical features and management. (4)
 - 3I) Specific precautions during dental treatment in pulmonary tuberculosis patient. (4)
 - 3J) Bacterial meningitis. (4)

-----End-----

GENERAL SURGERY

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Summarize aetiology, pathophysiology, and principle of diagnosis and management of common surgical ailments. (C1)
CO 2:	Apply the information obtained from case history to perform relevant clinical examination. (C3, P2,)
CO 3:	Choose, order and interpret appropriate investigations keeping in mind of their relevance to provide diagnosis of ailment. (C3,)
CO 4:	Identify various ailments that requires further evaluation, management & refer such patients to expertise. (C1, P1)
CO 5:	Demonstrate ethical principles and maintain proper etiquette in communication with patients, relatives and other health personals. (C3, A3,)

General Surgery:		Learning outcomes		
Third Year BDS				
Block	Sl. No	Content	Learning Outcomes	
I		General Principles of Surgery		
	SU 1	A) History and General Principles of Surgery asepsis, antisepsis and sterilization	- Summarize contributions made by various scientists, teachers and investigator(C2) - Define asepsis, antiseptic's, Sterilization (C1) - Describe Aseptic techniques, sterilization & disinfection (C1)	
	SU 2	B) Fluid , Electrolyte and Acid base balance Types of Electrolyte and Acid base imbalance, their clinical feature and how to diagnose and manage	- Summarize normal body fluid compartments & its constituents C2. - Enumerate the causes & discuss clinical manifestations, management of following electrolyte imbalances: Hypocalcaemia, Hypercalcemia, Hypomagnesemia, Hypermagnesemia Hyperkalaemia, Hypokalaemia. Hyponatremia, Hyponatremia(C1) - Explain the roles of the lungs, kidneys, and chemical buffers in maintaining acid-base balance C2 - Enumerate the causes, clinical manifestation, how do you evaluation & manage metabolic acidosis and alkalosis (C1) - Enumerate the causes, clinical manifestation, & how does you evaluate & manage respiratory acidosis and alkalosis (C1)	
Wounds				
	SU 3	A) Classification and types, complications , management with reference to oral cavity	- Define & Classify wounds(C3) - Describe the phases of wound healing (C1) - Distinguish types of wound healing- primary, secondary and tertiary (C2) - Discuss the Factors affecting wound healing (C2) - Explain complications of wound healing - Scars, Keloid, contractures(C2) - Discuss Medico-legal aspects of accidental wounds (C2)	
Inflammation				
	S U 4		Explain pathophysiology of inflammation (C2)	



		A)Pathophysiology , sequelae, clinical features , management	Describe sequelae, clinical feature & management of inflammation(C1)
Infections			
	SU 5	A) Acute and chronic abscess skin infections, cellulitis, carbuncle, and erysipelas	Enumerate the clinical features & Differentiate between Acute and Chronic abscess(C4)
			Define septicaemia, pyaemia, toxemia & differentiate them(C4)
			Define cellulitis, Enumerate the causes of cellulitis & describe pathophysiology, clinical features, Management of cellulitis(C2)
			Define Carbuncle, Enumerate the causes of carbuncle & describe pathophysiology, clinical features, Management of carbuncle (C2)
			Define erysipelas, Enumerate the causes of erysipelas & describe pathophysiology, clinical features, management of erysipelas(C2)
		B) Specific infections such as tetanus, gangrene, syphilis, gonorrhoea, tuberculosis, Actinomycosis, Vincent’s angina, cancrum oris, Pyaemia, toxemia and septicaemia	Enumerate the aetiology & describe pathophysiology, clinical features, and management of tetanus, & gas gangrene(C1)
			Enumerate aetiology & Describe pathophysiology, clinical features, and management of syphilis, gonorrhoea(C1)
			- Enumerate the aetiology & describe pathophysiology, clinical features, and management of tuberculosis(C1) - Enumerate the aetiology & Describe pathophysiology, clinical features, and management of Actinomycosis, Vincent’s angina, cancrum oris(C1)
	S U 6	Transmissible viral infections) HIV and Hepatitis with special reference to their prevention and precautions while treating patients in carrier state	Enumerate the precautions to be taken during treating patients with HIV & Hepatitis (Universal precaution). (C1)
			Enumerate the Post exposure measures to be taken. (C1)
Shock and Hemorrhage			
	S U 7	A) Hemorrhage Classification, Clinical features, Management.	Define & Classify haemorrhage. (C2)
			Enumerate the clinical features of haemorrhagic shock(C1)
			Summarize the management of haemorrhagic shock(C2)



	S U 8	B) Shock Classification, causes, clinical features and management of various types of shock. Syncope, Circulatory collapse	Define shock & Describe Pathophysiology of shock and its effects at local and systemic levels(C1)
			Classification of shock depending upon cause and severity(C2)
			Describe the clinical signs and symptoms of different types of shock (C1)
			Construct the treatment plan for various types of shock (C3)
	S U 9	C) Blood transfusion Blood groups, Blood products, Indications of transfusion, Complications of Blood transfusion, Blood substitutes. Hemophilia ; clinical features and management in relation to minor dental procedures	Classification of blood groups & principles of blood transfusion(C2)
			Enumerate the blood products, their indication, complications precautions to be taken for transfusion(C1)
			Discuss hemophilia, their transmission, clinical features and management(C2)
		Tumors, cysts, ulcers, sinus and fistulae	
	S U 10	Skin tumors Squamous cell carcinoma, basal cell carcinoma, Malignant melanoma and Marjolijn's ulcer	Enumerate aetiology & discuss the pathophysiology, clinical presentation, TNM staging and management of cutaneous squamous cell carcinoma & its variants(C1)
			Enumerate aetiology & discuss the pathophysiology, clinical presentation, TNM staging and management of Basal cell carcinoma(C1)
			Enumerate aetiology & discuss the pathophysiology, clinical presentation, TNM staging and management of Malignant melanoma(C1)
	S U 11	Neck swellings excluding thyroid and parathyroid and swellings in general Branchial cyst, Branchial fistula, Thyroglossal cyst and fistula, Ranula, laryngocele, Dermoid cyst , lipoma	Explain the cause, pathogenesis, clinical features, & management of the Branchial cyst & Branchial fistula(C2)
			Explain the cause, pathogenesis, clinical features, & management of the Cystic Hygroma, Thyroglossal cyst/Fistula(C2)
			Enumerate the etiological factors, clinical features & Discuss about management of Ranula(C1)
			Enumerate etiological factors & discuss clinical features, differential diagnosis & management of Laryngocele(C1)



			• Discuss clinical features and management of lipoma (C2) • Discuss aetiology, clinical features & management of dermoid cyst(C2)
Diseases of lymphatic system			
	S U 12	Diseases of lymphatics and lymphatic glands of the neck. Tuberculous lymphadenitis , Lymphoma , metastatic lymph node diseases	• Discuss about aetiology, pathogeneses, clinical features, & management of tuberculous lymphadenitis(C2) • Discuss about stages of tubercular lymphadenitis(C2) • Discuss about Cold abscess & its management(C2) • Enumerate causes of cervical lymphadenopathy. Discuss about pathogenesis, clinical features, classification, staging & management of lymphomas (C2) • Discuss the causes evaluation and management of secondaries in neck (C2)
Diseases of oral cavity and salivary glands			
	S U 13	Benign disorders , premalignant conditions of oral cavity , oral malignancy	• Describe the Surgical anatomy of Oral cavity (C1) • Enumerate the various premalignant lesion of oral cavity (C1) • Explain the Management of Premalignant lesions in oral cavity (C2) • Enumerate the etiological factors & Discuss about clinical features TNM staging & management of Lip Cancer (C2) • Enumerate the etiological factors & Discuss about clinical features TNM staging & management of buccal mucosa cancer(C2) • Enumerate the etiological factors & Discuss about clinical features TNM staging & management of soft& hard palate cancer (C2) • Enumerate the etiological factors & Discuss about clinical features TNM staging & management of carcinoma of Alveolus (C2) • Enumerate the etiological factors & Discuss about clinical features TNM staging & management of Carcinoma tongue (C2) • Discuss clinical features Management of carcinoma of floor of Mouth (C2)
	S U 14	Benign disorders – inflammation salivary gland calculi , Tumors of salivary glands	• Describe surgical anatomy of Parotid & submandibular salivary gland(C1) • Explain the presentation, pathology & investigations of salivary gland disease(C2)



			• Discuss medical & surgical treatment of sialolithiasis, Sialadenitis (C2) • Classify salivary gland tumours. Describe pathology, clinical presentation management of common benign & malignant salivary gland tumours (C2)
Diseases of the Larynx and nasopharynx			
	S U 15	Larynx - Infection and diseases of larynx	• Enumerate the causes & explain the clinical features, management of Laryngotracheobronchitis, pharyngitis. (C2) • Enumerate causes & discuss clinical features, & management of nasopharyngeal, Laryngeal cancer(C2) • Enumerate the causes of vocal cord palsy clinical features and management of vocal cord palsy(C2)
	S U 16	Tracheotomy - Principles, classification, procedure, complications	• Enumerate the Indications & Explain procedure and complications of Tracheostomy(C2)
	S U 17	Tonsillitis, complications. Indications of tonsillectomy	• Enumerate the causes of tonsillitis, and classification of tonsillitis (C2) • Discuss the pathology, clinical features, stages, investigations, treatment, & complications of Acute s tonsillitis(C2) • Discuss the pathology, clinical features, stages, investigations, treatment, & complications of chronic tonsillitis(C2)
Nervous system			
	S U 18	Principles of peripheral nerve injuries, their regeneration and principles of treatment of nerve injuries	• Enumerate the causes of peripheral nerve injuries. (C2) • Describe the Principles of their regeneration and treatment of peripheral nerve injuries (C1) • Detailed description of Afflictions of facial nerve injuries and its management(C2) • Discuss Trigeminal neuralgia, its presentation and treatment(C2)
Injuries: Fractures and Burns			
	S U 19	General principles of fractures, clinical presentation and treatment; fracture healing and rehabilitation	• Define & classify fractures in general (C2) • Describe the process of fracture healing(C1) • Clinical presentation & complications of fracture(C2) • Describe the methods of fracture treatment and rehabilitation(C1)
	SU 20	Burns	• Classify burns(C1)



			- Describe the local and systemic changes that occur in a burns(C2) - Describe the clinical features of thermal burns(C2) - Able to assess the burns on area and depth of involvement(C1) - Explain the method of calculating the rate & quantity of fluids required for burns patient(C1)
Principles of Operative Surgery			
	S U 21	Principles as applicable to minor surgical procedures including detailed description of asepsis, antiseptics, sterilisation, principles of anaesthesia and principles of tissue replacement. Knowledge of sutures, drains, diathermy, cryosurgery and use of Laser in surgery.	- Describe the principles of anaesthesia(C1) - Enumerate the indications and contraindications of various types of anaesthesia(C1) - Describe principles of tissue replacement, Diathermy, LASER, Suture materials Drains(C2) - Enumerate Principles & uses of cryosurgery(C1)
Anomalies of development of face			
	S U 22	Surgical anatomy and development of face; Cleft lip, Cleft palate – principles of management	- Enumerate the types of developmental abnormalities of the face, mouth and jaws(C1) - Discuss the aetiology of Cleft lip and palate(C2) - Enumerate the classification of Cleft lip and palate(C1) - Discuss the principles of reconstruction of cleft lip and palate including timing of repair(C2) - Describe the surgical procedure for cleft lip and cleft palate repair(C1) - Discuss the management of complications associated with cleft lip and palate(C2)
Diseases of Thyroid and parathyroid			
	S U 23	Surgical anatomy, Disorders of thyroid , hypothyroidism, hyperthyroidism, Thyroid malignancy , inflammatory conditions of thyroid,	- Describe the development of thyroid gland(C1) - Enumerate Blood supply, lymphatic drainage of thyroid gland and course of the recurrent laryngeal nerve & steps of thyroid hormone synthesis(C2) - Classify the goitre & describe pathophysiology for simple goitre and multi nodular goitre(C2) - Describe the signs and symptoms of Hypothyroidism & hyperthyroidism (C1)



			• Discuss the management of hypothyroidism & hyperthyroidism(C2) • Discuss management of Multi nodular goitre & solitary nodule of thyroid(C2) • Enumerate Various treatment modalities of benign thyroid conditions(C2) • Classify the thyroid malignancy & Describe clinical features and manifestation of thyroid malignancy(C2) • Explain various types of thyroidectomy and neck dissection. & its complications(C2)
	S U 24	Parathyroid	• Explain the development & surgical anatomy of Parathyroid gland(C2) • Classify hyperparathyroidism& Discuss the clinical features investigations & management of hyperparathyroidism(C2) • Describe the clinical features & management of Hypoparathyroidism(C1)
Swellings of the jaw			
	S U 25	Differential diagnosis and management of different types of swellings of the jaw	• Mention differential diagnosis of jaw swelling (C1) • Describe the pathology clinical features of management of Dentigerous cyst, Dental cyst. (C1) • Describe the pathology clinical features of management of Adamantinoma(C1) • Describe the pathology clinical features of management of Alveolar abscess osteomyelitis(C1) • Describe the pathology clinical features of management of mandibular malignant lesions(C1)
Biopsy			
	S U 26	Different types of biopsies routinely used in surgical practice. Skills to be developed by the end of teaching is to examine a routine swelling, ulcer and other related diseases and to perform minor surgical procedures such as draining an abscess, taking a biopsy etc	• Enumerate different types of biopsies routinely used in surgical practice. (C1) • Enumerate the indications, contraindication of different types of biopsies(C1)



CLINICAL TRAINING				90 Hrs	
		COMPONENTS	OBJECTIVES		
		HISTORY TAKING	• Demonstrate history taking, examine a surgical patient, recording of clinical signs and symptoms and presenting a comprehensive patient history (C3, P4, A3,) • Demonstrate analytical and critical thinking using existing data and resources to diagnose common surgical disorders and to outline their management(C3, P4, A3,)		
		PHYSICAL EXAMINATION			
		CASE PRESENTATION			
		DISCUSSION OF CASE			
		TOPICS			
		EXAMINATION OF ULCER	Skin ulcers		
		EXAMINATION OF SWELLING	Lymph nodes, Salivary gland disease, Lipoma, Dermoid cyst, sebaceous cyst,		
		EXAMINATION OF THYROID	Thyroid swelling		
		EXAMINATION OF ORAL MALIGNANCY	Carcinoma lip, buccal mucosa, tongue, floor of the mouth, alveolus, Soft & Hard palate		

REFERENCE BOOKS	1. Bailey and Love – Short practice of Surgery
	2. Das text book of surgery
	3. Manipal manual of surgery for dental students – K. R. Shenoy
	3. SRB manual of surgery for dental students
	4. Sabiston’s text book of surgery.
	6. Schwartz text book of surgery
	6. Clinical methods by S. Das

Question Paper

Exam Date & Time: 15-SEP-2023 (02:15 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION
THIRD BDS DEGREE EXAMINATION - SEPTEMBER 2023
SUBJECT: GS 3102T – GENERAL SURGERY

Marks: 60

Duration: 165 mins.

Answer all the questions.

Long Essays:

- 1) Classification of jaw tumours. Describe clinical features and management of ameloblastoma. (4+6 = 10 marks)
- 2) Classification of ulcer. Describe the management of diabetic foot ulcer. (4+6 = 10 marks)

3. Short Answers:

- 3A) Add a note on Branchial cyst. (4)
- 3B) Pleomorphic adenoma of parotid gland. (4)
- 3C) TB lymphadenitis. (4)
- 3D) Classify and describe suture material. (4)
- 3E) Describe premalignant lesion of oral cavity. (4)
- 3F) Classify Le Fort fracture of facial bones. (4)
- 3G) Complications of blood transfusion. (4)
- 3H) Add a note on Actinomycosis. (4)
- 3I) Add a note on Hyperkalemia. (4)
- 3J) Classification of goitre. (4)

-----End-----

ORAL PATHOLOGY AND MICROBIOLOGY

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Summarize the etiology, pathogenesis, clinical signs and symptoms, oral manifestations, investigative procedures, grading and prognostication of cysts and tumours (benign and malignant) affecting the oro-facial region. (C2)
CO 2:	Review the etiology, pathogenesis, clinical/oral manifestations, and investigative procedures of developmental, microbial, reactive/traumatic/iatrogenic/idiopathic, chemical, genetic, immunological and metabolic diseases affecting the oro-facial region. (C2)
CO 3:	Apply the knowledge of individual oral lesions and associated investigations in diagnosis. (C3, P3)
CO 4:	Relate the normal age changes of oral tissues and techniques of age/gender estimation, human identification in the field of Forensic Odontology. (C3, P3)

COURSE LEARNING OUTCOME

BLOCK 1: Taken in II year BDS (41 hours)

THEORY

	CONTENT	COMPETENCIES
ORAL PATHOLOGY		
BLOCK 1		
	Introduction and Orientation	• Orientation of the students about the subject.
	DEVELOPMENTAL DISTURBANCES OF ORAL AND PARA-ORAL STRUCTURES	
	Disturbances affecting the soft tissues of the cranio-facial system (Hereditary, familial, mutational, hormonal)	• Summarize the disturbances affecting the soft tissues of the cranio-facial system (C2)
	Disturbances affecting the jaws (<i>agnathia, micrognathia, macrognathia, hemifacial atrophy and hypertrophy</i>), lips (<i>cheilitis granulomatosa and glandularis, lip pits</i>), palate (<i>cleft</i>), oral mucosa (<i>Fordyce granules, Hecks disease, leukedema</i>) including gingiva (<i>Fibromatosis gingivae</i>) and tongue (<i>macroglossia, ankyloglossia, cleft tongue, fissured tongue, benign migratory glossitis, median rhomboid glossitis, hairy tongue, lingual varicose, cleft tongue, lingual thyroid nodule</i>) and salivary glands (<i>atresia, aberrancy, aplasia, hyperplasia, Stafne cyst</i>)	• Distinguish the developmental anomalies affecting the Jaws, lips, palate, oral mucosa, gingiva, tongue and salivary glands (C2) • Explain the clinical implications of developmental disturbances of the oral tissues (C2) • Recognize the clinical implications of the knowledge of developmental disturbances of oral tissues in their treatment procedures. (C3)
	Disturbances affecting the structure (enamel and dentine - <i>Amelogenesis imperfecta, environmental-enamel hypoplasia, dentinogenesis imperfecta, dentin dysplasia, regional odontodysplasia</i>), shape (<i>Transposition, transmigration, Gemination, Fusion, Talon's cusp, Dilaceration, concrescence, Enamel-Pearl, Hypercementosis, Dens invaginatus, Dens evaginatus, Taurodontism, Supernumerary roots</i>), size-number (<i>Microdontia, Macrodontia, Anodontia, Oligodontia, Supernumerary teeth</i>) and eruption	• Review the etio-pathogenesis, clinical features and histopathologic features of disturbances affecting the shape, size, structure, number and eruption of teeth. (C2) • Distinguish the developmental anomalies affecting the structure (enamel and dentine), shape, size and number of teeth (C2) • Explain the clinical implications of developmental disturbances affecting the structure (enamel and dentine), shape, size and number of teeth. (C2) • Recognize the clinical implications of the knowledge of developmental disturbances of structure, shape, size & number of teeth in their treatment procedures. (C3)



	(delayed eruption, premature eruption) of teeth	
	CLASS TEST	Class test /Assignment 1
	DENTAL CARIES	
	Introduction → definition, Theories of dental caries, etiology	- Define Dental Caries (C1) - Review the etio-pathogenesis and theories described for dental caries. (C2)
	Classification and clinical features of Dental caries	Classify dental caries based on morphology, dynamics, Chronology and anatomical aspect of caries. (C3)
	Histopathology of enamel and dentinal caries	Recognize types, and patterns of dental caries (enamel and dentin) histologically. (C2)
	Caries activity tests and Caries vaccine and caries prevention	- Explain the principle and interpretation of caries activity tests. (C2) - Recognize the principles involved in Caries vaccine. (C2)
	CLASS TEST	Class Test/Assignment 2
	DISEASES OF PULP AND PERIAPICAL TISSUES	
	Diseases of pulp and periapical tissues (Introduction, sequelae of dental caries – inter-relationship, focal reversible pulpitis, acute pulpitis, C/F, H/F, treatment, chronic pulpitis, pulp polyp, acute apical periodontitis C/F, H/F, treatment, Periapical granuloma, periapical abscess, phoenix abscess, Acute Osteomyelitis, chronic osteomyelitis, chronic focal sclerosing osteomyelitis, Chronic diffuse	Explain the sequelae of dental caries, clinical features, radiologic features and histopathology of pulpal and periapical diseases and various types of osteomyelitis (C2)

	sclerosing osteomyelitis, Garre's osteomyelitis)	
	CLASS TEST	• Class test/Assignment 3
	SPREAD OF ORAL INFECTION	
	Spread of oral infection (<i>cellulitis, Ludwig's angina</i>)	• Explain the concept of focal infection and focus of infection. (C2)
	Spread of oral infection (<i>focal infection, focus of infection, space infections</i>)	• Differentiate various space infections and their causes. (C2)
	CLASS TEST	• Class test/Assignment 4
	REGRESSIVE ALTERATIONS OF TEETH	
	Regressive alterations of enamel: Attrition (Bruxism), Abrasion, Erosion, Abfraction	• List the regressive alterations of teeth (C1) • Explain the etiology of regressive alterations. (C2) • Differentiate the clinical presentations of regressive alterations. (C2)
	Regressive alterations of dentin: Dead tracts, sclerotic dentin, secondary dentin, denticles	• Explain the etiology of regressive alterations. (C2)
	Regressive alterations of pulp and cementum: Internal and external resorption, pulp calcifications/denticles, cementicles, cemental hyperplasia, hypercementosis	• Explain the etiology of regressive alterations. (C2) • Differentiate the clinical presentations of these regressive alterations. (C2)
	CLASS TEST	Class Test/Assignment 5
	PERIODONTAL DISEASES	
	Periodontal diseases (<i>Gingival diseases → Introduction to plaque and calculus, anatomy of gingiva, pockets, NUG, Desquamative gingivitis, gingival abscess, pericoronitis and gingival enlargements</i>) (<i>Periodontal diseases → Chronic Periodontitis, Periodontal pockets, Aggressive periodontitis, necrotizing ulcerative periodontitis, Lateral periodontal abscess, Papillon Lefevre Syndrome.</i>)	• Classify the gingival and periodontal diseases (C2). • Distinguish extrinsic stains from intrinsic stains. (C2)
	CLASS TEST	Class Test/Assignment 6
	DISEASES OF THE NERVES	
	Trigeminal neuralgia and facial palsy	• Explain the neuralgias with clinical features of fifth cranial nerve and seventh cranial nerve affecting the orofacial region. (C2)

		Explain the clinical features of Glossopharyngeal neuralgia, causalgia, Psychogenic facial pain, Burning mouth disorder (C2)
	CLASS TEST	Class Test/Assignment 7
		Environmental Issues related to handling biopsy specimens
	FORENSIC ODONTOLOGY	
	Introduction, identification of victims/perpetrators in medico-legal cases/disasters using dental parameters, age estimation using hard and soft tissues of the oral cavity, bitemarks (<i>Introduction, definition, aims & scope, Sex and ethnic [racial] differences in tooth morphology and histological age estimation, determination of sex & blood groups from buccal mucosa / saliva, Dental DNA methods, Bite marks, rugae patterns & lip prints, Dental importance of poisons and corrosives. Overview of forensic medicine and toxicology</i>)	- Define Forensic Odontology. (C1) - Discuss the methods involved in personal and dental identification of individuals irt. Natural, criminal and accidental scenarios. (C2) - Explain the procedure of age estimation using dental radiographs, dental models, tooth specimens and biochemical methods. (C2) - Review the comparative dental identification procedures, rugoscopy and cheiloscopy techniques. (C2) - Recognize the patterns of bitemarks and procedures involved in the bitemark analysis. (C2)

BLOCK 2 – III YEAR (COVERED FROM BEGINNING OF SESSION TILL FIRST SESSIONALS)		
	BACTERIAL INFECTIONS OF THE ORAL CAVITY	
	Tuberculosis, syphilis, actinomycosis, diptheria, leprosy, streptococcal infections, pyostomatitis vegetans, NUG, cancrum oris.	- Review clinical (oral and general) and microscopic features of bacterial infections affecting the head and neck region. (C2) - List the laboratory investigations and special stains utilized for diagnosis of the bacterial infections of the head and neck. (C1)
	CLASS TEST	Class Test/Assignment 8
	VIRAL INFECTIONS OF THE ORAL CAVITY	
	Herpes simplex (<i>primary herpetic gingivostomatitis and recurrent herpes labialis</i>), varicella zoster (<i>chicken pox and Shingles</i>),	- Discuss the clinical (oral and general) and microscopic features of viral Infections. (C2) - List the laboratory investigations for diagnosing viral infections affecting oral cavity. (C1)

	measles, mumps, hand foot and mouth disease, HIV	Identify the clinical signs, syndromes associated with the viral infections of the oral cavity. (C1)
	CLASS TEST	Class Test/Assignment 9
	MYCOTIC INFECTIONS OF THE ORAL CAVITY	
	Candidiasis (<i>acute and chronic</i>), Aspergillosis ^δ , Mucormycosis ^δ , histoplasmosis ^δ , Rhinosporidiosis ^δ , Blastomycosis ^δ	- Review classification, clinical (oral and general), microscopic features and laboratory diagnosis of candidiasis. (C2) - Discuss clinical (oral and general) and microscopic features of aspergillosis, mucormycosis, histoplasmosis, rhinosporidiosis and blastomycosis. (C2) - List the laboratory investigations and special stains used for diagnosis of fungal infections affecting the oral cavity. (C1)
	CLASS TEST	Class Test/Assignment 10
	EPITHELIAL TUMOURS OF THE ORAL CAVITY	
	Premalignant lesions and conditions (Leukoplakia, erythroplakia, OSMF)	- Define premalignant lesions/conditions and potentially malignant disorders. (C1) - Explain the concept of Premalignancy. (C2) - Discuss the potentially malignant lesions and conditions of the oral cavity. (C2) - Write about premalignant lesions and conditions based on the etio-pathogenesis, clinical and histological features. (C3) - Summarize histological features of epithelial dysplasia. (C2) - List differential diagnosis and methods of management of these lesions. (C1)
	Benign epithelial tumours → squamous papilloma, verruca vulgaris keratoacanthoma, nevus	- Distinguish between the benign and malignant epithelial tissue neoplasms. (C2) - Summarize the etiology, clinical and histologic features of squamous papilloma, keratoacanthoma. (C2) - Summarize the etiology, types, clinical and histologic features nevus. (C2) - List differential diagnosis and methods of management of benign epithelial neoplasms. (C1)
	Malignant epithelial tumours → verrucous carcinoma, oral squamous cell carcinoma, basal cell carcinoma, malignant melanoma	- Enumerate malignant epithelial neoplasms. (C1) - Discuss the etio-pathogenesis, clinical and histopathological features (including types and grading) of Oral squamous cell and verrucous carcinoma. (C2) - Recognize the grading and staging system of OSCC. (C2) - Discuss the etiology, clinical and histopathological features of basal cell carcinoma. (C2)



		• Discuss the etiology, clinical, histopathological features and grading of malignant melanoma. (C2) • Relate the clinical/histopathological grading to the clinical outcome of malignant epithelial neoplasms. (C3) • Differentiate the differential diagnosis and methods of management of malignant epithelial neoplasms. (C2)
	CLASS TEST	Class Test/Assignment 11
	NON-EPITHELIAL TUMOURS OF THE ORAL CAVITY	
	Benign connective tissue tumours→ fibroma, giant cell fibroma, peripheral ossifying fibroma, central ossifying fibroma, peripheral giant cell granuloma, central giant cell granuloma,(<i>reactive lesions including Pyogenic granuloma and Fibrous Hyperplasia</i>), myxoma, lipoma, hemangioma, lymphangioma, neuroma (<i>traumatic and mucosal</i>), neurofibroma, neurilemmoma, chondroma, osteoma, osteoid osteoma, osteoblastoma, tori, Misc tumours (<i>Congenital Epulis & Granular Cell Myoblastoma</i>), Aggressive Fibrous lesions	• Classify benign connective tissue tumours. (C2) • Recognize the differences between benign and malignant connective tissue tumours. (C2) • Discuss the clinical and histopathological features of tumours of fibrous, myxoid, adipose, blood/lymphatic vessels, nerve, bone and cartilage tissue. (C2)



	Malignant connective tissue tumours→ tumours of fibrous connective tissue (<i>Fibrosarcoma</i>), adipose tissue, nerve, bone (<i>osteosarcoma</i>, <i>Ewing's sarcoma</i>, <i>giant cell tumour</i>), cartilage (<i>chondrosarcoma</i>), blood vessels, lymphatic system (<i>Kaposi's Sarcoma</i>, <i>Angiosarcoma</i>, <i>lymphomas</i>, <i>Burkitt's Lymphoma</i>) and metastatic tumours of the jaws	- Enumerate malignant connective tissue tumours (C1) - Discuss the clinical and histopathological diagnostic features of tumours of fibrous tissue. (C2) - Mention the malignant nerve tumour. (C1) - Discuss the clinical, radiographic, histopathological features and differential diagnosis of osteosarcoma including Ewing's sarcoma and osteoblastoma. (C2) - Discuss the clinical and histopathological differences between chondrosarcoma and chondroblastic variant of osteosarcoma. (C2) - Review the histopathological differences of hemangioma, hemangioendothelioma and hemangiopericytoma. (C2) - Outline the types of tumours of blood cell origin. (C1) - Discuss the clinical and histopathological features of lymphoma (Hodgkins and Burkitts lymphoma, multiple myeloma. (C2) - Discuss the pathogenesis (routes of metastasis), clinical and radiological features of tumours metastasising to and from the oral cavity. (C2) - Recall the immunohistochemical markers specific to malignant connective tissue tumours. (C1)
	CLASS TEST	Class Test/Assignment 12
HEALING OF ORAL WOUNDS		
	Physiology and complications of wound healing, biopsy wound healing, fracture healing, extraction wound healing, exfoliative cytology, Dry socket	- Discuss the factors affecting the healing of oral wounds. (C2) - Relate the physiology of wound healing pertaining to biopsy wounds, extraction sockets and fracture with emphasis on complications of wound healing. (C3) - Interpret the various classes of exfoliative cytology and its utility in oral squamous cell carcinoma. (C3)
	CLASS TEST	Class test/ Assignment 13



SALIVARY GLAND PATHOLOGY		
	Introduction and classification	- Classify benign and malignant salivary gland neoplasms. (C2) - Summarize the pathogenesis of salivary gland neoplasms. (C2)
	Benign salivary gland tumours → pleomorphic adenoma, Warthin tumour, Oncocytoma	- Discuss etio-pathogenesis, clinical, histopathologic features and differential diagnosis of pleomorphic adenoma. (C2) - Relate the use of special stains in diagnosis of benign Salivary gland neoplasms. (C3) - Discuss etio-pathogenesis, clinical, histopathologic features and differential diagnosis of Warthin tumour. (C2) - Summarize the clinical, histopathologic features and differential diagnosis of oncocytoma. (C2)
	Malignant salivary gland tumours → Mucoepidermoid Carcinoma, Adenoid cystic carcinoma, Acinic Cell Carcinoma & Adenocarcinomas	- Discuss the clinical, histopathologic features (including grading) and differential diagnosis of Adenoid cystic carcinoma and mucoepidermoid carcinoma. (C2) - Relate the use of special stains in diagnosis of malignant Salivary gland neoplasms. (C3) - Review the histological types/grading systems of Adenoid cystic carcinoma and mucoepidermoid carcinoma. (C2)
	Misc. lesions → Tumor like lesions, Necrotizing sialometaplasia, Sjogrens syndrome, mucocele, sialosis, sialadenitis, xerostomia, ptyalism	- Describe the clinical features, histopathological features and the differential diagnosis of Necrotizing sialometaplasia. (C2) - Explain the etiopathogenesis, clinical features, radiographic features, laboratory diagnosis of Sjogrens syndrome. (C2) - Discuss the different types of mucocele. (C2)
	CLASS TEST	Class Test/Assignment 14

CYSTS OF THE ORO-FACIAL REGION		
	Developmental odontogenic cysts → Odontogenic keratocyst, Dentigerous cyst, eruption cyst, Calcifying odontogenic cysts, Lateral periodontal cyst, glandular odontogenic cyst	- Classify cysts of the jaws. (C2) - Summarize the clinical radiological and histologic features of Dentigerous cyst, odontogenic keratocyst, calcifying odontogenic cyst. (C2) - Distinguish lateral periodontal cyst, glandular odontogenic cyst and eruption cyst from odontogenic keratocyst, dentigerous cyst and calcifying odontogenic cyst. (C2) - Illustrate the clinical, radiological and histopathological differences of the developmental odontogenic cysts. (C3)



	Inflammatory odontogenic cysts → radicular cyst, residual cyst	- Discuss the clinical, radiological and histologic features and treatment of Radicular and residual cyst. (C2) - Differentiate these cysts clinically radiologically and histologically from other cysts and granulomas. (C3)
	Non odontogenic cysts of orofacial region. Globulo-maxillary cyst, Nasopalatine cyst (<i>Epsteins pearls and Bohn nodules</i>), Nasolabial cyst, Mucocele, Ranula, Median palatal cyst, median mandibular cyst	- Classify non-odontogenic cysts. (C2) - Describe the pathogenesis and clinical features and radiographic features of non-odontogenic cysts. (C2) - Differentiate non-odontogenic cysts histologically. (C3)
	CLASS TEST	Class test /Assignment 15
	ODONTOGENIC TUMOURS	
	Introduction and classification	Outline the classification of odontogenic tumours. (C1)
	Epithelial odontogenic tumours → Enameloma, Ameloblastoma, Adenomatoid Odontogenic tumour (AOT), Calcifying epithelial odontogenic tumour (CEOT), Squamous odontogenic tumour	- Explain the etio-pathogenesis, clinical and radiographic features of Ameloblastoma. (C2) - Relate the clinical, radiological and histological features of ameloblastoma. (C3) - State clinical, radiographic and histopathological features squamous odontogenic tumour. (C1) - Relate the etio-pathogenesis, clinical, radiographic and histopathological presentation of AOT and CEOT. (C3) - Differentiate odontogenic tumours clinically, radiologically and histologically. (C3)
	Odontogenic malignancies → ameloblastic carcinoma and malignant ameloblastoma	Distinguish ameloblastic carcinoma from malignant ameloblastoma based on clinical, radiographic and histopathologic features. (C3)
	Mixed Odontogenic tumours → Ameloblastic fibroma, Ameloblastic fibro odontoma, odontoma	- Explain the etio-pathogenesis, clinical, radiographic and histopathological presentations of Ameloblastic fibroma and odontoma (C2) - Differentiate mixed odontogenic tumours clinically, radiologically and histologically (C3)
	Mesenchymal Odontogenic tumours → Odontogenic fibroma, Odontogenic myxoma, Cementoblastoma	- Discuss the origin, clinical, radiographic and histopathological presentations of mesenchymal odontogenic tumors. (C2) - Differentiate mesenchymal odontogenic tumours clinically, radiologically and histologically. (C3)

CLASS TEST		Class Test/Assignment 16
ALLERGIC AND IMMUNOLOGIC DISORDERS OF THE ORAL CAVITY		
Recurrent aphthous stomatitis (Major, minor, herpetiform and associated with Behcet syndrome); differential diagnosis		• Explain the clinical and histologic features of various forms of recurrent aphthous stomatitis(C2) • Differentiate these from the other lesions presenting as oral ulcers C2)
Orofacial granulomatosis ^δ and angioedema ^δ		• Explain the clinical and histologic features of orofacial granulomatosis (C2) • Explain the etiopathogenesis, clinical features of angioedema(C2)
Drug allergy		• Explain the clinical and histologic features of allergic reactions caused due to medications (C2)
CLASS TEST		• Class Test/Assignment 17
BLOCK 4 – III YEAR (COVERED BETWEEN SECOND SESSIONAL AND THIRD SESSIONAL EXAMINATION)		
DISEASES OF BLOOD AND BLOOD FORMING ORGANS		
Diseases involving Red blood cells (<i>Iron deficiency anemia, pernicious anemia, aplastic anemia, erythroblastosis fetalis, sickle cell anemia, Thalassemia, polycythemia</i>)		• Explain the various disorders involving the RBC's related to orofacial region (C2) • Differentiate these disorders based on various clinical and laboratory investigations. (C3) • Discuss the etiology, clinical features, oral manifestation, lab findings and treatment of RBC disorders. (C2)
Diseases involving White blood cells (<i>Agranulocytosis, cyclic neutropenia, Leukemia, leukemoid reaction, infectious mononucleosis</i>)		• Explain the various disorders involving the WBC's related to orofacial region (C2) • Differentiate these disorders based on various clinical and laboratory investigations. (C3) • Discuss the etiology, clinical features, oral manifestation, lab findings and treatment of WBC disorders. (C2)
Diseases involving platelets and specific blood factors (<i>Functions of platelets, approach to a patient with bleeding disorder, definition of terms petechiae, ecchymosis, and purpura, thrombocytopenic purpura, Hemophilia, Christmas disease, von Willebrand disease.</i>)		• Explain the various disorders involving the platelets and clotting factors related to orofacial region (C2) • Differentiate these disorders based on various clinical and laboratory investigations. (C3) • Discuss the etiology, clinical features, oral manifestation, lab findings and treatment of WBC disorders. (C2)
CLASS TEST		Class Test/Assignment 18
ORAL ASPECTS OF METABOLIC DISEASES - Brief review & oral manifestations, diagnosis & significance of common Nutritional, Hormonal, Metabolic diseases of Oral cavity.		



Water soluble Vitamin deficiency (B complex and C) Fat soluble Vitamin deficiency (A, D, E and K)	- List and Explain the various clinical features and oral manifestations of deficiency of water- and fat-soluble vitamins (C2) - Differentiate vitamin deficiencies based on clinical features and laboratory and histopathological features (C2)
Mineral metabolism defects (Iron, Calcium, Magnesium, phosphorous etc.)	- Explain the various clinical features and oral manifestations of mineral deficiency (C2) - Differentiate mineral deficiencies based on clinical features and laboratory and histopathological features (C2)
Disturbances in hormone metabolism (Pituitary, thyroid, parathyroid, adrenal glands)	- Explain the various clinical features and oral manifestations of disturbances in hormone metabolism(C2) - Differentiate disturbances of hormonal metabolisms based on clinical features, laboratory and histopathological features (C2)
Disturbances in protein, carbohydrate and lipid metabolism	Explain the various clinical features and oral manifestations of disturbances in nutrient (carbohydrate, Protein and Lipid) metabolism(C2)
CLASS TEST	Class Test/Assignment 19
PHYSICAL AND CHEMICAL INJURIES	
Physical and Chemical Injuries (<i>including allergic injuries; effects of radiation on human tissues, effects of heavy metal poisoning, traumatic Ulcer. Pigmentation of Oral & Paraoral region & Discolouration of teeth, traumatic injuries to maxillary sinus and salivary glands</i>)	Summarize the physical and chemical injuries sustained in the soft tissues of the oral cavity, alveolar bone and teeth. (C2)
CLASS TEST	Class Test/Assignment 20
BONE AND JOINT DISEASES	
Introduction, Osteogenesis Imperfecta, Marfan syndrome, Osteopetrosis ^o	Explain the etiopathogenesis, clinical and radiological features of bone dystrophies of craniofacial region. (C2)
Fibrous Dysplasia, Cherubism, Ossifying Fibroma, Paget's disease Cemento-osseous dysplasia, cementoblastoma	- Classify fibro- osseous lesions of oral and para-oral region. (C1) - Explain the etiopathogenesis, clinical and radiological features of fibro-osseous lesions and bone dystrophies of oral and paraoral region. (C2)



		Differentiate the histopathologic features of fibro-osseous lesions and bone dystrophies affecting the oral and para-oral region. (C2)
	Achondroplasia ^o , craniosynostosis (crouzon and Apert syndrome), Cleidocranial dysplasia ^o , Downs syndrome ^o , Pierre Robin Anomalad ^o	- Explain the etiopathogenesis, clinical and radiological features of bone dystrophies of oral and paraoral region. (C2) - Differentiate the clinical and radiographic features of bone dystrophies affecting the oral and para-oral region. (C2)
	Histiocytosis X ^o	Explain the types, clinical, radiological and histopathological features of Histiocytosis X. (C2)
	Disease of Temporomandibular joint Ankylosis, arthritis, Myofascial pain dysfunction syndrome, internal derangement	- Explain the various conditions/disease affecting the TMJ. (C2) - Differentiate clinical and histological features of TMJ disorders (C2)
	CLASS TEST	Class Test/Assignment 21
	DISEASES OF SKIN	
	Introduction, Etiopathogenesis, General clinical presentation and treatment. Ectodermal dysplasia, psoriasis, white sponge nevus, Lichen planus Erythema multiforme (Major and minor, Steven Johnson syndrome, TEN) Epidermolysis bullosa, Scleroderma (including CREST syndrome) Systemic Lupus erythematosus (SLE), Discoid lupus erythematosus (DLE)	- Classify the muco- cutaneous lesions which affect the skin and oral mucosa. (C3) - Explain the clinical and histopathological features of ectodermal dysplasia, psoriasis and white sponge nevus. (C2) - Explain the etio-pathogenesis, clinical, histopathological and immunofluorescent features of lichen planus. (C2) - Explain the clinical and histopathological features of erythema multiforme. (C2) - Explain the clinical and histopathological features of epidermolysis bullosa and scleroderma. (C2) - Explain the clinical and histopathological features of SLE and DLE. (C2) - Differentiate these diseases based on clinical and histopathological features (C2) - Differentiate different muco-cutaneous diseases based on clinical and histopathological features. (C3) - Discuss clinical and laboratory (histopathology and immunofluorescence) investigations used to diagnose muco-cutaneous lesions. (C3) - List various methods of treatment management. (C1)
	Pemphigus (<i>vulgaris, foliaceus, erythematosus and vegetans</i>) and Pemphigoid (<i>bullous and cicatricial pemphigoid</i>)	- Explain the etio-pathogenesis, clinical and histopathological features of pemphigus and pemphigoid. (C2) - Differentiate the mucocutaneous diseases based on clinical, histopathological and immunofluorescence

		findings. (C3)
	CLASS TEST	Class Test/Assignment 22
	WASTE DISPOSAL IN ORAL PATHOLOGY	
	Disposal of human tissues and reagents used	Discuss the methods of bio-medical waste management in laboratory in Oral Pathology. (C2)

PRACTICALS		
BLOCK 1	ORIENTATION	Relate the importance of the normal histological features of oral soft and hard tissues. (C2)
	DEVELOPMENTAL DISTURBANCES OF THE ORAL AND PARA-ORAL STRUCTURES Fusion, supernumerary roots, concrescence, taurodont, rhizomegaly [#] , rhizomicry [#] , dens in dente, dilaceration, microdont, complex odontoma, hypercementosis, periapical granuloma, Fordyce granules [#] , gingival hyperplasia [#] , enameloma [#] Dens evaginatus*, Peg shaped lateral incisor*, Multiple supernumerary teeth*, Mesiodens* MISC. Attrition, Abrasion, Hypercementosis (specimens)* Physical and Chemical Injuries Ankylosis (specimens)*	- Differentiate the developmental disturbances of the size of the tooth in relation to microdont, macrodont, rhizomicry and rhizomegaly. (C1, P1) - Identify the tooth specimens showing joining of two teeth (fusion, concrescence) (P1) - Explain the difference between fusion, concrescence, gemination. (P2) - Detect the developmental disturbances of the shape of the tooth among the specimens of dilaceration, taurodont, dens in dente, supernumerary roots. (P1) - State the clinical implications of the developmental disturbances of size and shape of the tooth. (C2, P2) - Display the ability to identify the specimen of complex odontoma, periapical granuloma and describe the pathogenesis. (P2) - Reproduce the histopathological features of enameloma, fordyces granules and gingival hyperplasia. (P2)
	DENTAL CARIES Pit and fissure caries [#] , smooth surface caries [#] Enamel Caries Initial Pit caries*, Pit caries with cavitation*, Pit caries with dentin involvement*	Reproduce the histopathological features of pit and fissure caries and smooth surface caries. (P2)



	Dental caries Dental caries – ground and decalcified sections* Cemental Caries*	
	PULP AND PERIAPICAL LESIONS Acute and chronic pulpitis, periapical granuloma and osteomyelitis, chronic hyperplastic pulpitis*	• Reproduce the histopathological features of acute and chronic pulpitis, periapical granuloma and osteomyelitis (P2)
	BACTERIAL VIRAL AND FUNGAL INFECTIONS OF THE ORAL CAVITY TB lymphadenitis#, Actinomycosis#, candidiasis#	• Reproduce the histopathological features of TB lymphadenitis, actinomycosis and candidiasis. (P2)
	TOTAL PRACTICAL HOURS	
BLOCK 2	PREMALIGNANT LESIONS & CONDITIONS + EPITHELIAL TUMOURS OF THE ORAL CAVITY Squamous papilloma, intradermal nevus#, leukoplakia#, erythroplakia#, Mild dysplasia*, Severe dysplasia*, carcinoma in situ#, oral submucous fibrosis, squamous cell carcinoma, verrucous carcinoma, malignant melanoma#	• Reproduce the histopathological features of premalignancies like leukoplakia, erythroplakia, carcinoma in situ and oral submucous fibrosis. (P2) • Reproduce the histopathological features of benign epithelial tumours like squamous papilloma and intradermal nevus. (P2) • Reproduce the histopathological features of malignant epithelial tumours like squamous cell carcinoma, verrucous carcinoma and malignant melanoma. (P2)
	CONNECTIVE TISSUE TUMOURS OF THE ORAL CAVITY Fibroma, peripheral ossifying fibroma, lipoma, neurofibroma#, neurilemmoma#, osteoma, Cancellous osteoma* chondroma#, hemangioma, Peripheral giant cell granuloma, Central giant cell granuloma*, Pyogenic granuloma fibrosarcoma#, osteosarcoma#, Hodgkins lymphoma#	• Reproduce the histopathological features of benign connective tissue tumours like fibroma, peripheral ossifying fibroma, lipoma, neurofibroma, neurilemmoma, osteoma, chondroma and hemangioma. (P2) • Reproduce the histopathological features of malignant connective tissue tumours like fibrosarcoma, osteosarcoma and Hodgkins lymphoma. (P2)
	CYSTS OF THE ORO-FACIAL REGION Orthokeratinized odontogenic keratocyst*, Keratocystic odontogenic tumour, calcifying cystic odontogenic tumour,	• Reproduce the histopathological features of keratocystic odontogenic tumour, calcifying cystic odontogenic tumour, dentigerous cyst, radicular cyst and epidermoid cyst. (P2)



	dentigerous cyst, radicular cyst, epidermoid cyst [#]	
	ODONTOGENIC TUMOURS Follicular, acanthomatous and plexiform ameloblastoma, adenomatoid odontogenic tumour, calcifying epithelial odontogenic tumour, ameloblastic fibroma, enameloma, Central cementifying fibroma*	• Reproduce the histopathological features of follicular, acanthomatous and plexiform ameloblastoma, adenomatoid odontogenic tumour, Calcifying epithelial odontogenic tumour. (P2)
	• TOTAL PRACTICAL HOURS	
BLOCK 3	SALIVARY GLAND NEOPLASMS Mucocele, pleomorphic adenoma, adenolymphoma, oncocytoma [#] , adenoid cystic carcinoma, mucoepidermoid carcinoma	• Reproduce the histopathological features of benign salivary gland tumours like pleomorphic adenoma, Warthins tumour and oncocytoma. (P2) • Reproduce the histopathological features of malignant salivary gland tumours like adenoid cystic carcinoma and mucoepidermoid carcinoma. (P2) • Reproduce histopathological features of mucocele. (P2)
	BONE AND JOINT DISEASES Paget's disease of bone*, Fibrous dysplasia, aneurysmal bone cyst	• Reproduce the histopathological features of Fibrous dysplasia and Paget's disease of bone (P2)
	DISEASES OF THE SKIN Pemphigus [#] , Lichen planus	• Reproduce the histopathological features of lichen planus and pemphigus (P2)
	Forensic Odontology	• Estimate the age of an individual based on the histopathological features of ground sections of a teeth. (Gustafsons technique) (P3) • Reproduce the lip prints and classify the type of prints. (C3, P3) • Estimate the pattern of Rugae in a maxillary cast. (C2, P2) • Correlate the type, number, alignment, teeth present and utilize it for comparative dental identification. (C3, P3)

FEEDBACK METHODS	1. Faculty feed back 2. Course feedback 3. Feedback after block examination
References	1. Neville, Damm, Allen, Chi. Oral and Maxillofacial Pathology. First south Asia edition. India: Elsevier India,, 2015. 2. Shafer, Hine, Levy. Edited by R.Rajendran and B.Sivapathasundaram: Shafer's Textbook of Oral Pathology. ; 8th Edition India: Elsevier India; 2009. 3. Regezi, Sciubba, Jordan, Oral Pathology. Clinical Pathologic Correlations. 6th Edition; India: Saunders Elsevier; 2011. 4. Cysts of the Oral and Maxillofacial Regions, Fourth Edition. Mervyn Shear, Paul Speight

Question Paper

Exam Date & Time: 18-Sep-2023 (02:15 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

FINAL BDS PART – II DEGREE EXAMINATION – SEPTEMBER 2023

SUBJECT: ORAL PATHOLOGY AND MICROBIOLOGY
(REGULAR BATCH)

Marks: 60

Duration: 165 mins.

Answer all the questions.

Draw diagrams and flowcharts wherever necessary.

- 1A) Classify salivary gland neoplasms. (2)
1B) Describe the histogenesis, clinical features and histological features of Pleomorphic adenoma. (2+3+3 = 8 marks)
- 2A) Classify Fibro-osseous lesions. (2)
2B) Explain the clinical features, radiographic features, and histological features of Fibrous dysplasia. (3+2+3 = 8 marks)
- 3) **Short answers:**
- 3A) Clinical and histological features of Adenomatoid odontogenic tumour (4)
3B) Radiographic and Histological features of Osteosarcoma (4)
3C) Clinical and histological features of Squamous papilloma (4)
3D) Pathogenesis and oral manifestations of Pernicious anaemia (4)
3E) Explain the Zones of Enamel caries (4)
3F) Clinical and histological features of Oral Lichen Planus (4)
3G) Deficiency of Vitamin D (4)
3H) A 18-year-old female complained of swelling over lower left region of face with no history of pain or discharge. On clinical examination lingual and buccal cortical expansion of mandible was evident. Panoramic radiograph showed a pericoronal radiolucency in relation to third molar extending into the ramus of mandible. Aspiration yielded a yellowish straw-coloured fluid. Identify the probable clinical diagnosis and describe the histopathological features in detail. (4)
3I) A 60-year-old male met with an accident and developed multiple swellings on the left mandible; one of the swellings erupted to discharge yellowish pus. Patient complained of pain and fever with weight loss. After culture on Brain heart fusion agar non- spore forming gram positive bacteria were noted. Identify the lesion and describe its clinical and histological features. (4)
3J) Classification of Bite marks (4)

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MANIPAL
ACADEMY of HIGHER EDUCATION
(Institution of Eminence Deemed to be University)

FOURTH YEAR BDS

ORTHODONTICS & DENTOFACIAL ORTHOPAEDICS

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Formulate the treatment planning for different types of malocclusion (C4,P3,A3)
CO 2:	Comprehend the biological basis of orthodontic therapy and biomechanics of orthodontic appliances (C4,P3,A3)
CO 3:	Classify and explain the principles, design, indications and usage of various removable, fixed, functional and orthopaedic appliances (C4,P3,A3)
CO 4:	Demonstrate the fabrication and activation of the removable appliances. (C4,P3,A3)
CO 5:	Identify and enumerate various major and minor surgical procedures pertaining to orthodontics (C2,P2,A2)

COURSE LEARNING OUTCOME		
BLOCK 1: Taken in III year BDS (21 hours)		
BLOCK 2,3,4: Taken in Final year BDS (45 hours)		
THEORY		
	CONTENT	COMPETENCIES
ORTHODONTICS AND DENTOFACIAL ORTHOPAEDICS		
Block 1	Introduction to Orthodontics	• Introduction and definition (C1) • Sequelae of malocclusion (C1) • Aim of orthodontic treatment (C1) • Scope of treatment Service offered (C2) • Brief history of Orthodontics (C1)
	GROWTH & DEVELOPMENT	
	Definition, Differential Growth	• Definition of growth and development (C1) • Concepts of growth (C3)
	Growth spurts, Factors influencing growth and development	• Definition of growth spurt (C1) • Factors affecting growth (C2) • Differential growth – Scammon's growth curve, cephalocaudal gradient of growth (C3)
	Methods of measuring growth, Clinical Application of growth and development	• Methods of gathering growth data- longitudinal and cross –sectional data (C3) • Types of growth data-opinion, observation, rating (C2) • Methods of studying growth-measurement and experimental approach (C2) • Clinical application-vital staining. (C3)
	MORPHOLOGIC DEVELOPMENT OF CRANIOFACIAL STRUCTURES	
	Osteology and Myology of the bones and muscles of cranium and face, Methods of bone growth.	• Osteogenesis (C3) • Methods of bone growth-drift, displacement. (C3)
	Prenatal growth of craniofacial structures	• Parachordal, hypophyseal, nasal and oticchondrification (C2) • Chondro-cranial ossification- Occipital, temporal, ethmoid, sphenoid (C2) • Flexure of cranial base and Uneven nature of growth of cranial base (C3) • Prenatal growth of maxilla-development of palate, maxillary sinus (C3) • Prenatal growth of mandible-meckle's cartilage (C3) • Endochondral bone formation (C2)
	Morphologic development of craniofacial structures- Postnatal growth of cranial base	• Remodeling and drift (C3) • Elongation at synchondroses(C3) • Sutural growth(C3)

		• Timing of cranial base growth(C3)
	Morphologic development of craniofacial Structures-Postnatal growth of maxilla	• Displacement(C3) • Growth at sutures(C3) • Surface remodelling(C3)
	Morphologic development of craniofacial structures-Postnatal growth of mandible	• Ramus, corpus angle, tuberosity, alveolar process, condyle chin, coronoid process(C3)
	• DETERMINANTS OF FACIAL GROWTH	
	Genetic, Sutural, Cartilaginous theories	• Introduced by(C1) • Drawbacks(C1) • Philosophy (C2) • Application (C3)
	Functional matrix theory, Van Limborg's	• Introduced by, skeletal unit, functional matrix (C1) • Drawbacks (C1) • Philosophy (C2) • Application (C3)
	Cybernetic theory	• Introduced by (C1) • Drawbacks (C1) • Philosophy (C2) • Application (C3)
	• DEVELOPMENT OF DENTITION	
	Development of tooth, Theories of eruption, Primary dentition	• Bud, cap and bell stages (C1) • Root formation (C2) • Pre-natal period (C2) • Gumpads (C3) • Eruption and sequence of eruption (C3) • Spacing in primary dentition (C3) • Flush terminal plane (C3) • Deepbite (C3) • Application (C3)
	Mixed dentition stage, Permanent dentition period	• 1st transitional period (C3) • Emergence of 1st permanent molar (C3) • Exchange of incisors (C3) • Inter-transitional period (C3) • Second transitional period (C3) • Ugly duckling stage (C4)
	FUNCTIONAL DEVELOPMENT OF DENTAL ARCHES AND OCCLUSION	
	Factors influencing functional development of dental arches and occlusion, Forces of occlusion, Wolfe's law Trajectories of forces	• Mastication (C2) • Deglutition-mature and infantile, phases of swallow (C4) • Trajectories of force-maxilla and mandible (C3)
	MALOCCLUSION	

	Concept of normal occlusion, Definition of malocclusion, Description of different types of dental, skeletal and functional malocclusion	• Types of cusps (C1) • Arrangement of teeth in humans (C1) • Centric relation and occlusion (C3) • Centric contacts and eccentric occlusion (C3) • Disocclusion (C3) • Andrew's keys to normal occlusion (C3) • Types of malocclusion (C4) • Maxilla-mandibular occlusions (C3)
	CLASSIFICATION OF MALOCCLUSION	
	Principle, description, advantages and disadvantages of classification of malocclusion, Angle's classification	• Basis of classification (C2) • Advantage (C2) • Disadvantage (C2) • Angle's Class I malocclusion (C4) • Angle's Class II malocclusion-Div 1 and Div 2 (C4) • Angle's class III malocclusion –Pseudo and True (C4) • Modification-Dewey and Lischer (C3)
	Classification of malocclusion by Simon's, Lischer's and Ackerman and Proffit's	• Salient features of profit classification and Venn diagram (C3) • Simon classification-planes and law of canine (C3)
	NORMAL AND ABNORMAL FUNCTION OF STOMATOGNATHIC SYSTEM	
	Buccinator mechanism, speech, deglutition, maturation of other function.	• Muscles anatomy (C2) • Respiration (C4) • Speech (C4) • Passive muscle function (C4)
	ENVIRONMENTAL SCIENCES –Related to Orthodontics	
	Revision Class	
Block-2	HABITS AND ETIOLOGY OF MALOCCLUSION	
	Definition, Classification of Habit and management of Thumb/Digit sucking habit	• Definition, classification (C2) • Types of habits (C2) • Thumb-sucking habit-etiology, effects, diagnosis, phases and management (C4)
	Management of mouth breathing, tongue thrusting and other minor habits	• Definition, classification (C2) • Clinical features, diagnosis and management (C4) • Bruxism, lip biting and nail biting- Definition, classification, Clinical features, diagnosis and management (C4)
	Etiology Of Malocclusion	• Classification –Moyers, White and Gardener and Graber (C2)

		- Local factors-anomalies in number, size, shape, premature loss of primary teeth, abnormal frenum, abnormal eruptive path, prolonged retention of primary teeth, delayed eruption of permanent teeth, caries, ankylosis, improper dental restorations. (C4) - General factors-hereditary, congenital, environmental factors, diet, nutritional, metabolic factors. (C4)
	DIAGNOSIS AND DIAGNOSTIC AIDS	
	Definition, Importance and classification of diagnostic aids, Importance of case history and clinical examination in orthodontics.	Case history-chief complaint, medical and dental history, prenatal, postnatal, family history, general history, extra-oral examination, intra-oral examination, functional examination. (C5)
	Importance of intraoral X-rays in orthodontics Panoramic radiographs: Principles, Advantages, disadvantages and uses	- OPG-indications, advantage, disadvantage (C3) - Occlusal- indications, advantage, disadvantage (C3) - Bitewing- indications, advantage, disadvantage (C3) - IOPA- indications, advantage, disadvantage (C3) - Study models (C5)
	CEPHALOMETRICS	
	Advantages, disadvantages, Definition, Description and use of cephalostat Description and uses of anatomical landmarks lines and angles used in cephalometric analysis	- Definition of landmark, classification (C2) - Lines and planes used in cephalometry (C2)
	Analysis- Steiner's, Down's, Tweed's, Ricket's-E- line, Electromyography and its uses in orthodontics	- Skeletal and dental parameters of Steiner's, Down's, Tweed's analysis (C5) - EMG-types of electrodes, uses (C2)
	Hand wrist X-rays	
	Importance in orthodontic skeletal maturity indicators, Greulich & Pyle , Bjork, Grave & Brown	- Uses of handwrist radiograph (C3) - Anatomy of handwrist (C2) - Various stages of assessment in each method (C5)
	Fishman's , Hassel & Farman's method of assessment	- Anatomy of handwrist (C2) - Various stages of assessment in each method (C5)
	General Principles in Orthodontic Treatment Planning	

	Facial growth predictability, esthetic guidelines of Dental and Skeletal Malocclusion	• Setting goals (C2) • Enlisting objectives (C2) • Assessment of growth potential (C4) • Assessment of etiological factors (C4) • Planning space (C3) • Planning anchorage (C3) • Selection of appliance (C4) • Planning retention (C4) • Re-evaluation (C6)
	Ethics	
	Ethics	Ethics in Orthodontics (C2)
	First Internal Assessment Exam-Block 1 &2	
Block 3		
	Anchorage In Orthodontics	
	Anchorage	• Definition of Anchorage. (C1) • List the sources of anchorage. (C2) • Classification of Anchorage. (C2) • Anchorage planning preparation. (C4)
	Biomechanical Principles in Orthodontic Tooth Movement	
	Physiology of tooth movement, histology of tooth movement Theories of tooth movement, Optimum force Phases, biochemical reactions, mechanics of tooth movement	• Describe the Theories of tooth eruption (C3) • Discuss Migration of teeth (C3) • Discuss Changes in tooth position during mastication (C3) • Describe the Changes following application of mild force and extreme forces (C4) • Describe the Various theories of tooth movement (C4) • Explain Hyalinization (C2) • Optimum force-Definition, Value, Clinical Characteristics, Histologic Characteristics (C3) • Discuss Various Phases of tooth movement (C4) • Describe biochemical reactions of tooth movement (C4) • Describe Bone resorption, Bone deposition (C3) • Explain Age factor in orthodontic tooth movement (C2)
	Preventive Orthodontics	
	Definition, Different procedures undertaken in preventive orthodontics and their limitations	• Definition- Preventive Orthodontics (C1) • Classify Clinical preventive procedures (C2) • Space Maintainers-Classification, Ideal requirements (C4)

		• Indications, Contraindications, Advantages, Disadvantages of Commonly used Space maintainers. (C4)
	Interceptive Orthodontics	
	Interceptive orthodontics, Serial extractions. Role of Muscle exercises as an interceptive procedure	• Definition (C1), Different procedures undertaken in interceptive orthodontics (C2) • Serial extractions: Definition, indications, contra-indication, technique, advantages and disadvantages. (C4) • Exercises for the masseter muscle, lips, tongue. (C4)
	Corrective Orthodontics	
	Definition, Consideration during treatment planning. Model analysis Methods of gaining space in the arch	• Definition (C1) • factors to be considered during treatment planning (C4) • Model analysis: Pont's, Ashley Howe's, Bolton, Carey's, Moyer's Mixed Dentition Analysis (C4) • Methods of gaining space in the arch: Indications, relative merits and demerits of • proximal stripping, (C4) • arch expansion (C4) • extractions, (C4) • Extractions in Orthodontics - indications and selection of teeth for extraction (C4)
	Designing and construction of various appliances	
	General principles in selection designing and construction of various appliances and materials in orthodontics	• Classification of Orthodontic appliances (C2) • Describe Ideal requirements (C2) • Discuss Components of an appliance (C4) • Discuss Materials- Alginate, Wires, Brackets, Elastics, Separators (C3)
Second Internal Assessment Exam-Block 3		
Block 4	Orthodontic Appliances	
	Orthodontic Appliances	• General requisite for orthodontic appliances (C2) • Classification (C2) • Indications of Removable and functional Appliances. (C2) • Methods of force application (C3)
	Removable orthodontic appliances	
	Components of removable appliances Different types of clasps, labial bows, springs and their uses	• Advantage and disadvantages (C2) • Components of removable appliances (C2) • Types of clasps (C2)



		• Active components of removable appliances-springs, bows and screws (C2, P3) • Baseplate (C2, P3) • Delivery of appliance (C2, P3, A2) • Instructions to patients (C2, A2) • Problems with removable appliance therapy (C3)
	Expansion appliances in orthodontics	
	Principles, Indications for arch expansion, description of expansion appliances and different types of expansion devices and their uses. Rapid maxillary expansion	• Applied anatomy of maxilla (C2) • Diagnostic aids (C4) • Effects of RME(C3) • Indications and contra-indication of RME (C2) • Types-removable and fixed (C2) • Expansion screw-activation(C2) • Treatment evaluation during RME (C2) • Retention after RME (C2) • Slow expansion appliances (C2)
	Fixed orthodontic appliances	
	Definition, Indications & Contraindications, Component parts and their uses Basic principles of different fixed appliance techniques.	
	Definition and principles, Muscle exercises and their uses in orthodontics. Functional appliances: Activator, Frankels function regulator Oral screens, Bionator, Twin block Lip bumper Incline planes - upper and lower, fixed functional appliances	
	Orthodontic management of Cleft lip and palate	
	Incidence, etiology, pathogenesis, management	• Incidence(C2) • Embryology(C2) • Etiology of cleft lip and palate(C2) • Predisposing factors(C2) • Classification of cleft lip and palate (C2) • Problems associated with cleft(C2) • Stages in management(C3)
	Orthopaedic Appliance:	
	Basis of orthopaedic appliances-Head gear, Face mask, Chin cup	• Commonly used appliances (C2) • Headgear-facebow, force element, headcap, principles and types(C3) • Uses and types of headgear(C3) • Indications(C3) • Biomechanical considerations(C3) • Parts and types with use(C3)

Surgical orthodontics	
Diagnosis and treatment plan for orthognathic surgery, Pre and post-surgical orthodontics. surgical procedures. Major surgical procedures for correction of Mandibular Prognathism and Retrognathism, Maxillary Prognathism and Retrognathism anterior open bite and deep bite, Cross bite	• Etiology of Dentofacial deformities (C2) • Pre-operative evaluation (C2) • Pre-surgical orthodontics (C2) • Mock surgery (C2) • Surgery and stabilization(C2) • Post – surgical orthodontics • Extractions-serial extraction, therapeutic, carious teeth, malformed teeth and supernumerary teeth. (C2) • Surgical uncovering of teeth(C2) • Frenectomy(C2) • Pericision(C2) • Transplantation(C2) • Corticotomy(C2) • sagittal procedures(C2) • transverse procedures(C2) • vertical procedures(C2)
Principles Differential diagnosis and methods of treatment of some common malocclusions	
1.Midline diastema, Cross bite, Open bite, deep bite, spacing, crowding 2.Class II Division 1, Division 2 3.Class III Malocclusion - True and Psuedo Class III	• Etiology, clinical features, diagnosis, treatment (C4) • Etiology, clinical features, diagnosis, treatment (C4) • etiology,clinical features, diagnosis, treatment (C4)
Retention & Relapse	
1.Definition, need for retention, Causes of relapse, Methods of retention, Different types of retention devices 2.Duration of retention, Theories of retention	• Definition of retention and relapse(C2) • Need for retention (C2) • Causes of relapse (C2) • Methods of retention (C2) • Different types of retention devices-removable and fixed (C2) • Theorems 1-9 (C2) • Duration of retention(C2)
Revision Classes	
Soldering and Welding	
1.Principles of soldering, Different methods of soldering, fluxes and antiluxes 2.Principles of welding, methods of welding, Principles of spot welding	• Definition of soldering and welding(C2) • Dental solders(C2) • Flux (C2) • Steps in soldering (C2) • Practical considerations and applications (C2) • Welding-principles, procedure and applications (C2)
Third Internal Assessment Exam-Block 4	



	ORIENTATION	Relate the importance of developing dexterity through the art of wire bending including components of removable appliances and familiarize with various instruments (C2)
	Straightening of Wire	To bend the wire configuration to the given shape and dimensions (C3, P3)
	Bending of Rectangle	To bend the wire configuration to the given shape and dimensions (C3, P3)
	Bending of Square	To bend the wire configuration to the given shape and dimensions (C3, P3)
	Bending of Triangle	To bend the wire configuration to the given shape and dimensions (C3, P3)
	Bending of Circle	To bend the wire configuration to the given shape and dimensions (C3, P3)
	Bending of U-V	To bend the wire configuration to the given shape and dimensions (C3, P3)
	C- clasp	To fabricate components of removable appliances (C3, P2)
	Full clasp	To fabricate components of removable appliances (C3, P2)
	Triangular Clasp	To fabricate components of removable appliances (C3, P2)
	Adams Clasp	To fabricate components of removable appliances (C3,P2)
	TOTAL PRACTICAL HOURS	
	BLOCK 2:Taken in III year BDS (42 hours)	
	ORIENTATION	
	Short labial bow	Demonstrate ability to fabricate components of removable appliances (C3, P3, A2)
	Long labial bow	Demonstrate ability to fabricate components of removable appliances (C3, P3, A2)
	Reverse labial bow	Demonstrate ability to fabricate components of removable appliances(C3,P3,A2)
	Split labial bow	Demonstrate ability to fabricate components of removable appliances (C3, P3, A2)
	Roberts retractor	Demonstrate ability to fabricate components of removable appliances (C3, P3, A2)

	High labial bow with apron spring	Demonstrate ability to fabricate components of removable appliances (C3, P3, A2)
	U/L Impression making and pouring the cast.	Demonstrate ability to fabricate simple removable appliance (C3, P4, A2)
	U/L Hawley's appliance (wire bending, acrylisation, trimming and polishing)	Demonstrate ability to fabricate simple removable appliance (C3, P4, A2)
	TOTAL PRACTICAL HOURS	

BLOCK 3: Taken in Final year BDS (140 hours)

S. No.	Description
Project 1: Impression Making	
01	Upper & Lower arch alginate impression making (C3,P3,A3)
02	Pouring, Trimming and finishing the study cast (C3,P3)
Project 2: Study Cast Analysis	
03	Ashley Howe's Analysis (C4,P3)
04	Pont's analysis (C4,P3)
05	Carey's analysis (C4,P3)
06	Arch perimeter analysis (C4,P3)
07	Bolton's analysis (C4,P3)
Project 3: Wire Bending Exercises	
08	C- clasp (2 Samples) (C3,P3)
09	Adams Clasp (2 Samples) (C3,P3)
10	Adam clasp on Anterior (1 Sample) (C3,P3)
11	Adams clasp with Helix (1 Sample) (C3,P3)
12	Adams clasp single arrow head (1 Sample) (C3,P3)
13	Adams clasp Additional Arrow head (1 Sample) (C3,P3)
14	Short labial bow (1 Sample) (C3,P3)
15	Long labial bow (1 Sample) (C3,P3)
16	Reverse labial bow (1 Sample) (C3,P3)
17	Split labial bow (1 Sample) (C3,P3)
18	Roberts retractor (1 Sample) (C3,P3)
19	High labial bow with apron spring (1 Sample) (C3,P3)
20	Palatal finger spring (2 Samples) (C3,P3)



21	Z spring (2 Samples) (C3,P3)
22	T spring (1 Sample) (C3,P3)
23	Coffin spring (1 Sample) (C3,P3)
24	U loop canine retractor (2 Samples) (C3,P3)
25	Helical canine retractor (2 Samples) (C3,P3)
26	Buccal canine retractor (2 Samples) (C3,P3)
27	Palatal canine retractor (2 Samples) (C3,P3)
Project 4: Cephalometric analysis	
28	Landmark identification (C3,P3)
29	Tracing procedure and technique (C3,P3)
30	Analysis and interpretation (C4,P3)
31	Downs analysis (C4,P3)
32	Steiner analysis (C4,P3)
33	Tweed analysis and Wits analysis (C4,P3)
Project 5: Appliance fabrication	
34	Duplication of the dye (C4,P3)
35	Wax bite registration (C4,P3)
36	Orientation (C4,P3)
37	Acrylisation (C4,P3)
38	Trimming of activator (C4,P3)
39	Finishing (C4,P3)
40	Lower inclined plane (1 Sample) (C4,P3)
41	Upper expansion plate with expansion screw (1 Sample) (C4,P3)
42	Habit breaking appliances (1 Sample) (C4,P3)
43	Upper Hawley's with anterior bite plane (1 Sample) (C4,P3)
44	Upper Hawley's with posterior bite plane (1 Sample) (C4,P3)
Project 6: Orthodontic Case Clinical Examination and Diagnosis	
45	Clinical Case presentation (C4,P3, A3)
Total number of hours	

References	1. Contemporary Orthodontics, William R. Proffit, Henry W. Fields, David M. Sarver, 6th Edition, Elsevier, US 2. Textbook of Orthodontics, W. J. B. Houston, William John Ballantyne Houston, C. D. Stephens, Walter Jack Tulley. 3. Diagnosis of orthodontic patient, F. McDonald, A. J. Ireland, OUP Oxford University Press, 1998
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| | <ol style="list-style-type: none"> 4. Introduction to Orthodontics, Laura Mitchell, OUP oxford, 4th edition, 2013 5. The design and construction of removable orthodontic appliances, Charles Philip Adams, Bristol: J. wright & sons, 2nd Edition 6. Orthodontic treatment with removable appliances, W.J.B. Houston, K.G Issaacson.. 2nd edition 7. Handbook of orthodontics Robert E. Moyers. 4th edition. 8. Orthodontics-The art and science S I Bhalajhi.. 7th edition 9. Text book of orthodontics, Gurkeerat Singh. 3rd edition. 10. Removable orthodontic appliances, Graber and Newmann, 2nd edition. 11. Essentials of Orthodontics, Rohan Mascarenhas, Paras Medical Books. 12. Handbook of Orthodontics, Martyn T. Cobourne, Andrew T. DiBiase ,2 edition, Elsevier. |
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Question Paper

Exam Date & Time: 30-Mar-2024 (02:15 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

FINAL BDS PART - I DEGREE EXAMINATION - MARCH / APRIL 2024

SUBJECT: ORTHODONTICS AND DENTOFACIAL ORTHOPAEDICS

(OBE SCHEME - REGULAR BATCH)

Marks: 60

Duration: 165 mins.

Answer all the questions.

Essay:

- 1) Define Orthodontic Anchorage. Give any two classifications of anchorage. Write a note on indications, types, placement sites, and possible complications of temporary anchorage device (TAD).

(1+2+2+2+2+1 = 10 marks)

- 2) Explain in detail about Angle's Classification of Malocclusion. Write a note on drawbacks of Angle's classification, and Dewey's modification of Angle's classification.

(6+2+2 = 10 marks)

3) Short notes:

- | | |
|--|-----|
| 3A) Synchronoses | (4) |
| 3B) Dunlops's Beta hypothesis | (4) |
| 3C) Carey's Analysis | (4) |
| 3D) Centre of resistance of a tooth | (4) |
| 3E) Quad helix | (4) |
| 3F) Reverse pull headgear | (4) |
| 3G) Catlan's appliance | (4) |
| 3H) Permanent retention in orthodontics | (4) |
| 3I) Trimming of orthodontic study models | (4) |
| 3J) Phases of orthodontic tooth movement | (4) |

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ORAL MEDICINE & RADIOLOGY

Course Outcomes COs):	On successful completion of this course, students will be able to
CO 1:	Document a thorough case history and formulate a treatment plan for common dental diseases & oral mucosal lesions (C6,P4,A3)
CO 2:	Recognize the presence of systemic disease and how the disease and its treatment influence the delivery of dental care and write a medical referral in selected cases (C2, A2)
CO 3:	Choose and interpret appropriate investigations (Chairside investigations, Laboratory investigations, Imaging) customized to the patient's dental needs (C3,P3)
CO 4:	Justify and perform intraoral radiographic examination for diagnosis of dental diseases and interpret the findings (C4, P5)

COURSE LEARNING OUTCOME		
BLOCK 1: Taken in III year BDS (37 hours)		
THEORY		
	CONTENT	COMPETENCIES
ORAL MEDICINE AND RADIOLOGY		
BLOCK 1	Introduction to Oral Medicine and Radiology	• Introduction of Subject • Faculty • Work requirements • Clinical postings • Assessment methods • Attendance requirements
	Diagnostic aspects of Common Dental Disorders	• Enumerate the common dental problems (C1) • Describe the important clinical features of each (C2) • Identify the differentiating features (C2) • Recognize the key points in Case history taking and clinical examination (C3)
	SEQUELAE OF DENTAL CARIES	
	Sequelae of Dental Caries I Periapical Abscess and Osteomyelitis	• Discuss and differentiate the various sequelae of Caries(C4) • Explain the predisposing factors and clinical features of Osteomyelitis(C3) • Distinguish the types of osteomyelitis and treatment plan (C3)
	Sequelae of Dental Caries II Fascial Space infections Cellulitis, Ludwig's angina, and other life threatening complications	• Explain the concept of focal infection and focus of infection. (C2) • Differentiate various space infections their causes and clinical manifestations. (C3) • Discuss the management of fascial space infection (C2) • Formulate a drug prescription for medical management of fascial space infection(C5)
	CERVICAL LYMPHADENOPATHY	
	Cervical Lymph nodes, drainage, examination and clinical and applied aspects	• Explain the lymphatic drainage of head and neck region (C2) • Explain the distribution of cervico-facial lymph nodes (C2) • Explain the functions of cervico-facial lymph nodes (C2) • Differentiate the various conditions causing cervical lymphadenopathy (C4) • Distinguish lymphadenopathies from other disorders (C4) • Analyze the importance of further investigation for cervico-facial lymphadenopathy (C4)

LABORATORY INVESTIGATIONS	
Laboratory investigations: Overview, Ideal Requirements Types of investigations • Serologic investigations • Microbiologic investigation • Histopathologic examination • Specialised tests Common screening Lab investigation protocol for: • Routine blood picture • Diabetic status • Bleeding status • Anemia • Liver diseases • Bone disorders • Renal disorders Normal Values of Common Lab tests of Dental relevance	• List the types of lab investigations (C1) • Discuss the common hematological, serological microbiological, immunological and histopathological investigations (C2) • Interpret the results of these investigations and identify the clinical significance (C4)
Laboratory investigation: QUIZ/ written test	
CHRONIC OROFACIAL PAIN	
Orofacial Pain: Part I • Pain definition • Acute versus chronic Pain • Classification of Pain • Characteristics of pain • Types of pain and differential diagnosis • Pain assessment methods • Dentinal Hypersensitivity • Odontogenic pain features	• Define terminologies related to pain (C1) • Classify causes for orofacial pain (C3) • Explain neurophysiology of pain (C2) • Describe methods to quantify pain (C1) • Differentiate odontogenic pain conditions (C4) • List the treatment options for such pain conditions (C4)
Orofacial Pain: Part II (Non Odontogenic: TMJ and Muscular Origin) TMJ and Masticatory disorders • TMDs classification • Components of TMD • Case History and Clinical examination • Trigger points • MPDS • Management	• Describe the important features of TMD (C2) • Differentiate musculoskeletal pain from odontogenic pain conditions (C4) • Differentiate joint pain from muscle pain (C4) • Describe the features of MPDS (C2)

	Orofacial Pain: Part III Non Odontogenic: (OFP of Neurogenic/ Neurovascular Origin) • Trigeminal neuralgia • Other neuralgias • Neural injuries Diagnosis, management	• Differentiate neuralgic pain from other pains (C4) • Explain the aetiology, clinical features and investigations of orofacial neuralgias (C2) • Select appropriate drugs/treatment for patients with neuralgic pain (C5)
	Orofacial Pain: Part IV (Non-odontogenic: OFP of Miscellaneous origin) • Burning Mouth Syndrome • Atypical Facial Pain • Phantom tooth ache • Post treatment neuropathies • Post traumatic trigeminal neuropathy Referred pains	• Explain the aetiology, clinical features and investigations of burning mouth syndrome, atypical facial pain, headaches and causalgia (C2) • List appropriate drugs/treatment for such patients (C1)
	SYSTEM REVIEW: Medically compromised dental patients	
	Dental Considerations in Hypertensive and Asthmatic patients • General clinical features of disease • Oral manifestations • Co morbidities • Medications and its impact • Investigations for diagnosis/ monitoring the status • Scheduling of Dental Appointments, precautions to be taken, treatment delivery and drug considerations • Complications anticipated • Infection control measures	• Discuss the oral manifestations (C2) • List the possible co-morbidities associated with the disease and oral side effects of the medications taken. (C2) • List the Investigations for diagnosis/ monitoring the status (C1) and relate the values to the patient's health status and treatment rendering. (C3) • Discuss how to schedule dental Appointments, precautions to be taken, treatment precautions and modifications and drug considerations(C3) • Describe the complications anticipated and steps taken to prevent/ handle it (C3) • Formulate a referral Letter to the physician for the needful consent. (C4) (P1) • Mention the Infection control measures to be undertaken (C1)
	Dental Considerations in Cardiac patients	• Discuss the oral manifestations (C2) • List the possible co-morbidities associated with the disease and oral side effects of the medications taken. (C2) • List the Investigations for diagnosis/ monitoring the status (C1) and relate the values to the patient's health status and treatment rendering. (C3)

		• Discuss how to schedule dental Appointments, precautions to be taken, treatment precautions and modifications and drug considerations(C3) • Describe the complications anticipated and steps taken to prevent/ handle it (C3) • Formulate a referral Letter to the physician for the needful consent. (C4) (P1) • Mention the Infection control measures to be undertaken (C1)
	Dental Considerations in Diabetic patients • General clinical features of disease • Oral manifestations • Co morbidities • Medications and its impact • Investigations for diagnosis/ monitoring the status • Scheduling of Dental Appointments, precautions to be taken, treatment delivery and drug considerations • Complications anticipated • Infection control measures	• Discuss the oral manifestations (C2) • List the possible co-morbidities associated with the disease and oral side effects of the medications taken. (C2) • List the Investigations for diagnosis/ monitoring the status (C1) and relate the values to the patient's health status and treatment rendering. (C3) • Discuss how to schedule dental Appointments, precautions to be taken, treatment precautions and modifications and drug considerations(C3) • Describe the complications anticipated and steps taken to prevent/ handle it (C3) • Formulate a referral Letter to the physician for the needful consent. (C4) (P1) • Mention the Infection control measures to be undertaken (C1)
	Dental Considerations in patients with Kidney Diseases • General clinical features of disease • Oral manifestations • Co morbidities • Medications and its impact • Investigations for diagnosis/ monitoring the status • Scheduling of Dental Appointments, precautions to be taken, treatment delivery and drug considerations • Complications anticipated • Infection control measures	• Discuss the oral manifestations (C2) • List the possible co-morbidities associated with the disease and oral side effects of the medications taken. (C2) • List the Investigations for diagnosis/ monitoring the status (C1) and relate the values to the patient's health status and treatment rendering. (C3) • Discuss how to schedule dental Appointments, precautions to be taken, treatment precautions and modifications and drug considerations(C3) • Describe the complications anticipated and steps taken to prevent/ handle it (C3) • Formulate a referral Letter to the physician for the needful consent. (C4) (P1) • Mention the Infection control measures to be undertaken (C1)
	Dental Considerations in patients with Gastrointestinal diseases	• Discuss the oral manifestations (C2)

	• General clinical features of disease • Oral manifestations • Co morbidities • Medications and its impact • Investigations for diagnosis/ monitoring the status • Scheduling of Dental Appointments, precautions to be taken, treatment delivery and drug considerations • Complications anticipated • Infection control measures	• List the possible co-morbidities associated with the disease and oral side effects of the medications taken. (C2) • List the Investigations for diagnosis/ monitoring the status (C1) and relate the values to the patient's health status and treatment rendering. (C3) • Discuss how to schedule dental Appointments, precautions to be taken, treatment precautions and modifications and drug considerations(C3) • Describe the complications anticipated and steps taken to prevent/ handle it (C3) • Formulate a referral Letter to the physician for the needful consent. (C4) • Mention the Infection control measures to be undertaken (C1)
	Dental Considerations in patients with RBC disorders • General clinical features of disease • Oral manifestations • Co morbidities • Medications and its impact • Investigations for diagnosis/ monitoring the status • Scheduling of Dental Appointments, precautions to be taken, treatment delivery and drug considerations • Complications anticipated • Infection control measures	• Discuss the oral manifestations (C2) • List the possible co-morbidities associated with the disease and oral side effects of the medications taken. (C2) • List the Investigations for diagnosis/ monitoring the status (C1) and relate the values to the patient's health status and treatment rendering. (C3) • Discuss how to schedule dental Appointments, precautions to be taken, treatment precautions and modifications and drug considerations(C3) • Describe the complications anticipated and steps taken to prevent/ handle it (C3) • Formulate a referral Letter to the physician for the needful consent. (C4) (P1) • Mention the Infection control measures to be undertaken (C1)
	Dental Considerations in patients with WBC disorders • General clinical features of disease • Oral manifestations • Co morbidities • Medications and its impact • Investigations for diagnosis/ monitoring the status • Scheduling of Dental Appointments, precautions to be taken, treatment delivery and drug considerations	• Discuss the oral manifestations (C2) • List the possible co-morbidities associated with the disease and oral side effects of the medications taken. (C2) • List the Investigations for diagnosis/ monitoring the status (C1) and relate the values to the patient's health status and treatment rendering. (C3) • Discuss how to schedule dental Appointments, precautions to be taken, treatment precautions and modifications and drug considerations(C3) • Describe the complications anticipated and steps taken to prevent/ handle it (C3)

	• Complications anticipated • Infection control measures	• Formulate a referral Letter to the physician for the needful consent. (C4) (P1) • Mention the Infection control measures to be undertaken (C1)
	Dental Considerations in patients with Bleeding and Clotting disorders • General clinical features of disease • Oral manifestations • Co morbidities • Medications and its impact • Investigations for diagnosis/ monitoring the status • Scheduling of Dental Appointments, precautions to be taken, treatment delivery and drug considerations • Complications anticipated • Infection control measures	• Discuss the oral manifestations (C2) • List the possible co-morbidities associated with the disease and oral side effects of the medications taken. (C2) • List the Investigations for diagnosis/ monitoring the status (C1) and relate the values to the patient's health status and treatment rendering. (C3) • Discuss how to schedule dental Appointments, precautions to be taken, treatment precautions and modifications and drug considerations(C3) • Describe the complications anticipated and steps taken to prevent/ handle it (C3) • Formulate a referral Letter to the physician for the needful consent. (C4) (P1) • Mention the Infection control measures to be undertaken (C1)
	Dental Considerations in patients with Hormonal Disorders • General clinical features of disease • Oral manifestations • Co morbidities • Medications and its impact • Investigations for diagnosis/ monitoring the status • Scheduling of Dental Appointments, precautions to be taken, treatment delivery and drug considerations • Complications anticipated • Infection control measures	• Discuss the oral manifestations (C2) • List the possible co-morbidities associated with the disease and oral side effects of the medications taken. (C2) • List the Investigations for diagnosis/ monitoring the status (C1) and relate the values to the patient's health status and treatment rendering. (C3) • Discuss how to schedule dental Appointments, precautions to be taken, treatment precautions and modifications and drug considerations(C3) • Describe the complications anticipated and steps taken to prevent/ handle it (C3) • Formulate a referral Letter to the physician for the needful consent. (C4) (P1) • Mention the Infection control measures to be undertaken (C1)
	Dental Considerations in patients with Neuromuscular disorders • Diseases of dental relevance • General clinical features of disease • Oral manifestations • Co morbidities	• Discuss the oral manifestations (C2) • List the possible co-morbidities associated with the disease and oral side effects of the medications taken. (C2) • List the Investigations for diagnosis/ monitoring the status (C1) and relate the values to the

	• Medications and its impact • Investigations for diagnosis/ monitoring the status • Scheduling of Dental Appointments, precautions to be taken, treatment delivery and drug considerations • Complications anticipated	patient's health status and treatment rendering. (C3) • Discuss how to schedule dental Appointments, precautions to be taken, treatment precautions and modifications and drug considerations(C3) • Describe the complications anticipated and steps taken to prevent/ handle it (C3) • Formulate a referral Letter to the physician for the needful consent. (C4) (P1) • Mention the Infection control measures to be undertaken (C1)
DENTAL RADIOLOGY : INTRODUCTION		
	Introduction to radiology • Pioneers • Evolution of Radiology • X rays and its properties • Radiology Department and its construction • Importance of Radiation protection	• Describe the history of x-rays (C1) • Explain atomic model, types of radiation and properties of x-rays (C2) • Differentiate between electromagnetic radiation and particulate radiation (C4)
	X-ray Machine • Construction and working of X ray tube • Coolidge tube and its components • X ray production • Electrical supply • Control panel and the parameters • Quality assurance of X ray machine	• Discuss the construction and function of X ray tube(C2) • Draw and label each part of X ray tube(C2) • Enlist various exposure parameters(C1) • Explain the production of x-rays (C3)
	Image receptors used in Conventional Radiology • Films • Digital Sensors	• Classify X ray films (C2) • Enlist the various types of X ray films (C1) • Describe the composition of film and the contents of the film packet (C2) • Enlist the different types of digital sensors (C1)
	Projection Geometry and Intraoral Radiography • Requirements • Techniques	• Enumerate the various intraoral radiographic techniques (C1) • Describe the rules of projection geometry (C2) • Discuss the indications, techniques advantages and disadvantages of various Intraoral Radiographic techniques (C2) • Differentiate the two IOPA techniques (C4)

	Film Processing Latent Image formation	• Define film processing(C1) • Enumerate the types of processing(C1) • Explain the steps in manual processing(C2) • Discuss the dark room requirements and components of processing chemicals (C2) • Differentiate between manual, Automatic and Digital processing (C3)
	Image characteristics and requirement for Ideal Radiographs • Principles of image formation • Image characteristics • Definition of Ideal radiograph • Criteria to evaluate periapical radiograph	• Discuss the Principles of image formation(C2) • Define Ideal radiograph (C2) • Discuss various Image characteristics and the factors influencing it. (C2)
	Faulty Radiographs	• Classify the faults (C2) • Identification of faults and the reason (C3)
	Principles of Radiographic interpretation • Significance of Organized approach • Ambient viewing conditions • Various Methods of interpretation • Interpretation patterns and lines	• Identify the presence or absence of a disease (C2) • Recognize the nature and extent of the disease as seen on radiograph. (C2) • Formulate differential diagnosis (C3) • Formulate a radiographic report (C3)
	Radiographic interpretation for Dental Caries • Rationale for radiographic examination • Type of radiographs; Frequency of Radiographic examination; • Radiographic features of dental caries • Radiographic DD of dental caries	• Discuss the indications of radiography and the information provided (C2) • Type and Frequency of Radiographic examination; (C1) • Recognize the radiographic features (C2) • Analyse Radiographic differential diagnosis (C3) • Limitations of the radiography while providing information (C1)
	Radiographic interpretation for Periodontal diseases	• Discuss the indications of radiography and the information provided (C2)

	- Usefulness of radiography in diagnosis and treatment planning of periodontal disease; - Limitations; - Radiographic features of different periodontal conditions	- Type and Frequency of Radiographic examination; (C1) - Recognize the radiographic features (C2) - Analyse Radiographic differential diagnosis (C3) - Limitations of the radiography while providing information (C1)
	Radiographic interpretation for Traumatic injuries of teeth - Type of radiographic examination; - Radiographic features of traumatized teeth; - classification of traumatized teeth;	- Discuss the indications of radiography and the information provided (C2) - Type and Frequency of Radiographic examination (C1) - Recognize the radiographic features (C2) - Analyse Radiographic differential diagnosis (C3) - Limitations of the radiography while providing information (C1)
MUCOSAL PIGMENTATION AFFECTING ORAL CAVITY		
	Pigmentation affecting oral Cavity - Endogenous Pigmentation: Causes; Clinical features, Differential diagnosis & management - Exogenous Pigmentation: Causes; Clinical features, Differential diagnosis & management	- Define endogenous and exogenous pigmentation (C1) - Enlist the various endogenous pigments (C1) - Discuss various causes of endogenous and exogenous pigmentations (C2) - Differentiate the pigmented lesions on oral mucosa(C2)
MISCELLANEOUS		
	Allergic and Granulomatous conditions	- Enlist granulomatous diseases affecting oral cavity (C1) - Describe the oral manifestations of granulomatous disease (C2) - Enlist the allergic conditions and hypersensitivity reactions(C1) - Define local allergy, anaphylaxis and serum sickness (C1) - Enumerate Anti-allergic medications used in dentistry, their doses and dosages (C1)
	Metabolic disorders: Quiz Defects in carbohydrate, lipid, protein metabolism and their oral manifestations	Enlist the important oral manifestations due to metabolic disorders (C2)
	Forensic Odontology - Forensic identification: - Age estimation	- Enlist the various orofacial features which aid in Forensic medicine (C2) - Discuss the role of dental radiographs in age

	• Bite mark analysis; • Palatal rugae analysis; • Role of dental and maxillofacial Radiography in Forensic medicine	estimation (C2)
	WASTE DISPOSAL IN ORAL RADIOLOGY	
	Disposal of Fixing Solution and Lead Foils	• Discuss the methods of waste management in Oral Radiology (C2)
	DEVELOPMENTAL DISORDERS	QUIZ/ ASSIGNMENT
	NUTRITIONAL DISORDERS	QUIZ/ ASSIGNMENT
	CLINICAL HOURS (BLOCK I):	
	Demonstrations and small group discussion on: • General physical examination • TMJ examination • Salivary gland examination • Recording vital signs • Bisecting angle technique • Parallel cone technique • Manual processing of radiograph • Lymph node examination • Radiographic interpretation • Radiographic faults identification	• Perform general and orofacial examination of any given patient (P3) • Relate the findings to the treatment plan (P1) • Demonstrate bisecting/parallel cone technique (P4) • Display the skills of manual and automatic processing of intraoral radiograph (P4)
	Assessment I	• Radiographic interpretation
	Assessment II	• Clinical assignment Book
	Assessment III	• End Posting Spotter exam
	Assessment IV	• Age estimation using radiographs
	Assessment V	• Log book

1BLOCK II Final year Part I	WHITE LESIONS ,RED AND MIXED RED/WHITE LESIONS AFFECTING ORAL CAVITY	
	<u>White lesions I</u> • Introduction. • Variations in structure and appearance of normal mucosa; • Classification of oral white lesions; • Normal Variants	• Define the terminologies (C1) • Classify White lesions (C2) • Discuss the history taking and examination of a white patch(C2) • Differentiate the normal variants from pathologic white lesions (C3)
	<u>White lesions II</u> Non keratotic white lesions Oral candidiasis: Etiology, Predisposing factors, classification, Clinical features,	• Define Non-keratotic White lesions (C1) • Enlist the non keratotic white lesions (C1)

	Differential diagnosis & management. Other conditions	• Describe the predisposing factors, clinical features, investigations and treatment of Oral Candidiasis (C3) • Differentiate candidiasis from similar appearing lesions and plan appropriate treatment (C5) • Distinguish the relevant clinical history and oral manifestation of non keratotic lesions (C3)
	<u>White lesions III</u> Keratotic lesions with no malignant potential Oral genodermatoses; Clinical features, Differential diagnosis & management;	• Enlist the keratotic white lesions with no malignant potential (C1) • Identify the differentiating features of similar conditions (C3)
	<u>White Lesions III</u> Leukoplakia- Etiology, Clinical features, Classification, malignant potential; Differential diagnosis & management	• Enlist the Keratotic white lesions (C1) • Describe the predisposing factors, classification, clinical features, investigations and treatment of Oral Leukoplakia (C3) • Differentiate Leukoplakia from similar appearing lesions and plan appropriate treatment (C5) • Describe the chair side tests involved in diagnosis (C3) • Mention the malignant transformation potential of the condition (C2)
	<u>White lesions IV</u> OSMF: Etiology, Clinical features, malignant potential Differential diagnosis & management	• Enlist the Keratotic white lesions (C1) • Define premalignant lesions and conditions and potentially malignant oral disorders. (C1) • Describe the predisposing factors, classification, clinical features, investigations and treatment of Oral Submucous Fibrosis (C3) • Differentiate OSMF from similar appearing lesions and plan appropriate treatment (C5) • Mention the malignant transformation potential of the condition (C2)
	<u>White lesions V</u> Lichen planus, lichenoid reaction & others: Etiology, Clinical features, malignant potential Differential diagnosis & management	• Enlist the Keratotic white lesions (C1) • Define premalignant lesions and conditions and potentially malignant oral disorders. • Describe the predisposing factors, classification, clinical features, investigations and treatment of Oral Submucous Fibrosis (C3) • Differentiate OSMF from similar appearing lesions and plan appropriate treatment (C5) • Mention the malignant transformation potential of the condition (C2)

	<u>Red lesions and Potentially malignant oral lesions of oral cavity</u> Erythroplakia, Erosive lesions, atrophic candidiasis, Allergic stomatitis ; Significance of red lesions	• Enlist the red and mixed red and white lesions affecting oral cavity(C1) • Define potentially malignant oral disorders (C1) • Describe the predisposing factors, classification, clinical features, investigations and treatment of Oral Erythroplakia (C3) • Differentiate Erythroplakia from similar appearing lesions and plan appropriate treatment (C5) • Mention the malignant transformation potential of Erythroplakia (C2)
RADIATION PHYSICS AND BIOLOGY		
	Factors controlling X ray beam	• Discuss the factors which affect the quantity of X ray beam (C3) • Discuss the factors which affect the quality of X ray beam (C3) • Discuss the types and function of filtration and collimation (C2)
	Interactions rays with matter	• Discuss the three interactions of X rays with matter and its impact in image formation (C2)
	Radiation Biology and dosimetry: • Definition; • Direct and indirect effects • Stochastic and deterministic effects • Somatic and genetic effects • Concept of radio sensitivity • Radiation effects on Oral cavity and whole body • Radiation Mucositis, ORN, Radiation Caries	• Define radiation biology (C1) • Explain the effects of radiation at molecular, genetic, cellular and tissue level (C2) • Analyze the effects of radiation therapy on oro-facial tissues (C4) • Choose the SI units of measurement for radiation appropriately (C3) • Explain the use of dosimeters and the legal issues related to it (C2, EM1) • Relate the principles of ALARA to dental practice (C2, EM1) • Describe the predisposing factors, clinical features, investigations and treatment of Osteoradionecrosis (C3)
	Radiation protection • Sources of Radiation; • Exposure and Dose in radiography: Occupational exposure: • Patient exposure; • Maximum Permissible dose; • Principle of Radiation protection; Radiation	• Enlist the sources of radiation (C2) • Describe the principles of radiation Protection (C2) • Explain the principle of ALARA (C4) • Apply Position distance rule in dental practice (C5) • Summarise the radiation protection measures for patient, personnel and public (C6)

	protection measures; Dosimetry	• Define maximum permissible dose (MPDs) and restate the MPDs for personnel, public and pregnant patients (C2) • Explain various radiation protection devices used in dentistry (C2)
ULCERATIVE LESIONS AFFECTING ORAL CAVITY		
	Ulcerative & Vesiculo-bullous lesions –Part I Introduction • Definition of ulcer/erosion; Vesicle/ Bulla; • Parts of an ulcer; • Classification of oral ulcers and vesiculo-bullous lesions • Case history taking and clinical examination • Traumatic ulcers in mouth • Thermal/ chemical burns	• Define ulcer (C2) • Classify ulcers affecting oral cavity (C2) • Describe the parts of an ulcer (C2) • Recognise the relevant features of history taking and clinical examination of an ulcer(C4)
	Ulcerative & Vesiculo-bullous lesions –Part I Differential Diagnosis of Acute ulcers • Classification • Recurrent aphthous stomatitis: (Etiology, Predisposing factors. Clinical variants, associated syndromes, Investigations management) • Cyclic neutropenia • Fixed drug eruptions	• Classify acute ulcers (C2) • Describe the etiology, predisposing factors. Clinical variants, investigations of recurrent aphthous stomatitis (C3) • Formulate a treatment plan for aphthous stomatitis according to the severity of clinical presentation (C5) • Discuss the diagnostic aspects of cyclic neutropenia (C2)
	Ulcerative & Vesiculo-bullous lesions –Part III Differential Diagnosis of Acute ulcers Viral: • Herpes Simplex • Herpangina • Hand foot and mouth disease • Chicken pox	• Enumerate acute ulcers of infectious origin (C1) • Describe the etiology, predisposing factors. Clinical variants, investigations of herpes simplex infection (C3) • Describe the etiology, predisposing factors. Clinical variants, investigations of ANUG(C3) • Summarise the differentiating features of acute multiple ulcers (C5)

	• Herpes zoster Bacterial : • ANUG Etiology ; Clinical features, Differential diagnosis & management • Others	
	Ulcerative & Vesiculo-bullous lesions –Part IV Differential diagnosis of Acute Ulcers • Classification of Acute ulcers • Drug induced stomatitis • EM, SJS, TEN • (Etiology; Clinical features, Differential diagnosis & management) • Allergic stomatitis • Drug induced lichenoid reactions	• Enumerate acute ulcers of allergic/ drug induced origin (C1) • Describe the etiology, predisposing factors. Clinical variants, investigations of Erythema Multiforme(C3) • Describe the differentiating features of EM, SJS and TEN(C3) • Summarise the differentiating features of acute multiple ulcers (C5)
	Ulcerative & Vesiculo-bullous lesions –Part V Differential diagnosis of Chronic single ulcers: Etiology; Clinical features, Differential diagnosis & management • TB • Syphilis • Traumatic • Major aphthous • Cancrum oris • Deep fungal infection • Necrotizing Sialometaplasia • Others	• Enumerate chronic single ulcers of infectious origin (C1) • Describe the etiology, oral manifestations and dental considerations of tuberculosis. (C3) • Summarise the differentiating features of chronic single ulcers (C5)
	Ulcerative & Vesiculo Bullous lesions –Part VI Differential diagnosis of Chronic multiple ulcers: • Pemphigus and its variants • (Etiology; Clinical features, Differential diagnosis & management) • Bullous and Mucous Membrane Pemphigoid • EBA	• Enumerate and chronic ulcers (C1) • Describe the etiology, predisposing factors. Clinical variants, investigations of Pemphigus vulgaris(C3) • Identify the differentiating features of Pemphigus, pemphigoid and lichen planus(C3) • Write uethe differentiating features of chronic multiple ulcers (C3)



	• Bullous lichen planus	
EXTRAORAL RADIOLOGY		
	Definition • Films used in extraoral radiography • X ray machine used; • Panoramic radiography • Other extra-oral radiographs, Maxillary Sinus views • Radiography, Indications and interpretation	• Explain the principles of panoramic imaging (C2) • List various indications, advantages and disadvantages of panoramic images (C1) • Compare various extra oral radiographic techniques their indications (C2) • Choose appropriate radiographic technique for a given problem (C3)
	LOCALIZATION Techniques Objectives Methods: • Clarke's technique • Miller's technique	• Describe various techniques for localisation techniques (C2) • Apply the techniques for tooth localization using IOPA (C5)
SALIVARY PATHOLOGIES		
	Salivary Gland Disorders-Part I • Introduction, • Classification, • Relevant case taking, • Clinical examination, Investigations • Developmental Disorders	• Explain the clinical features of developmental disorders affecting salivary glands (C2) • Describe the clinical features of salivary gland cysts and sialolithiasis (C1) • Distinguish the clinical features of salivary gland infections (C2)
	Salivary Gland Disorders-Part II Functional Disorders: • Xerostomia in detail, • Ptyalism Causes, Clinical features, Differential Diagnosis, Investigations, Treatment	• Identify the symptoms of xerostomia/ ptylosis (C1) • Explain medical management of xerostomia and ptyalism (C2) • Relate the importance of preventive dentistry and long term follow-up in such patients (C2)
	Salivary Gland Disorders-Part III Obstructive & Inflammatory Salivary Gland Disorders: • Sialolithiasis	• Identify the clinical features of Sialadenitis (C1) • Explain the causes medical management of sialadenitis (C2)

	Sialadenitis	
	Salivary Gland Disorders-Part 4 Autoimmune conditions and Salivary Gland Neoplasms	- Explain the clinical manifestations and special investigations related to autoimmune salivary glands disorders (C4) - Relate the importance of preventive dentistry and long term follow-up in such patients (C2)
	Salivary Gland Disorders-Part 5 Imaging of Salivary glands: - Sialography and Salivary scintigraphy: Indications; Contraindications; - Procedure; - Interpretation. - Other imaging modalities	- Discuss the imaging modalities seen in diseases of salivary glands (C3) - Enumerate the higher imaging modalities for visualization of salivary gland area (C3)
	CYSTS AND NEOPLASMS AFFECTING ORAL CAVITY	
	Cysts of the oral cavity Definition, classification, Clinical and radiologic features of relevant conditions	- Define cysts (C1) - Enumerate the odontogenic and non-odontogenic cysts. (C1) - Describe the clinical features, Radiographic features and management of odontogenic cysts (C3)
	Tumours of oral cavity Definition, classification, Clinical and radiologic features of relevant conditions	- Enumerate the odontogenic and non-odontogenic tumors - Describe the clinical features, Radiographic features and management of odontogenic tumours (C3)
	Oral Cancer - Etiopathogenesis, predisposing factor, Clinical presentation, Investigations and early detection of oral cancer. - TNM Staging	- Differentiate the etiological factors, clinical features, investigations and management principles for oral cancer (C4) - Apply the TNM staging of oral carcinoma, salivary gland malignancies and malignant melanoma (C3) - Describe the principles of radiotherapy and types of radiotherapy for oral cancer (C1) - Summarize the oral complications of cancer therapy (chemotherapy and radiotherapy) (C6) - Explain the medical management for such oral complications (C2)
	HIV INFECTION AND AIDS	
	- Definition; - Pathophysiology; - Clinical features; - diagnosis and treatment; - Oral manifestations;	- Distinguish oral manifestations of AIDS patients (C4) - Relate investigations and its reports to the oral manifestations/ stage of AIDS (C6)

	- Dental considerations, - Infection control & PEP	- Apply the principles of HAART in management of such patients (C3) - Explain post-exposure prophylaxis for needle stick injuries (C2)
RADIOGRAPHIC INTERPRETATION/ DIFFERENTIAL DIAGNOSIS OF PATHOLOGIES		
	Radiolucencies of Jaws- Part I Periapical radiolucencies : Anatomical, Pathological, True, False, Differential diagnosis	- Identify various pathologies seen as periapical and/multi-locular radiolucencies (C1) - Differentiate the radiographic features of pathologies seen as periapical and/multi-locular radiolucencies (C4) - Identify and Differentiate the radiographic features of pathologies seen as periapical radiolucencies(C4)
	Radiolucencies of Jaws- Part II Multilocular radiolucencies: Anatomical, Pathological, True, False, Differential diagnosis Generalized radiolucencies and mixed RO & RL	Differentiate the radiographic features of pathologies seen as Multilocular radiolucencies (C4)
	Radiolucencies of Jaws- Part III Generalized Radiolucencies, Mixed Radiolucent- Radioopaque patterns, Pericoronal Radiolucencies	Differentiate the radiographic features of pathologies seen as generalised radiolucencies/ mixed radiolucent-radiopaque appearance (C4)
	Radiopacities in the jaws Anatomical; Pathological; Generalized ; Soft tissue calcifications; Differential diagnosis	Differentiate the radiographic features of pathologies seen as periapical radiopacities (C4)
	Radiographic diagnosis of Malignancies of Jaws - Various Radiographic appearances, - Difference between Benign and malignant tumors	- Discuss the radiographic features seen in malignancies affecting jaws (C4) - Differentiate between Benign and malignant tumors (C4)
	Radiographic diagnosis of mandibular and midfacial fractures - Clinical features; - Selection of radiograph; - Rad features and DD	- Classify orofacial fractures (C3) - Choose appropriate radiographic techniques for various traumatic injuries affecting mandible (C3) - Explain the limitations of 2D imaging in diagnosis of fractures (C3) - Choose appropriate radiographic techniques for Le-forte fractures and zygomatic fractures (C3)

		- Explain the limitations of 2D imaging in diagnosis of fractures (C3) - Describe the common principles of radiographic diagnosis of fractures (C2)
	TMJ imaging Various TMJ imaging modalities - Indications, information provided - Radiographic features of the diseases of TMJ - Specialised TMJ views	- Discuss the radiographic features seen in diseases of TMJ (C3) - Choose appropriate radiographic techniques for TMJ (C3) - Enumerate the higher imaging modalities for visualization of TMJ area (C3)
	HIGHER IMAGING MODALITIES	
	Principles, Indications, Advantages and contraindications of - Digital radiography - Computed Tomography - CBCT - Ultrasonography - Magnetic resonance imaging - Positron Emission Tomography	- Describe the principles of digital imaging (C2) - Explain the various types of image receptors in digital imaging (C2) - Compare the advantages/disadvantages between various image receptors (C3) - Describe the principles of CBCT, CT, MRI and USG (C2) - List the uses of CBCT, CT, MRI and USG and PET scan in dentistry (C1)
	Assessment 1	1st Sessional Theory examination
	Assessment 2	2nd Sessional Theory examination
	Assessment 3	3rd Sessional Theory examination
	CLINICAL POSTING- BLOCK II : 100 hours	
	Oral Diagnosis/ Oral Medicine (integrated with Oral Radiology)	- Perform clinical examination and related investigations of common dental disorders (dental caries, periodontitis, pericoronitis, facial space infection, aphthous ulcers, traumatic ulcers, oral bleeding, tooth fracture, candidiasis) (P5) - Integrate the available data to diagnose oral diseases/oral manifestation of systemic diseases (P5, A4) - Formulate a comprehensive treatment plan including pharmacological management for common dental disorders (dental caries, periodontitis, pericoronitis, facial space infection, aphthous ulcers, traumatic ulcers, oral bleeding, tooth fracture, candidiasis) (P6, A4) - Display the ability to do specialist referral appropriately (P5) - Display the ability to take all types of intra oral radiographs (P4)

		• Diagnose pathologies affecting the oro-facial region with the aid of radiographs (P5) • Construct a radiographic report of intraoral and panoramic images independently (P4) • Perform the skills of effective communication in prescription writing and referral letter writing (A2) • Identify various intraoral radiographic landmarks (P1) • Perform general and orofacial examination of any given patient (P3) • Determine age and gender of individuals using radiographs (A4) (4 hours)
	IOPA and bitewing interpretation	• Diagnose pathologies affecting the oro-facial region with the aid of radiographs (P5) • Construct a radiographic report independently (P4)
	Problem based case discussions	
	CLINICAL ASSESSMENT: BLOCK II	
	Assessment I Case taking	• Display the skills of case-history taking and oro-facial examination. • Diagnose pathologies affecting the oro-facial region with the aid of radiographs • Construct a comprehensive treatment plan
	Assessment II Radiographic exercise	• Perform radiographic procedure and manual processing in a patient independently. Formulate a report of radiographic interpretation and identify anatomic landmarks and faults.
	Assessment III Prescription writing	• Write a prescription for the given case scenario
	Assessment IV OSCE: Clinical examination methods	• The student will be able to demonstrate the various specific examination
	Assessment: V Seminar	• Students will present a topic and their knowledge and communication skills will be assessed
	SDL/PBL	25
	TOTAL CLINICAL HOURS (BLOCK 1 AND BLOCK 2)	150

References	1. Martin S. Greenberg, Michael Glick. <i>Burket's Text book of Oral Medicine, Diagnosis & Treatment</i>. 12th edition. New Delhi: Elsevier Science Asia publishers; 2015. 2. White SC, Pharoah MJ. <i>Oral radiology: Principles & Interpretation</i>, New Delhi: 7th edition, Elsevier-Mosby publishers; 2014
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Question Paper

Exam Date & Time: 01-Apr-2024 (02:15 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION
FINAL BDS PART - I DEGREE EXAMINATION - MARCH / APRIL 2024
SUBJECT: ORAL MEDICINE AND RADIOLOGY
(OBE SCHEME)

Marks: 60

Duration: 165 mins.

Answer all the questions.

Draw diagrams wherever necessary

- 1) Describe the clinical features and chair side investigations for oral cancer.
(5+5 = 10 marks).
- 2) Classify Multilocular radiolucencies of jaws. Mention the various patterns of multilocular radiolucencies with diagram. Discuss the differential diagnosis for any four multilocular radiolucency affecting the mandible.
(4+6 = 10 marks).
- 3) **Short notes:**
(4 marks x 10 = 40 marks)
 - 3A) Describe the clinical features of myofascial pain syndrome
 - 3B) Describe dental considerations in an Asthmatic patient.
 - 3C) List the blood investigations for diabetes mellitus and discuss the indications for the same.
 - 3D) Describe clinical features of Malignant Melanoma.
 - 3E) Discuss the differential diagnosis for any four red lesions affecting the tongue.
(2+2 = 4 marks)
 - 3F) Enumerate the factors controlling x ray beam. Describe the role of tube voltage in image quality.
(2+2 = 4 marks)
 - 3G) What is a Collimator? Describes the types of collimators used in dental radiographic units.
(2+2 = 4 marks)
 - 3H) Four advantages of digital receptors vs conventional receptors.
 - 3I) List four indications and four contraindications of sialography.
 - 3J) With a neat, labelled diagram write about composition of dental x-ray film. Add a note on contents of film packet.
(3+1 = 4 marks)

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PAEDIATRIC & PREVENTIVE DENTISTRY

Course Outcomes (COs)	On successful completion of this course, students will be able to
CO 1:	Outline the scope, objectives and importance of Paedodontics, set up of a pediatric dental clinic along with practise management. (C1)
CO 2:	Explain in detail the normal growth and development of orofacial structures including teeth, its eruption and occlusal development. (C2)
CO 3:	Develop a detailed treatment plan for commonly encountered dental diseases/ disorders in children upto adolescence including children with special health care needs and preventive/interceptive orthodontics (C3, P2, A2)
CO 4:	Perform various preventive and restorative procedures including simple extractions in children using appropriate behaviour management techniques on the basis of child psychology. (C2, P3, A2)

Course learning outcomes

Block	Topics	Learning Outcomes
Block 1 (3 rd year)	Introduction	• Relate with the history of paediatric dentistry(C1) • Explain the definition and goals of Pediatric Dentistry. (C2) • Explain the differences between the child patient from an adult patient and the need to modify the treatment protocol to suit a child. (C3) • Explain the scope of Pediatric Dentistry (C2) • Relate Pediatric Dentistry to other health sciences in multi-disciplinary approach. (C2)
	Growth and Development	Introduction • Distinguish growth and development (C2) • To recognize the importance of growth & development in Pediatric dentistry (C2) • Discuss Prenatal growth (C2) • Explain factors affecting growth prenatal & postnatal(C2) Pedologic Anatomy • Explain Post-natal growth & development (C2) • Identify changes in mandible and maxilla (C2) • Describe mechanisms of growth (C2) Growth assessment parameters • Outline various methods of growth assessment both In vitro& in vivo methods including Krogman's ages (C2) Principles and theories of growth • Explaining differential growth(C2) • Relate Cephalocaudal gradient of growth(C1) • Discuss various theories of growth and development(C2) • Explain Growth spurts and growth trends(C2)

Development of dentition with brief revision of Chronology and its importance.	Introduction • Explain normal Stages of tooth development. (C2) • Explain Chronology of primary and permanent dentition (C2) • Explain process of eruption (C2) • Explain process of exfoliation of primary teeth (C2) PREDENTATE PERIOD • Explain the pre-dentate period (C2) • Describe the gum pads (C1) • Explain the changes occurring in from 0-6 months of age(C2) • Describe Self-correcting anomalies (C2) PRIMARY DENTITION STAGE • List General features (C1) • State Chronology (C1) • Describe spaced and non-spaced dentitions (C2) • Describe Primary molar and canine relationship (C2) • Discuss dental arch changes (C2) • Describe self-correcting anomalies (C2) MIXED DENTITION STAGE • Explain the mixed and permanent dentition phases of normal occlusal development. • First transition period(C2) • Second transition period(C2) • Inter transition period(C2) • Occlusal characteristics(C2) • Arch dimension changes and self correcting anomalies(C2) • Importance of first permanent molars (C2)
Dental Caries	Introduction • Define dental caries(C1) • Review History of dental caries (C1) • Classify dental caries(C2) • Discuss theories of etiology of dental caries(C2) • Identify the risk factors in development of caries(C2) Diagnosis of caries & caries risk assessment • Describe caries pattern in primary, young permanent and permanent teeth (C1) • Discuss various methods of caries diagnosis including recent methods (C2) • List methods of caries risk methods (C1) • List methods caries activity tests (C1)

	• Explain caries susceptibility & their clinical application (C2) Nursing caries, ECC with management • Define ECC, nursing caries (C1) • Discuss etiology (C2) • Describe clinical features and its stages (C2) • Describe management and prevention of ECC (C2) Rampant caries & its management • Define Rampant Caries including aetiology and clinical features (C2) • Management and prevention of rampant caries (C2)
Pediatric Operative Dentistry	Principles and concepts of cavity preparation • Identifying the difference in anatomic features of primary and permanent teeth(C2) • Apply Principles of cavity preparation(C3) • Show Modifications of conventional cavity preparation(C3) • Classify of cavity designs (C2) • Isolations & Matrices • State the role of isolation in operative dentistry (C1) • Explain the role of saliva ejectors, cotton rolls and rubber dam • in isolation (C1) • Illustrate the application rubber dam and its uses (C3) • Describe different types of matrices and wedges used (C2) • Choose right method of isolation (C3) • Minimal intervention dentistry (MID) • Outline Principles & concepts of MID (C2) • Describe changing concepts & techniques of MID in pedodontic operative dentistry(C2) Modern restorative materials and techniques • List Dental materials in paediatric dentistry (C1) • Choose Modern restorative materials & cavity designs to suit the newer materials (C3) Semi-permanent restoration • Describe Semi Permanent Restoration used in paediatrics dentistry (C2) • Categorize indications and contraindications of their use (C4) • 3. Illustrate technique of placement of stainless steel crown (C4)

Preventive Dentistry	Introduction - List concept of preventive dentistry with definition, principles and scope (C1) Levels of prevention - Classify levels of prevention (C2) - Distinguish between different levels of prevention such as primordial, primary, secondary and tertiary prevention (C2) - Discuss each sub levels of prevention at personal, community and professional level (C2) Pit & Fissure sealants - Describe role of Pit and fissure Sealants including their indications and Contraindications (C2) - Explain technique of application of Pit and fissure sealant (C2) Infant oral health - Identify the goals and objectives of infant oral health(C2) - Discuss the role of dentist (C2) - Identify the importance of first dental visit (C2) - Explain anticipatory guidance for infants (C2) Parent counselling Define parent counselling (C1) List Objectives (C1) - Discuss parent counselling from infancy through adolescence (C2) - Explain Information about first dental visit of a child (C2) - Review the right method of tooth brushing (C2)
Examination, diagnosis and treatment planning.	- Prepare step wise recording of case history of a child patient and its significance (C3) - Prepare stepwise charting of Clinical oral examination and understanding the principles of recording DMFT/dmft, gingival and plaque indices. (C3) - Explain differences between provisional diagnosis, differential diagnosis and final diagnosis (C2) - Choose necessary investigations and arriving at a final diagnosis. (C3) - Formulating a treatment plan based on case history recorded (C5)
Gingival and Periodontal diseases in	Gingival Diseases - Explain the features of healthy gingiva and periodontium(C2) - Identify common gingival diseases in children(C1)

children	Periodontal Diseases - Identify common periodontal disease in children(C1) - Discuss understanding of the etiopathogenesis of common periodontal diseases in children(C2) - Describe treatment options and preventive approaches for these common periodontal conditions(C2)
Dental radiology related to pediatric dentistry	- Identify the need for radiology in children(C2) - Discuss different techniques for radiography for children(C2) - Prepare indications for different radiographs in pediatric patients(C3) - Discuss different film surveys used in child patients (C1) - State Radiation hygiene in children (C1) - Discuss optimising the usage of radiographs in children (C2) - Identify radiation protection for the patient & operator (C2).
Fluorides	- Outline the Historical background and natural resources (C1) - Explain the Mechanisms of action: Pre-eruptive and Post eruptive (C2) - Classify the types of Fluorides used in dentistry (C1) - Describe the Methods of systemic fluoride therapy along with advantage and disadvantages of each method: (C2) - Water Fluoridation - Salt and Milk Fluoridation - Fluoride Tablets - Describe the composition, method of application of topical fluorides along with advantages and disadvantages of each method: (C2) - Sodium Fluoride, stannous fluoride, Acidulated phosphate fluoride used as solution, gel and foam - Fluoride dentifrices - Fluoride mouth rinses - Fluoride varnishes - Slow fluoride release systems - Describe School Water fluoridation and School fluoride rinse program along with their advantages and disadvantages (C2) - Describe the types of Fluoride Toxicity, their clinical management and prevention (C2) - Describe Defluoridation techniques (C2)
Practice management	- Describe the Dental Clinic environment and its importance in behavior management (C2) - Explain Personnel system, Patient system and Operational system and their management (C2) - Discuss Infection control measures, disposal of dental materials and waste disposal methods used in pediatric dental clinic (C2)

	Medical and Dental emergencies in children and their management	- List medical emergencies in pediatric dental setup (C1) - List the equipment and drugs required for managing emergency situations (C1) - Describe Basic life support techniques (C2) - Describe Common emergencies encountered in dental practice, its prevention and management such as Acute asthmatic attack, Hypersensitivity reactions, Foreign Body Obstruction, Local anesthesia overdose, Syncope, Hypoglycemia, Respiratory depression (2)
Block 2 (Final yr)	Oral surgical procedures in children	- Define Local anesthesia (C1) - Enumerate Composition of Local anaesthetic solution and components of local anaesthetic syringe (C1) - List the types of local anesthetics (C1) - Explain the mechanism of action of local anesthetics (C2) - List the Indications and contraindications for use of local anaesthetics (C1) - Discuss the special considerations during local anesthetic administration in children (C2) - Explain the difference in the technique of administration of inferior alveolar nerve block in children (C2) - Relate the complications due to local anaesthesia in children and their management (C3) - List the Indications, contraindications for extractions of primary and permanent teeth in children (C1). - Describe the technique of extraction of primary teeth (C2) - Describe the methods of calculation of drug dosage in children (C2) - List the types of non-steroidal anti-inflammatory drugs and antibiotics in children and their indications (C1) - Describe the management of acute dental infections in children (C2) - Discuss the diagnosis and treatment plan for ankylosed teeth, supernumerary teeth, impacted and unerupted teeth, dentigerous and radicular cysts, eruption hematoma and eruption cyst, mucocele and abnormal frenum (C2)
	Child Psychology	- List the commonly seen emotions in the child (C1). Describe different types of cries seen in children (C1). - Define fear, anxiety and phobia (C1). - Discuss various types of fears in children observed in the dental clinic (C2). - Explain Venham's anxiety scale (C2). - Classify theories of child psychology (C1). - Discuss the following theories of child psychology with their dental applications (C2)- 1. Psychoanalytical theory. 2. Psychosocial theory. 3. Theory of cognitive development. 4. Classical conditioning theory. 5. Operant conditioning theory.

		6. Social learning theory. 7. Theory of Hierarchy of needs.
	Behaviour Management	• Define behavior, behavior management, behaviour shaping, behaviour guidance, and behaviouralpedodontics (C1). • Describe the factors affecting the child's behaviour in the dental clinic under control of dentist, out of control of dentist, under control of parent's (C2). • Explain maternal attitude and its influence on child behaviour in the dental clinic (C2). • Discuss the advantages and disadvantages of parental presence and absence in the operatory (C2). • Classify child's behaviour in the dental clinic: Lampshire, Wright and Frankl (C1). • Classify behaviour management techniques according to AAPD (C1). • Discuss Pre-appointment behaviour modification, communication, euphemisms, Tell show do, Desensitization, contingency management, Modeling, Behavior shaping (modification), distraction, retraining, Voice control, Protective stabilization, Hand over mouth exercise, flooding (C2). • Define minimal, moderate, deep sedation and general anesthesia (C1). • Indications for conscious sedation and general anesthesia (C1). • Discuss the advantages and disadvantages of different routes of sedation administration (C2). • Classify the drugs used in enteral and parenteral sedation (C2). • Describe the parts of the inhalation sedation equipment (C2). • Explain the clinical steps and complications involved in nitrous oxide oxygen sedation (C2).

Preventive and Interceptive Orthodontics.	1. Preventive Orthodontics • Define preventive orthodontics (C1) • Discuss the importance of preventive orthodontics (C2). • List the various preventive orthodontic measures employed (C1). • Explain the factors influencing space maintenance (C2) • Discuss mixed dentition analysis in children (C2) • Define space maintenance and space maintainers (C1). • Classify space maintainers (C1). • List the indications, contraindications, advantages, disadvantages and modifications if any of various fixed (band and loop, lingual arch, nance palatal arch, transpalatal arch, distal shoe) and removable space maintainers (C1). • Explain the clinical steps in the fabrication and the design of various fixed (band and loop, lingual arch, nance palatal arch, transpalatal arch, distal shoe) and removable space maintainers (C2). 2. Interceptive orthodontics • Define Interceptive Orthodontics (C1). • Outline the need for early interception (C2). • Discuss the benefits and considerations for early interception (C2). • List various Interceptive orthodontic measures (C1). • List different types of space regainers, their indications and limitations (C1). • Define cross bite and crowding (C1). • Classify cross bite and crowding (C1). • Discuss the etiology, clinical features and management of cross bite (Anterior and Posterior) and crowding (C2).
Pernicious Oral habits in Children and their management	• Define oral habits (C1). • Classify oral habits (C1). • Explain the etiology and effects of oral habits on orofacial region (C2). • Define thumb sucking, tongue thrusting, mouth breathing, bruxism, lip habits and masochistic habits (C1). • Classify thumb sucking, tongue thrusting, mouth breathing, bruxism, lip habits and masochistic habits (C1). • Explain the theories for development of thumb sucking habit (C2). • Explain the clinical features, diagnosis and management of thumb sucking, tongue thrusting, mouth breathing, bruxism, lip habits and masochistic habits (C2).

Pulp therapy for the Primary and young Permanent Dentition	• Explain the histological structure of the primary tooth pulp (C2) • Explain the inflammatory changes in the primary tooth pulp (C2) • List the Difference Between Primary And Permanent Pulp (C1) • Pulpal diseases • List the etiology (C1) • Classify pulpal diseases (C1) • Define each pulpal disease(C1) • Explain the Clinical features of Pulpal Diseases (C2) • Periradicular diseases • List the etiology (C1) • Classify periradicular diseases (C1) • Define each periradicular disease, explain the Clinical features of Periradicular Diseases (C1) • Apply the diagnostic features including investigations, treatment planning of Pulp and periradicular pathology in a clinical situation (C3) • Pulp Therapies in Deciduous and young permanent teeth (Indirect Pulp Capping, Direct pulp capping, Pulpotomy, Pulpectomy, Apexification, Apexogenesis, Revascularization). • List the aim, indications, contraindications (C1) • Explain the step by step procedure of the treatment (C2) • List the materials used for each pulpal procedure (C1) • List the advantages, disadvantages and contraindications for each material (C1) • Outline the post treatment rehabilitation (C1).
Trauma to the anterior teeth and its sequelae in children.	• Outline the Epidemiology of Injuries to the anterior teeth (C1). • Discuss the etiological and predisposing factors to traumatic injuries (C2). • Classify the traumatic Dental injuries to teeth: Ellis and Davis Classification, Andreason's classification (C1). • Apply the diagnostic features including investigations and treatment planning of traumatic injuries in a clinical situation (C3). • Apply the Management of dental injuries based on Andreason's classification: step by step procedure (C3). • Describe the reaction of pulp and periodontal tissues to trauma and their management (C2). • List on the Sequelae of trauma to deciduous teeth on developing permanent teeth(C1). • Discuss on the Prevention of trauma (C2).
Dental care of the children	• Define Children with Special health care needs (C1). • Classify children with special health care needs (C1).

	with special needs.	- Describe the classification (if any), behavioural and clinical features, dental features (if any) and management of children with following conditions in the dental clinic: Cerebral palsy, Mental retardation, Downs syndrome, Autism, Deafness, Blindness, Leukaemia, Bleeding disorders, Coagulation disorders, Heart diseases, Renal diseases, Asthma, Epilepsy, HIV and Hepatitis B Infection (C2). - Describe the etiology, classification, clinical features and the role of pediatric dentist in the management of cleft lip and palate (C2). - Explain the methods used to prevent dental diseases and conditions in a special child (C2).
	Epidemiology	- Describe the components of epidemiology (C2) - Discuss on the procedures in Descriptive epidemiology (C2) - Discuss on the procedures in Analytical epidemiology(C2) - Discuss on the procedures in Experimental epidemiology (C2) - List the uses of epidemiology (C1)
	Dental Auxiliaries	- Define Dental auxiliary (C1) - Classification of the dental auxiliaries (C2) - Discuss Four handed dentistry (C2)

PRACTICALS

BLOCK	TOPIC	OBJECTIVES
	Discussions	A. Discuss infection control practices (C2). B. Tooth Identification - Discuss the differences between primary and permanent teeth (C2) - Reproduce the chronology of primary and permanent teeth (C1) - Describe the morphology of primary and permanent teeth (C2) - Perform the tooth numbering as per FDI system (C3,P3)
	Problem Based and Case Based Learning (CBL)	- Relate the clinical and radiographic findings to diagnose and make a treatment plan for- (C3, P1) - Dental trauma - Deep carious lesion - Early loss of primary tooth

Demonstrations	A. Professional Topical Fluoride Application - Describe the mechanism of action of fluorides: Types of fluorides, rationale & indications for professional fluoride application, method, instructions to patient and precautions during application (C2). - Perform the application of topical fluoride (P3). B. Pit & fissure sealant - Explain rationale, indications & contraindications, types of sealants, method of application (C2). - Perform the application of Pit & Fissure sealant on extracted tooth (P3). C. Resin Modified Glass Ionomer Restoration: - Describe the Principles of conservative cavity preparation (C2). - List the indications, advantages and disadvantages of Resin modified glass ionomer cement (C1). - Prepare Class II cavity on molar- on extracted tooth (P3) D. Composite restoration - List the indications, advantages and disadvantages of Composite resins (C1). - Describe the step by step procedure of composite restoration (C2). - Prepare Class IV cavity on permanent incisor- on extracted tooth (P3)
	E. Identify Spotters (C2, P1).
Preclinical exercises	- Fabrication of Oral screen (C2, P3). - Fabrication of Habit breaking appliance (C2, P3). - Fabrication of removable space maintainer (C2, P3).
Diagnosis of clinical cases	Develop a detailed treatment plan for commonly encountered dental diseases/ disorders in children up to adolescence (C3, P2, A2)
Clinical cases	Performing procedures on the patient viz oral prophylaxis, fluoride application, restorations, pit and fissure sealants (C3, P3, A2)

References	- Textbook of Pedodontics – Dr. ShobhaTandon - Principles and Practice of Pedodontics – Dr. Arathi Rao - Pediatric Dentistry (Infancy through Adolescences) – Pinkham. - Dentistry for the Child and Adolescence – McDonald
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Question Paper

Exam Date & Time: 22-Sep-2023 (02:15 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

FINAL BDS PART – II FINALDEGREE EXAMINATION – SEPTEMBER 2023

**SUBJECT: PAEDIATRIC AND PREVENTIVE DENTISTRY
(REGULAR BATCH)**

Marks: 60

Duration: 165 mins.

Answer ALL questions.

Draw diagrams and flowcharts wherever appropriate

- 1) Write the indications, contra indications and step-by-step procedure in adaptation of stainless steel crowns. (2+2+6 =10 marks)
- 2) Define growth and development. Enumerate various stages of development of occlusion and discuss in detail mixed dentition period. (1+1+2+6 = 10 marks)
- 3) **Write notes on:**
 - 3A) Apexification. (4)
 - 3B) Self-inflicted injuries. (4)
 - 3C) Juvenile periodontitis. (4)
 - 3D) Glass ionomer cement. (4)
 - 3E) Nalgonda Technique (4)
 - 3F) Growth trends. (4)
 - 3G) Tell Show Do Technique (4)
 - 3H) Lingual Arch Space Maintainer. (4)
 - 3I) Psychic triad. (4)
 - 3J) Antibiotic prophylaxis to prevent bacterial endocarditis. (4)

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PERIODONTOLOGY

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Discuss the periodontium in health and disease with emphasis on clinical features, histopathology, radiographic features with a note on etiopathogenesis of periodontal disease (C3)
CO 2:	Recognize and interpret diseases affecting periodontium and prepare a treatment plan (C2,P3,A1)
CO 3:	Display the ability to render basic nonsurgical therapy and customized oral hygiene instructions (C2, P3, A2)
CO 4:	Summarize the basic knowledge of surgical periodontics and implantology (C2)

COURSE LEARNING OUTCOME		
BLOCK 1: Taken in III year BDS (30 hours)		
THEORY		
	CONTENT	COMPETENCIES
PERIODONTOLOGY		
	Introduction to Periodontology	- State the definitions of Periodontology, Periodontics, Periodontia (C1) - Recognize the natural history of this science (C1) - Identify the scope of Periodontics in the field of dentistry (C1)
	Sterilization and various methods of infection control	Discuss the Infection control methods used in management of patients during periodontal therapy (C2)
	THE NORMAL PERIODONTIUM	
	Gingiva -1	- List the zones of oral mucosa (C1) - Define gingiva and describe the parts of the gingiva (C2) - List the clinical features, and explain microscopic features of gingival epithelium with diagram (C2, P1) - Explain the microscopic features of gingiva (C2) - Describe the development of gingiva (C2) - Relate the clinical appearance of gingiva to the microscopic features they represent (C3).
	Gingiva -2	- List and explain the components of the gingival connective tissue (C1, C2) - Outline three sources of blood supply to the gingiva (C1) - Discuss the age changes in gingiva. (C2)
	Periodontal ligament	- Explain the structure and cellular elements of the periodontal ligament. (C2) - Write in detail the functions of periodontal ligament. (C3) - List the periodontal ligament fibers and explain their functions (C1, C2) - Sketch the diagram of periodontal ligament fiber arrangement (C3, P3) - Discuss the age changes in periodontal ligament. (C2)
	Cementum	- Define cementum and explain the development of cementum (C1, C2) - Describe the characteristic features of cementum (C2) - Classify cementum (C3)



		• Write the clinical significance of cementum and associated age changes. (C3) • Distinguish between various types of cementum (P1, C2) • Write about the different types of CEJ s with diagram (C3) • Describe etiology and radiographic appearance of hypercementosis (C2)
	Alveolar bone:	• Explain the development of alveolar bone (C2) • Describe the structure of alveolar bone (C2) • Write the cellular and intercellular matrix of alveolar bone (C3) • Explain the mechanism of bone remodeling in detail with age changes(C2) • Define fenestration and dehiscence and discuss its clinical significance (C1, C2)
	GINGIVAL DISEASES	
	Defense mechanisms of the gingiva	• Discuss the role of GCF and saliva in periodontal pathology (C2 P1) • Discuss the functions of saliva and relate with its composition. (C2, P1) • Describe the epithelial defence mechanism (C2) • Describe the various methods of GCF collection (C2) • Explain the composition of GCF and relate it to its clinical significance. (C3, P1)
	Classification of Gingival and periodontal diseases	• Outline the classification of gingival diseases. (C1) • Categorize periodontal diseases as per the 1999 classification and add a note on 2017 classification. (C4)
	Gingivitis-1	• Summarize the various stages of gingival inflammation based on histopathology and clinical features (C2, P1)
	Gingivitis-2	• Compare the clinical features of gingivitis and relate it to the associated histopathologic changes. (C3) • Discuss the importance of gingival bleeding (C2)
	Gingivitis-3	• Define and describe the clinical features of desquamative gingivitis (C1, C2) • Explain the approach to diagnosis of a case of desquamative gingivitis(C2)



		• Illustrate management of desquamative gingivitis with a flow chart. (C3)
	Acute gingival infections-1	• List the acute gingival infections (C1) • Discuss the etiology, clinical features and diagnosis of NUG. (C2) • Write the management of NUG in ambulatory and non-ambulatory patients. (C3)
	Acute gingival infections- 2	• Describe the clinical features, etiology and management of acute gingival infections. (C2) • Distinguish NUG from herpetic gingivostomatitis. (C2) • Explain the management of Gingival abscess and Pericoronitis (C2)
	Gingival enlargements -1	• Explain the types of gingival enlargements (C2) • Describe the role of various drugs in gingival enlargement (C2) • Explain the management of drug induced gingival enlargement (C2)
	Gingival enlargements -2	• Discuss gingival enlargements associated with systemic diseases / conditions and their management. (C2)
	Indices – 1	• Define the terminologies - Epidemiology, Index, Incidence, Prevalence, Endemic, Epidemic, Pandemic (C1) • List various periodontal indices and explain OHI-S (C1 / C2)
	Indices – 2	• Discuss Plaque Index [Silness and Loe], Gingival Index [Loe and Silness], Russell's Index, CPITN, CPI, PSR (C2) • Explain periodontal screening index and reproduce the grading for a clinical case scenario. (PSR) (C2, P3)
	ETIOLOGY OF PERIODONTAL DISEASE	
	Dental Plaque – 1	• Define and classify plaque (C2) • Explain the composition and types of plaque (C2, P2) • Explain in detail about various stages of plaque formation (C3) • Explain plaque as a Biofilm and its significance in periodontal diseases. (C2, P2) • List the plaque retentive factors. (C1)



		Discuss about different types of disclosing agents (C2)
	Dental Plaque- 2	- Write the various metabolic interaction among different bacterial species found in plaque, host and bacteria (food web) with a diagram (C3) Describe the interactions among different plaque bacteria (C2) - Write the key characteristics of <i>Aggregatibacter actinomycetemcomitans</i> (Aa). (C2) - Write about microbial complexes with examples. (C3) - Discuss various plaque hypotheses. (C2)
	Dental calculus	- Write in detail about composition of dental calculus (C3) - Distinguish between supra and Sub gingival calculus (C2, P1) - Summarize the methods by which calculus is attached to the tooth surface (C2) - Explain the theories of formation of calculus and its role in periodontal disease (C2) - Discuss the etiologic significance of dental calculus (C2)
	Iatrogenic factors	- Explain the iatrogenic aspects of interface between restorations and teeth - contact point, contour, surface roughness, marginal ridge, occlusal surface, overhanging restorations, bridges and other prostheses, pontics (types), encroachment of biologic width. (C2) - Discuss the possible iatrogenic impact on periodontal tissues during orthodontic treatment with removable and fixed appliances - retention of plaque, bacterial changes, traumatic occlusal forces (C2)
	PERIODONTAL DISEASES	
	Pocket -1	- Define pocket (C1) - Categorize the different types of pockets and display diagrams to illustrate the same. (C4, P3) - List the various signs and symptoms of periodontal pocket (C2) - Explain pathogenesis of periodontal pocket (C2)

	Pocket -2	Explain histopathology, root surface changes and contents of the pocket (C2)
	Bone Loss and Patterns of bone destruction	• Explain the mechanism of spread of inflammation from gingival area to deeper periodontal structures and sketch the diagram (C2, P3) • List the factors that modify the spread of inflammation (C1) • Explain factors determining bone morphology in periodontal disease (C2) • Explain various bone destruction patterns in periodontal disease(C2)
	Chronic Periodontitis	• Describe the etiology, clinical features, diagnosis and treatment of chronic periodontitis (C2) • List the models of disease progression - Continuous paradigm, Random burst and asynchronous multiple burst models (C1) • List the causes of tooth mobility (C1)
	Periodontal abscess	• Define periodontal abscess (C1) • Compare periodontal abscess with periapical and gingival abscess (C2) • Write the pathogenesis and treatment of periodontal abscess (C2)
	Aggressive Periodontitis	• Describe the clinical and radiographic features of Localized Aggressive Periodontitis (C3) • Explain the risk factors for aggressive periodontitis (C3) • Discuss the differences between Chronic and Aggressive Periodontitis (C2) • Recognize the role of A. actinomycetemcomitans in Aggressive Periodontitis (C2) • Recognize changes in terminology in new classification. (C1)
	Endodontic – Periodontic continuum	• Write in detail the various classifications of endodontic-periodontal lesions (C2) • Discuss the various routes of spread of infection and its management (C2)
	Habits	• List the parafunctional habits and explain their periodontal significance: Bruxism, tongue thrusting, mouth breathing, lip biting and occupational habits (C1)

		Identify and Discuss the various parafunctional habits and their periodontal significance (C2)
	Total	
FINAL BDS, Part 1 BLOCK 2: Taken in final year BDS (50 hours)		
	Food impaction	- Define food impaction (C1) - List the types, Etiology, Hirschfeld's classification, signs, symptoms, sequelae, of food impaction (C1) - Explain the management of food impaction (C2)
	Oral Malodour	- Define oral malodour and mention the synonyms (C1) - Write the etiology of oral malodour. (C3) - Describe the various methods of diagnosis of oral malodour (C2) - Write the treatment of oral malodour. (C3)
	Periodontal response to external forces (Trauma from Occlusion-1)	- Define and classify trauma from occlusion. (C1, C2) - Explain the tissue response to increased and insufficient occlusal forces (Histopathological changes) (C2) - Write the clinical and radiographic features of trauma from occlusion. (C2)
	Trauma from occlusion-2	- Explain in detail the influence of trauma from occlusion on progression of marginal periodontitis(C2) - Explain in detail about pathologic migration(C2)
RELATIONSHIP BETWEEN PERIODONTAL DISEASE AND SYSTEMIC HEALTH		
	Systemic diseases- 1	- Discuss the role of Nutrition: Vitamins and Proteins (C2) - Explain the role of vitamin C in detail (C2) - Discuss the role of stress on the periodontium(C2)
	Systemic diseases- 2	- Explain the periodontal manifestations and management of changes occurring during puberty, pregnancy, menopause and use of oral contraceptives. (C2) - Explain the role of periodontal infection in adverse pregnancy outcomes - Pre-term labour and low birthweight. (C2) - Summarize the precautions to be taken while treating a pregnant patient. (C2)
	Systemic diseases- 3	- Describe the lab investigations of Leukemia, clotting factor disorder, platelet disorders and their dental implications (C2) - Summarize the management of bleeding and clotting disorders. (C2)

	Systemic diseases- 4	• Discuss HIV and Periodontium → C2 • State CDC classification. (C2) • Describe oral and periodontal findings of HIV infection. (C2)
	RISK FACTORS	
	Risk factor 1	• Define the terminologies related to risk assessment (C1) • Explain the influence of smoking on Periodontium (C2) • Describe the role of genetics as a risk determinant for periodontal disease. (C1)
	Risk factor 2	• Explain the influence of diabetes on periodontal tissues. (C2) • Demonstrate with a flow diagram the inter-relationship between Diabetes and Periodontal disease. (C3) • Review the impact of periodontal therapy on glycemic control. (C2)
	IMPACT OF PERIODONTAL INFECTION ON SYSTEMIC HEALTH	
	Impact of periodontal infection on systemic health-1	• Define focal infection theory (C1) • Explain the relationship between the CVS and Periodontal infection (C2) • Summarize the heart conditions associated with infective endocarditis and add a note on antibiotic prophylaxis (C2)
	Impact of periodontal infection on systemic health-2	• Relate periodontal infection to COPD (C3) • Discuss the link between periodontal disease and acute respiratory diseases-(community acquired / hospital acquired). (C3) • Summarize the precautions to be taken while treating patient with Pulmonary diseases. (C2) • Relate the significance of Periodontal medicine in clinical practice. (C3)
	HOST RESPONSE	
	Host Response -1	• Explain the mechanism of initiation and progression of periodontal diseases (C2) • List the inflammatory cells involved in periodontal disease (mast cells, neutrophils, macrophages, lymphocytes) (C1) • Explain immunoglobulins, Complement system and Cytokines (in brief) (C2)
	Host response-2	• Explain and sketch Trans endothelial migration (C2, P1).



		List the Leukocyte functions and its alterations (PMN disorders) (C1)
	Host response-3	• Explain the microbial interactions with host. (C2) • Explain connective tissue destruction as part of the host response. (C2)
	DIAGNOSIS, PROGNOSIS AND TREATMENT PLAN	
	Advanced Diagnosis-1	• Summarize the various advances in clinical diagnosis (C2) • Write about different generations of probes (C2) • List the NIDCR criteria for probing (C1) • Explain the various advances in dental radiographic techniques (C3)
	Advanced Diagnosis-2	• Explain in detail about various advances in microbiological analysis. (C2) • Indicate the advances in characterizing the host response (C2) • List chairside periodontal diagnostic kits. (C1)
	Prognosis	• Define and classify prognosis (C1, C2) • Relate the role of overall and individual factors in determination of prognosis (C3) • Discuss the relationship between diagnosis and prognosis (C2, P1)
	Treatment plan	• Write about different phases of periodontal therapy (C3) • Discuss phase I periodontal therapy (C2).
	Periodontal therapy	• Define repair, regeneration, new attachment and reattachment (C1) • Explain the tissue response and clinical results after periodontal treatment. (C2) • Describe Melcher's concept with a neat labelled diagram. (C2, C4)
	Periodontal therapy in Medically compromised patients	• Write the clinical precautions to be taken while treating hypertensive patients (C3) • Discuss the management of patient with angina attack on the dental chair (C2) (P1) (A1) • Explain the treatment modifications to be followed in treating patient with renal disease (C2) • Summarize the precautions to be taken while treating patient with (C2) ○ Liver diseases

		○ Immunosuppression and chemotherapy ○ Radiation therapy ○ Infectious diseases
	NON-SURGICAL THERAPY	
	Plaque control -1	• Classify the various types of mechanical methods (C3, P3) • Classify interdental aids based on the types of gingival embrasures. (C2)
	Plaque control -2	• Classify chemical plaque control agents. (C2) • Summarize the indications, contraindications, mechanism of action, and dosage of use of chlorhexidine (C3, P2)
	Dentinal hypersensitivity	• Define dentinal hypersensitivity (C1) • Explain the etiology of dentinal hypersensitivity (C2) • Explain the theories of dentinal hypersensitivity (C2) • Describe the treatment options for dentinal hypersensitivity (C2) (P1)
	Periodontal splinting	• Write about rationale, principles and different types of splints used in periodontal therapy (C3)
	Chemotherapeutics-1	• Write about uses of systemic antibiotics in periodontal disease management (C3) • Discuss the role of local drug delivery in the management of periodontal disease. (C2)
	Chemotherapeutics-2	• Write in detail the role of host modulation therapy in periodontal management (C3) • Discuss in detail the role of sub antimicrobial dose doxycycline in periodontal therapy and periodontal management. (C2)
	Scaling and Root planing	• Write the indications and rationale behind scaling and root planing. (C3) • Write the differences between piezoelectric and magnetostrictive scalers (C3)
	SURGICAL THERAPY	
	Phase II therapy	• List the objectives of surgical phase (C1) • Discuss the results of pocket therapy (C2) • Discuss pocket elimination versus pocket reduction (C2) • Describe critical zones in pocket surgery (C2)



		• Write about indications and contraindications for periodontal surgery (C3) • Discuss hemostatic agents (C2)
	Curettage	• Explain the rationale for gingival curettage (C2) • List the indications of gingival curettage(C1) • Describe ENAP in detail and display it as a diagram (C2, P3)
	Gingivectomy	• Discuss the Indications and contraindication of gingivectomy (C2) • Write in detail about steps in Surgical gingivectomy (C3) (P1) • Distinguish between gingivectomy and Gingivoplasty(C2) • Describe the healing after surgical gingivectomy(C2) • Explain the different methods of gingivectomy(C2)
	Flap surgery-1	• Define flap and write about various designs. (C1, C3) • Classify periodontal flaps (C2) • Write the indications and contraindications of flap surgery (C3) • Describe in detail about various incisions used in flap surgery (modified Widman flap surgery, papilla preservation flap, conventional flap) using diagrams. (C2, P1) • Write the rationale for suturing and list various suturing techniques (C3, C1).
	Flap surgery-2	• Explain in detail other flap techniques used in periodontal surgery (palatal / distal wedge surgery) (C2) • Discuss periodontal dressings. (C2) • Describe the healing after flap surgery. (C2)
	Resective osseous surgery	• Review the osseous defects in periodontal disease (C2). • State the rationale of osseous resective surgery. (C1) • Distinguish between osteoplasty and osteotomy. (C2) • Discuss the various steps in osseous resective surgery, using a sketch. (C2, P3)

Reconstructive periodontal surgery -1	- Describe the different methods of evaluation of new attachment and periodontal reconstruction (C2) - Explain the concept behind GTR Procedure and describe the procedure of GTR. (C2) - Discuss the membranes used for GTR. (C2) - Discuss the concept and various agents used for root surface bio -modification (C2)
Reconstructive periodontal surgery-2	- Discuss the various non bone graft associated procedures(C2) - Describe various bone graft materials used in periodontal treatment. (C2) - Explain healing after various osseous graft procedures. (C2)
Furcation Involvement -1	- List the etiological factors of furcation involvement (C1) - List the methods to detect furcation involvement. (C1) - Classify furcation involvement. (Glickman's classification; Tarnow and Fletcher's) (C2)
Furcation Involvement -2	Appraise the various treatment modalities for grade I, II, III and IV furcation involvement. (C4)
Periodontal plastic surgery -1	- State the objectives of periodontal plastic surgery(C1) - Write the techniques to increase width of attached gingiva(C2) - Describe the procedure of free gingival graft and display with a diagram. (C2, P2) - Write in detail about the apically positioned flap procedure (C2).
Periodontal plastic surgery -2	- Explain the etiology of gingival recession with a sketch. (C2, P3) - Describe various root coverage procedures for gingival recession and display diagrams. (LPG, CAF with modifications) (C2, C4)
Periodontal plastic surgery-3	- Illustrate the procedure of Sub-epithelial connective tissue graft with diagram. (C4) - Distinguish frenectomy and frenotomy. (C2) - Describe the procedure of frenectomy and illustrate with a diagram. (C2, C4) - Explain criteria for selection of mucogingival techniques. (C2)



	Advances in surgical technology	- List different types of loupes used in periodontics(C1P1) - State the advantages of surgical microscope compared to loupes (C1) - Explain the advantage, disadvantage and application of LASERs in periodontal therapy (C2)
	Periodontal–restorative interrelationships	Discuss the periodontal considerations during restorative margin placement, biologic width and maintenance of periodontal health (C2)
	Adjunctive orthodontic treatment	Discuss the periodontal considerations during orthodontic tooth movement (C2).
	ORAL IMPLANTOLOGY	
	Dental implants-1	- List the different types of Implants (C1) - List the biomaterials used for implants (C1)
	Dental implants -2	- Explain diagnosis and treatment planning for implant placement with a schematic diagram (C2, P3) - Describe biology and morphology of bone for implant placement (C2)
	Dental implants -3	Describe one stage versus two stage implants. (C2)
	Dental implants -4	Explain the advanced implant surgical procedures (C2)
	Dental implants -5	Summarize in detail the etiology, diagnosis and management of peri-implant diseases (C2, P2)
	PERIODONTAL MAINTENANCE	
	Supportive periodontal therapy	- Explain the rationale of SPT. (C2) - Write the recall intervals for various classes of periodontal patients. (C3)
	ETHICS IN DENTISTRY	
		- Define ethics and jurisprudence. (C1) - List the principles of dental ethics. (C1)
	Total	
CLINICAL HOURS - III BDS		
	Orientation, and Infection Control and sterilization protocol	- Show the disinfection and sterilization techniques used in the dental clinic (P2) - Display infection Control methods like hand washing technique, use of personal protective equipment (P4)



		• Display methods to minimize aerosol during dental procedures (P4)
	• Introduction to basic Instrumentation	• Show wax up and scaling on cast /model using hand instruments under supervision. (P2)
	• Discussion and demonstration of mechanical plaque control	• Identify and classify toothbrushes. (P1, C2) • State ADA specifications of toothbrush and explain to the patient parts of a toothbrush. (P2) • Display brushing techniques to patients and differentiate techniques based on indications (P4, P1) • Identify interdental aids and trace its indication to the embrasure spaces (P1, P2).
	• Discussion on chemical plaque control	• Describe and select composition of toothpaste, based on specific indications. (P1) • Select appropriate mouth rinse based on classification (P1) • Identify indications and adverse effects for use of Chlorhexidine (P1) • State and reproduce instructions on use of mouthwash, for patient care (P2, P3)
	• Examination of gingival status with demonstration of recording it on the patient along with recording of PSR	• Listen to patient complaints and ask related questions (A1) • Identify and relate clinical features of gingival disease (P1) • Show and measure PSR index (P1, P3)
	• Diagnosis and treatment plan	• Differentiate types of gingival and periodontal diseases to diagnose condition, based on examination of gingival tissues (P1) • Construct a customized treatment plan (P3) • Communicate need for treatment to patient (A2)
	• Treatment	• Display supra gingival scaling on patients using hand scaling instruments (P4)
	• Motivating patients and oral hygiene instructions	• Show use of disclosing agent (P2) • Encourage patient to follow correct brushing method (A3) • Explain and display the brushing technique on the model (P2, P3)
	• Total	
	Final year part -1	
	Periodontal status recording along with oral hygiene index-simplified	• Communicate clinical findings and need for treatment to patient (A2) • Display ability to take case history and examine patients (P3, A2)

		• Display recording of OHI-S (P3)
	Investigation	• Interpret lab investigations and radiographs relevant to each patient and differentiate conditions (C3, P1)
	Diagnosis and treatment plan Prognosis	• Construct a treatment plan and explain to the patient (P3, A1) • Describe the various factors involved in prognosis of periodontal disease and share with patient (P1, A3) • Describe indications for chemotherapeutics. (P1)
	Ultrasonic scaling Oral Hygiene instructions	• Display supra gingival ultrasonic scaling on patients (P5, A2) • Display use of mechanical plaque control aids (P4) • Suggest customized oral hygiene instructions to patient (A3)
	Surgical periodontics	• Display gingivectomy procedure on waxed up cast (P3) • Differentiate the various periodontal flap procedures based on indications (P1) • Identify various incisions in flap surgery (P1) • Identify suture types and describe suturing techniques (P1) • Describe parts of suture needle (P1) • Identify periodontal surgical instruments and describe indications (P1) • Describe bone graft materials (P1) • Identify periodontal dressings (P1)
	LASER and Electrocautery	• Identify surgical loupes. (P1) • Discriminate indications for use of Laser and electro cautery (A1) • Display skill on models (P3)
	Problem based learning	• Summarize and interpret clinical findings (C3), construct a treatment plan (P3) and explore alternate treatment options. (A2)
	Spotters	• Identify instruments used for nonsurgical and surgical periodontal therapy (P1)
	TOTAL	
	TOTAL PRACTICAL HOURS (BLOCK 2 AND BLOCK 3)	

Question Paper

Exam Date & Time: 28-Mar-2024 (02:15 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION
FINAL BDS PART - I DEGREE EXAMINATION - MARCH / APRIL 2024
SUBJECT: PERIODONTOLOGY
(OBE SCHEME - REGULAR BATCH)

Marks: 60

Duration: 165 mins.

Answer all the questions.

Draw diagrams wherever necessary

- 1) Define gingiva. Name the parts of the gingiva. Explain the microscopic features of gingiva.
- 2) What is the rationale for gingival curettage. List the indications of gingival curettage. Describe ENAP in detail.

(10 x 2 = 20 marks)
- 3) **Short notes:**

(4 marks x 10 = 40 marks)

 - 3A) What are the various methods of GCF collection?
 - 3B) List the treatment options for grade II furcation involvement.
 - 3C) Name the methods by which calculus is attached to the tooth surface.
 - 3D) What is the rationale for resective osseous surgery?
 - 3E) Explain the rationale of SPT.
 - 3F) Explain the role of vitamin C in periodontal disease.
 - 3G) List the different types of Implants.
 - 3H) Name the techniques to increase width of attached gingiva.
 - 3I) Discuss the role of sub antimicrobial dose doxycycline in periodontal therapy.
 - 3J) A 49-year-old female patient was concerned that her family members often hinted at her bad breath. She was generally healthy with no significant medical history. Oral examination revealed poor oral hygiene, oedematous gingivae, deep pockets of 6 mm which showed bleeding on probing. No dental abnormalities were seen. Interpret the cause of oral malodour in this patient. Write one method of treating oral malodor. Choose an objective method of assessing oral malodour. Which systemic condition is associated with a sweet breath odour.

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ORAL & MAXILLOFACIAL SURGERY

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Able to Diagnose and Plan treatment for patients with oral surgical problems and have knowledge of range of surgical treatments.
CO 2:	Should have acquired the skill to examine any patient with an oral surgical problem in an orderly manner and should be competent in the extraction of teeth and minor oral surgical procedures under L.A. like frenectomy, alveolar procedures & biopsy etc. and decide the requirement of a patient to have oral surgical specialist opinion
CO 3:	Provide primary care and manage medical emergencies in the dental office.
CO 4:	Understand management of major oral surgical problems and Principles involved in inpatient care



Course content and outcomes:	
Content	Competencies
Unit I: Oral & Maxillofacial Theory	
Introduction and Orientation	Orientation of the students about the subject. Introduction, Definition, Scope, Aims & Objectives (C1)
Principles of infection control in Oral Surgery	• Describe Asepsis • Sterilization of instruments • Universal Barrier techniques used for prevention of cross-infection • Discuss Needle stick injuries (C2)
Local Anesthesia	• Define and describe Advantages & disadvantages, Indication & contra indications for L.A. (C2) • Explain Ideal requirements & Composition of L.A solution, Mechanism of action of Local anesthesia (C2) • Explain Theories of Local Anesthesia (C2) • Discuss Pharmacology of Local anesthetics (C2) • Discuss Pharmacology of Vasoconstrictors (C2) • Describe Local complications of L.A. (C2) • Describe Systemic complications of L.A and management (C2)
Exodontia	• Define Ideal tooth extraction. Discuss Indication & contraindications for extraction. (C2) • Explain Methods of extraction- Intra alveolar extraction (C2) • Explain Transalveolar extraction (C2) • Describe Complications of exodontia (C2) • Explain Dry Socket (C2) • Describe Elevators in Exodontia (C2)
Impacted teeth	• Explain the definition, Incidence, aetiology and theories of impacted teeth (C2) • Classify and assess impacted 3rd molar (C2) • Describe Surgical procedure for removal of lower 3rd molar & complications (C2) • Describe Impacted Maxillary third molars. Classifications. Surgical procedure for removal Complications (C2) • Describe Impacted Maxillary canines – Classification, Localization & Indications for removal. (C2) • Explain Surgical removal of the impacted canine & complication (C2)
Cystic lesions of the jaws	• Explain the Definition, Classification, Pathogenesis, Investigations & Differential diagnosis (C2) • Describe Surgical management of the Cyst of the jaw and complications (C2) • Discuss Odontogenic Keratocyst C/F/ R/F & Management (C2)
Diseases of the maxillary sinus	• Describe Surgical Anatomy and Development of Maxillary sinus, Acute & chronic sinusitis, C/F and investigation (C2) • Explain Management (C2)



	• Discuss Removal of root from maxillary sinus and Caldwell-Luc operation (C2) • Describe Oro-antral fistula- aetiology and C/F (C2) • Describe Various surgical methods of closure of oro-antral fistula (C2)
Odontogenic tumours of the jaws	• Discuss and classify (C1) • Discuss Ameloblastoma: C/F, R/F & investigations (C2) • Describe Treatment modalities (C2) • Discuss Odontomes and other odontogenic tumors (C1)
Pre-prosthetic surgery	• Define, Classify and explain Indications, Alveoloplasty Procedure (C2) • Discuss Vestibuloplasty procedures (C2) • Describe Ridge Augmentation procedures (C2) • Describe Other Pre prosthetic surgical procedures like Frenectomy and tori removal (C2)
Orthognathic Surgery	• Discuss Jaw deformities- Types and aetiology (C2) • Describe Treatment Planning for Orthognathic surgery (C2) • Describe Maxillary osteotomy procedures: Anterior Segmental Osteotomy, Lefort –I osteotomy (C2) • Describe Mandibular osteotomy procedures: Body Osteotomy, Genioplasty (C2) • Discuss Ramus procedures (C2). • Describe Sagital split osteotomy (C2)
Osteomyelitis of the Jaws	• Discuss Definition, Aetiology, Pathogenesis & Classification (C2) • Describe Acute & Chronic Osteomyelities C/F, R/F, Investigations. (C2) • Discuss Management of osteomyelities of the jaws (C2) • Describe Osteoradionecrosis: Aetiology, C/F, R/F investigations (C2) • Discuss Management of osteoradionecrosis (C2)
Endodontic Surgery	• Discuss Indications, Incisions & Flaps used, surgical technique (C2)
Biopsy	• Explain Types of biopsy , Indications (C2)
Antibiotics in Oral & Maxillofacial Surgery	• Classify, Discuss mechanism of action, Principles of Antibiotic treatment, Commonly used antibiotics in oral surgery (C2)
Analgesics and anti-inflammatory drugs	• Classify, explain Mechanism of action of commonly used analgesics and anti-inflammatory drugs in oral surgery (C2)
Pain	• Discuss Definition, Types of pain, Classification of orofacial pain, Management of pain (C2) • Describe Pain pathway from orofacial region, Theories of pain (C2) • Explain Trigeminal Neuralgia – Define, Discuss its aetiology, C/F, Diagnosis, Management (C2)
Trauma	• Discuss Maxillofacial Trauma, its Etiology, Applied Anatomy (C2) • Discuss General examination, Local examination & primary resuscitation (C2) • Discuss Open & closed reduction; direct & indirect fixation (C2)



	- Describe Mandible fractures- Symphysis, Parasymphysis, Body & Angle fractures (C2) - Discuss Management of fracture of Angle of the mandible (C2) - Explain Classification C/F /Radiographic features of condylar fracture (C2) - Discuss Dento alveolar injuries (C2) - Describe Midface fractures- Lefort –I, II, III (C2) - Discuss Midface fracture management (C2) - Describe ZMC fractures (C2) - Describe Orbital fracture (C2) - Discuss Complications of Maxillofacial trauma (C2)
Space Infections	- Discuss, Aetiology, Microbiology, Principles of management of odontogenic infection, Factors affecting spread of Infections (C2) - Discuss Maxillary space infection- Anatomy C/F, Diagnosis and management (C2) - Discuss Mandibular space infection, C/F, diagnosis and management (C2) - Discuss Masticatory space infection (C2)
Salivary gland disorders	- Describe, Surgical anatomy, Classification, Investigations (C2) - Discuss Acute Sialadenitis, Sialolithiasis (C2) - Describe Mucocele & Ranula (C2) - Classify of salivary gland tumors, Discuss Pleomorphic adenoma (C2) - Describe Management of Salivary Gland Neoplasms (C2)
Temporomandibular Joint Disorders	- Discuss Surgical Anatomy & Classification of the disorders of the TMJ (C2) - Discuss Internal derangement and degenerative disorders (C2) - Describe TMJ Dislocation and subluxation- C/F, R/F & Management (C2) - Describe Aetiology, Classification, C/F, R/F, Investigations of TMJ Ankylosis (C2) - Discuss TMJ Ankylosis- Management (C2)
General anesthesia	- Define General Anaesthesia, Describe Anaesthesia machine, Stages of Anaesthesia, Inhalation Anaesthetic agents – Halothane & Nitrous oxide (C2) - Discuss Pre medications- Definition, Objectives, Advantages, Disadvantages, Premedication drugs (C2) - Discuss Conscious sedation - Intravenous sedation- Propofol, Ketamine, Diazepam (C2)
Implants	- Discuss Surgical consideration -Indication/Contra indications for Implant. (C2) - Describe Surgical procedure (C2)
Unit 2: Preclinical Practical	
Principles of infection control (C3,P2)	Asepsis - measures to prevent introduction of infection during surgery. Preparation of the patient



	- Measures to be taken by operator 3. Sterilization of instruments
Armamentarium (C3,P2)	Identification and use of Oral surgery instruments
Local anesthesia Injection techniques (C3, P2)	Demonstration of Local anesthesia Injection techniques
Exodontia (C3, P2)	Demonstration of Exodontia
Suturing (C3, P2)	Demonstration of different techniques of suturing Understand Principles of suturing
Dental wiring and Arch bar fixation (C3, P2)	Perform different techniques of wiring and arch bar fixation for dental and maxilla-mandibular fixation
Medical emergencies during dental treatment (C3, P2)	- Identify and manage medical emergencies in dental practice - Perform basic life support
Waste Management (C3, P2)	Demonstrate appropriate disposal of clinical waste
Unit 3: Clinicals	
Patient Care – Diagnosis (C4, P3, A2)	- Obtaining patient's history in a methodical way - Performing thorough clinical examination - Selection and interpretation of clinical, radiological and other diagnostic information - Obtaining appropriate consultation - Arriving at provisional, differential and final diagnosis
Patient Care – Treatment Planning (C4, P3, A2)	- Integrate multiple disciplines into an individual comprehensive sequence treatment plan using diagnostic and prognostic information - Able to order appropriate investigations
Patient Care – Treatment (C3,P3, A2)	- Recognition and initial management of medical emergencies that may occur during dental treatment - Perform basic cardiac life support - Management of pain including post-operative pain - Administration of all forms of local anaesthesia - Administration of intra muscular and venous injections - Prescription of drugs, pre-operative, prophylactic and therapeutic requirements - Perform Uncomplicated extraction of teeth - Perform Transalveolar extractions and removal of simple impacted teeth - Perform Minor oral surgical procedures - Manage oro-facial infections

Reference Material	Recommended books - Text book of oral and maxillofacial surgery; Srinivasan B. - Handbook of medical emergencies in the dental office, Malamed SF. - Handbook of Local Anaesthesia, Malamed SF - Killeys Fractures of the mandible; Banks P. - Killey's fractures of the middle 3rd of the facial skeleton; Banks P. - Oral & maxillofacial surgery, Vol 2; Laskin DM
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- Extraction of teeth; Howe, GL
- Minor Oral Surgery; Howe.GL
- Contemporary oral and maxillofacial surgery; Peterson I.J.& EA

Reference Books:

- Impacted teeth; Alling John F & et al.
- Principles of oral and maxillofacial surgery; Vol.1,2 & 3 Peterson LJ & et al.
- The maxillary sinus and its dental implications; McGovanda
- Killey and Kays outline of oral surgery – Part-1; Seward GR & etal
- Essentials of safe dentistry for the medically compromised patients; Mc Carthy FM

Oral and maxillofacial infections; Topazian RG & Goldberg

Question Paper

Exam Date & Time: 15-Sep-2023 (02:15 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

FINAL BDS PART – II DEGREE EXAMINATION – SEPTEMBER 2023

SUBJECT: ORAL AND MAXILLOFACIAL SURGERY
(REGULAR BATCH)

Marks: 60

Duration: 165 mins.

Answer all the questions.

Draw diagrams and flowcharts wherever necessary.

Essay Question:

- 1) Describe the surgical anatomy of Temporomandibular Joint. Explain in detail the clinical features and management of TMJ Ankylosis. (3+3+4 = 10 marks)
- 2) Define Cyst. Explain in detail the clinical features, radiographic features and management of Odontogenic Keratocyst (1+3+3+3 = 10 marks)
- 3) **Write short notes on:**
 - 3A) Indications and technique of Genioplasty (4)
 - 3B) Pain pathway (4)
 - 3C) Describe the etiology, clinical features and management of Ludwig's Angina (4)
 - 3D) Describe the etiology, clinical features and management of Leukoplakia (4)
 - 3E) Describe the radiographic features and management of Nonunion (4)
 - 3F) Elaborate on WAR lines (4)
 - 3G) Describe the radiographic features and management of Ameloblastoma (4)
 - 3H) Write the clinical features and management of Unilateral Condylar Fractures (4)
 - 3I) Describe the various radiographic investigations advised and management of Sialolithiasis (4)
 - 3J) Local Anaesthesia toxicity (4)

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PROSTHODONTICS AND CROWN & BRIDGE

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Formulate a treatment plan with professional, ethical consideration after diagnosis and patient requirements.
CO 2:	Explain the basic principles and concepts of designing and fabricating removable, fixed, special need and implant prosthesis.
CO 3:	Communicate and correspond effectively with technicians, oral health professional and patients in providing effective service to a patient requiring removable prosthesis and referral of complex cases.
CO 4:	Distinguish between patient's prosthetic requirements for a removable or fixed prosthesis and construct dentures for a partially or fully edentulous patient.
CO 5 :	Perform complex restorative procedures including, single crowns and short-span bridge on simulated cases.

Course content and outcomes:	
Content	Competencies
Unit 1:	
Introduction to Removable partial dentures	- Describe the differences between a definitive and temporary partial denture (C2) - Outline the protocol for treating a patient requiring Cast partial denture(C4)
Classifications of removable partial denture	- Classify a partially edentulous arch (C2) - Apply Applegate's rules in classifying partially edentulous arches (C3)
Oral examination to precede Prosthodontics	- Explain the need for diagnosis and treatment planning (C2) - Apply the knowledge in the diagnosis and planning the treatment (C3)
The diagnostic cast and its uses	- Explain the purpose of a diagnostic cast (C2) - Explain the uses of fabricating a diagnostic cast(C2)
Maxillary major connectors	- Analyse the rationale behind using various types of major connector (C4) - Choose the right major connector for the particular partially edentulous situation (C3)
Mandibular major connectors	- Analyse the rationale behind using various types of major connector (C4) - Choose the right major connector for the particular partially edentulous situation (C3)
Minor connectors	- Analyse the rationale behind using various types of minor connector (C4) - Choose the right choice of Minor connector for the particular partially denture design(C3)
Rest and Rest seats	- List the choice of rest and rest seat (C4) - Choose the right rest and rest seat for particular partially edentulous situation (C3)
Direct retainers	- Demonstrate the Role and Purpose of using a direct retainer in a Partial denture(C3) - Select an appropriate retainer for the partial denture (C4)
Indirect retainers	- Categorise the various type of Indirect retainer (C4) - Select the right indirect retainer for the particular partially edentulous situation(C4)
Denture base	- Analyse the rationale behind using various types of the saddle in a removable partial denture(C4) - Select the right choice of denture base and teeth for the particular partially edentulous situation(C4)



Surveyor	- Analyse the role of Surveyor and need for surveying (C4) - Apply the knowledge in the diagnosis and planning the treatment (C3)
Laboratory procedures	- List different Lab steps (C1) - Explain different steps involved with the aid of videos (C3)
Preliminary jaw relation record for a partial denture	- Apply the knowledge of jaw relation, to record bite registration in RPD (C3) - Explain the difference between Jaw relation and Bite registration (C2)
Fitting, try-in, completion of partial denture	Justify and interpret the need for the try-in procedure(C4, C2)
Instructions for a patient receiving RPD service	Explain the importance of giving post-insertion instructions to a patient wearing a partial denture(C2)
Stresses in RPD and measures to control them	- Analyse various stresses acting on the partial denture (C4) - Apply the knowledge in the designing of the partial denture to eliminate the stress caused by it (C3)
Stress breakers	
Mouth preparation	Explain various phases of Mouth preparation(C2)
Impression registration procedures	- Distinguish the significance of various impression techniques (C4) - Apply the knowledge and select the appropriate technique for a particular situation(C3)
Support for a removable partial denture	Explain the significance of support in partial denture construction(C2)
Principles in designing of RPD	- Explain various factors in designing partial cast dentures (C2) - Apply the clinical reasoning in the decision making for a particular design(C3)
Different forms of removable partial dentures	- Classify removable partial denture. (C2) - Distinguish the different types of removable partial denture (C4)
RPD opposing complete dentures	- Explain the problems associated with single Complete Dentures(C2) - Apply the clinical reasoning in the handling of such situations(C3)
Overdentures	- Explain the need for overdenture(C2) - Analyse the patients need and prosthetic requirement in fabricating an overdenture(C4)
Immediate denture treatment	- Explain the need for Immediate denture(C2) - Analyse the patients need and requirement in fabricating an immediate denture(C4)

Single complete denture	• Explain the need for a single complete denture(C2) • Analyse the patients need and requirement in fabricating a single complete denture (C4)
Geriatrics	• Define Geriatric Dentistry (C2) • Explain the management of Geriatric patients (C4)
Maxillofacial prosthesis	• Define Maxillofacial Prosthesis (C2) • ClassifyMaxillofacial Prosthetics (C2) • Explain the different types and material choice for each type (C4)
Obturator	• Define Maxillofacial Prosthesis (C2) • ClassifyMaxillofacial Prosthetics (C2) • Explain the different types and material choice for each type (C4)
Eye, ear, nose prosthesis	• Define Maxillofacial Prosthesis (C2) • ClassifyMaxillofacial Prosthetics (C2) • Explain the different types and material choice for each type (C4)
Finger, toe Prosthesis	• Define Maxillofacial Prosthesis (C2) • ClassifyMaxillofacial Prosthetics (C2) • Explain the different types and material choice for each type (C4)
Revise diagnosis, treatment planning, RPD designing.	• Revise the topic (C5, P5)
Introduction to Fixed partial denture prosthodontics	• Explain FPD (C2) • Explain importance of each component that makes up a FPD (C2)
Classification of fixed partial denture	• Explain the need for Classification(C2) • Demonstrate the ability to name a particular bridge(C3)
Indications and Contraindications of FPD	• Differentiate between fixed and removable prosthesis(C4) • Apply the knowledge in making a choice (C3)
Diagnosis and treatment planning	• Explain the need for diagnosis and treatment planning (C2) • Apply the knowledge in the diagnosis and planning the FPD treatment (C3)
Abutment evaluation	• Choose an abutment for a fixed prosthesis (C3) • Justify the evaluation protocol for abutment selection(C4)
Biomechanical considerations	• Understand and Analyze various factors affecting a partial denture (C4) • Apply the knowledge in the designing of the Fixed partial denture (C3)



Retainers	• Explain what is a retainer(C2) • Explain the rationale behind using them(A3)
Pontics	• Explain what is a Pontic(C2) • Explain the rationale behind using them(A3)
Connectors in FPD	• Explain what is a Connector(C2) • Explain the rationale behind using them(A3)
Fluid control and Gingival tissue management	• Explain the need for fluid control and gingival retraction(C2) • Demonstrate the understanding of the procedure(C3)
Impression in FPD	• Differentiate between impression techniques(C4) • Demonstrate appropriate impression procedure for a patient(C3)
Provisional restorations	• Explain the need for Provisional restorations (C2) • Demonstrate the understanding of the procedure(C3)
Occlusion in FPD	• Define Occlusion (C1) • Classify the different types of occlusion (C2) • Explain the different clinical implications for each (C3)
Intra coronal restorations	• Classify the different types of intra-coronal restorations (C2) • Explain the different clinical implications for each (C3)
Resin-bonded bridges	• classify Resin Bonded bridges (C2) • Compare Indication and contraindication advantages and disadvantage for Resin Bonded bridges (C3) • Explain the procedure for case selection and tooth preparation (C3)
Jacket crown preparation	• Explain the basic principles in tooth preparation(C2) • Apply the knowledge during tooth preparation(C3)
Anterior $\frac{3}{4}$ crown preparation	• Explain the basic principles in tooth preparation(C2) • Apply the knowledge during tooth preparation(C3)
Mesial $\frac{1}{2}$ crown preparation	• Explain the basic principles in tooth preparation(C2) • Apply the knowledge during tooth preparation(C3)
7/8 crown preparation	• Explain the basic principles in tooth preparation(C2) • Apply the knowledge during tooth preparation(C3)
Reverse $\frac{3}{4}$ crown preparation	• Explain the basic principles in tooth preparation(C2) • Apply the knowledge during tooth preparation(C3)
Complete veneer crown preparation	• Explain the basic principles in tooth preparation(C2) • Apply the knowledge during tooth preparation(C3)
Complete veneer crown with facing preparation	• Explain the basic principles in tooth preparation(C2) • Apply the knowledge during tooth preparation(C3)



Die materials	• Differentiate between various die materials(C4) • Explain the process of fabrication of a die(C2)
Die systems	• Differentiate between various die systems(C4) • Explain the process of fabrication of a die(C2)
Wax pattern	• Explain the process of fabrication of a Wax pattern (C2)
Spruing and investing	• Explain the process of fabrication of a Spruing and investing (C2)
Casting and Polishing	• Explain the process of fabrication of a Casting and Polishing (C2)
Casting defects	• Define and classify Casting defects (C2) • Explain the procedure to manage Casting defects (C3)
Soldering	• Understand and Apply the basic principles in soldering(C3)
Cementation of FPD	• Classify cements (C2) • Compare composition Indication and contraindication advantages and disadvantage for different types of cement (C3) • Explain the procedure for the use of each cement (C3)
Management of extensively damaged tooth	• Explain the procedure to manage extensively damaged tooth (C3)
Post and core preparation	• Explain the procedure to manage post and core preparation (C3)
Articulators in FPD	• Classify articulators and Face bows (C2) • Explain and compare the theory, indication, advantages clinical implication of each type (C3)
Functionally generated path technique	• Explain and compare the theory, indication, advantages clinical implication of occlusion (C3)
Colour science & shade selection	• Classify different type and method of shade selection (c2) • Explain and compare the procedures for shade selection (C3)
Failures in FPD	• Define and classify failures in FPD(C2) • Explain the procedure to manage failures in FPD (C3)
Laminates & veneers	• Define Laminates and Veneers (C2) • Classify the different type of Laminates and Veneers (C2) • Explain the concepts for case selection and principles of tooth preparation (C4)
Splints and stents	• Classify Splints and stents (C2) • Distinguish the different types of Splints and stents (C4)

Diagnosis and treatment planning in implantology	• Explain the need for diagnosis and treatment planning (C2) • Apply the knowledge in the diagnosis and planning the implant treatment (C3)
General consideration in Prosthodontic reconstruction and biomechanics	• Classify Implants (C2) • Describe and explain different prosthetic options and its indication (C2)
Surgical implant procedure	• Explain the staging protocol for implants (C2)
Osseointegration	• Explain the process of Osseointegration (C2)
Impression procedure and master cast	• Differentiate between impression techniques(C4) • selection of appropriate impression procedure for a patient(C3)
Prosthodontic component of the Brenamark system as a role model	• List the various components of implant prosthesis (C1)
Jaw relation record and construction of occlusion for osseointegrated prosthesis	• Explain the different clinical implications for each occlusal schemes (C3)
Management of prosthodontic complication and failure	• Define and classify failures(C2) • Explain the procedure to manage failures (C3)
Revision of complete denture topics Impression making, jaw relations, denture fabrication	• Revise the topic (C5, P5)
Unit 2: Preclinical Practical	
Tooth Preparation on Typhodont teeth.	• Demonstrate restorative procedures, including single crowns and short-span bridge on simulated cases. (C3, P4, A3) • Perform complex restorative procedures for porcelain jacket crowns on simulated cases. (C4, P5, A3)
Unit 3: Clinicals	
Examination, Diagnosis and treatment plan for Edentulous patients and Partially Edentulous patients Fabricate Acrylic partial denture and complete denture under supervision.	• Demonstrate the ability to assess a patient's prosthetic requirements, diagnose the oral conditions, formulate a treatment plan with professional, ethical consideration and fabricate partial denture for a partially edentulous patient. (C3, P4, A3) • Distinguish between a removable and fixed prosthetic solutions for the patient requiring prosthesis (C4, P1) • Demonstrate the ability to record the patients bite and insertion of a palatal plate/ acrylic denture an appliance (C3, P4) • Demonstrate the ability to repair a removable denture(C3, P4)

Examination, Diagnosis and treatment plan for Edentulous patients and Partially Edentulous patients Fabricate Acrylic partial denture and complete denture under supervision.	• Perform removable prosthetic procedure for replacement of missing dentition. (P5, C4)
Examination, Diagnosis and treatment plan for Edentulous patients and Partially Edentulous patients Fabricate Acrylic partial denture and complete denture under supervision.	• Perform assessment of patient prosthetic requirements, diagnose the oral conditions and formulate a treatment plan with professional ethics /ethical consideration (C5, P4, A4) • Demonstrate the ability to communicate and correspond effectively with technicians, other oral health professional and patients in providing effective service to a patient requiring removable and/or fixed prosthesis and referral of complex cases. (C4, P5, A3, CS3)

Reference Material	Recommended books 1. Boucher's Prosthetic Treatment for Edentulous patients: George Zarb John Hobkirk Steven Eckert Rhonda Jacob; 13th ed. 2012; © Mosby. 2. Heartwell Syllabus of complete denture; Arthur O.Rahn and Charles M. Heart Well; 5th ed. 1993; Lippincott Williams & Wilkins, Philadelphia. 3. Mc Cracken's Removable Partial Prosthodontics; Alan B. Carr, David T. Brown; 13th ed. 2015; © Mosby. 4. Fundamental of fixed Prosthodontics; Shillingburg; 4th ed. 2012; Quintessence Publishing Co. Chicago. 5. Clinical Removable Partial Prosthodontics. RD Phoenix, DR Cagna, CF DeFreest. Quintessence Pub Co; 4 edition 2008. Contemporary Implant Dentistry.Carl E. Misch. Mosby; 2009; 3rd ed.
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Question Paper

Exam Date & Time: 20-Sep-2023 (02:15 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

FINAL BDS PART - II DEGREE EXAMINATION - SEPTEMBER 2023
SUBJECT: PROSTHODONTICS AND CROWN AND BRIDGE
(REGULAR BATCH)

Marks: 60

Duration: 165 mins.

Answer all the questions.

- 1) List the objectives of impression making; Define stability in complete denture and discuss the factors affecting stability (10)
(2+2+6 = 10 marks)
- 2) Write short notes on:
- 2A) Gothic arch tracing (4)
2B) Epulis Fissuratum (4)
2C) Dentogenic concept in teeth selection (4)
2D) Rebasing in complete denture (4)
2E) Discuss the factors affecting Osseointegration (4)
- 3) Define a Major connector. Explain any **two** maxillary and two mandibular major connectors in detail. (10)
(2+4+4 = 10 marks)
- 4) Write short notes on:
- 4A) Altered Cast Technique (4)
4B) Direct-Indirect technique in fabrication of provisional restoration (4)
4C) Conical pontic (4)
4D) Single chord technique of gingival retraction (4)
4E) Classification of posts (4)

-----End-----

CONSERVATIVE DENTISTRY AND ENDODONTICS

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Evaluate all carious and non-carious defects of the teeth and dental restorations(C6)
CO 2:	Describe the various properties of dental materials and their clinical applications(C2)
CO 3:	Explain the various steps related to laboratory processing of dental restorations(C2)
CO 4:	Practice personal and professional infection control measures(A2)
CO 5:	Formulate the treatment plan for dental carious and non-carious defects. (C5)
CO 6:	Display clinically acceptable levels of skill in restorative procedures (P5)
CO 7:	Empathize with the patient's dental conditions and resolve the problems satisfactorily(A5)

COURSE LEARNING OUTCOME		
BLOCK 1: Taken in III year BDS (36 hours)		
THEORY		
	CONTENT	COMPETENCIES
CONSERVATIVE DENTISTRY AND ENDODONTICS		
	Introduction	- Define operative dentistry (C1) - Describe the scope of operative dentistry (C1) - Describe the history of operative dentistry (C1)
	Diagnosis in operative dentistry	- Define diagnosis (C1) - Describe the method of recording case history (C1) - Explain the methods of extra-oral and intra-oral clinical examinations (C2) - List the different defects of the tooth (C1) - Explain the methods of diagnosing different defects of the teeth (C2)
	Treatment planning in operative dentistry	- Define treatment planning (C1) - Describe the steps involved in treatment planning (C1) - Outline the sequence in treatment planning (C1) - Describe the phases involved in treatment planning (C1)
	Biological and periodontal considerations in operative dentistry	- Describe the response of pulp to tooth preparation, restorative procedures and restorative materials (C1) - Describe the response of the Enamel and dentin to tooth preparation, restorative procedures and restorative materials (C1) - Describe the response of the periodontium to tooth preparation, restorative procedures and restorative materials (C1) - Explain the methods to protect the hard and soft tissues during operative procedures (C2)
	Moisture control in operative dentistry	- Describe the goals of moisture control in operative dentistry. (C1/C2) - List the methods of isolation. (C1) - Describe the various methods of isolation (C1) - Describe in detail the armamentarium (C1) - Describe the method of application, advantages and disadvantages of rubber dam. (C2)
	Pain control in operative dentistry	- Define pain (C1) - Explain the neurophysiology of pain (C2) - List the methods of pain control in operative dentistry (C1) - Explain the different methods of pain control in operative dentistry (C2)
	Gingival tissue management	- Describe the indications for gingival retraction. (C1) - List the various methods of gingival retraction. (C1)



		Describe the various methods of gingival retraction along with their advantages and disadvantages.(C1)
	Infection control in dental office	- Define infection control (C1) - Describe the objectives of infection control in the dental office (C1) - Identify the infectious diseases of concern in the dental office (C1) - Describe the mode of transmission of diseases in the dental office (C2) - Practice personal protection barrier techniques (C3) - Describe sterilization and disinfection methods followed in the dental office (C1) - Describe the steps followed in clinical waste disposal (C1) - Explain needle stick injury protocol to be followed in dental office (C2)
	Direct filling gold (DFG)	- List the advantages and disadvantages of DFG (C1) - Classify types of DFG (C1) - Describe the steps in tooth preparation for DFG (C2) - Describe the steps in the placement of DFG (C2)
	Pin amalgam and complex restorations	- Define pin amalgam restoration (C1) - List the advantages and disadvantages of pin amalgam restorations (C1) - Classify amalgam pins (C2) - Describe different pin systems (C2) - Outline the principles of pin placement (C1) - Describe the methods of pin placement (C2) - List the Indications and Contraindications of complex amalgam restorations (C1) - List the advantages and disadvantages of complex amalgam restorations (C1) - Describe the types of complex amalgam restorations (C2)
	Impression materials and techniques	- Define impression(C1) - List the desirable properties of impression materials (C1) - Classify impression materials (C2) - Describe the composition and Properties of the various impression materials (C1) - Describe the advantages and disadvantages of each impression material(C1) - Discuss the various impression techniques used in operative dentistry(C2) - Explain the methods of disinfecting impressions (C2)
	Wax pattern	- List the properties of inlay wax (C1) - Classify inlay wax (C2) - List the components of inlay wax (C1)



		Described the technique involved in the fabrication of wax pattern (C2)
Die materials		- Define Cast and Die (C1) - List the ideal requirements of Die materials (C1) - Describe the advantages and disadvantages of various die materials (C2) - Describe various cast and die systems (C2)
Noble and Non noble metal alloys		- Classify noble and non-noble alloys (C2) - Recall the composition of metal alloys (C1) - List the uses in dentistry (C1)
Casting procedures (Investing and Casting)		- Summarize investment materials (C2) - Describe the methods of investing (C2) - Explain the casting procedure using centrifugal casting machine (C2) - Explain high and low heat casting techniques (C2) - Outline the cleaning of the casting (C1)
Finishing and polishing of cast restoration		- State the benefits of finishing and polishing (C1) - Outline the principles of finishing and polishing (C1) - Explain the finishing and polishing techniques (C2)
Failure of cast restoration (Casting Defects)		Explain various casting defects- Causes and Prevention (C2)
Dental Ceramics		- Classify Dental Ceramics (C2) - Discuss the composition and uses of dental ceramics (C2) - Explain the methods of strengthening ceramics (C2) - Describe the technical considerations for cavity preparations (C1) - Distinguish Metal ceramic systems and all ceramic systems (C2) - Explain CAD-CAM systems (C2)
Wasting diseases I		- Explain the Clinical features, diagnosis, prevention, and treatment of - Abrasion (C2) - Attrition (C2) - Erosion (C2) - Abfraction (C2)
LASERS in Operative Dentistry		- State the principles of LASER (C1) - List the various LASERS in operative Dentistry (C1) - Indicate various areas of application (C2) - Explain the hazards and precautions (C2)
Minimal Interventional Dentistry		- List the differences between minimal intervention dentistry and conventional dentistry (C1) - Define MID (C1) - List and describe the various MID techniques (C2)



	Wasting diseases II	• Explain the Clinical features, diagnosis, prevention, and treatment of ○ Abrasion (C2) ○ Attrition (C2) ○ Erosion (C2) ○ Abfraction (C2)
	Dentinal Hypersensitivity	• Define Dentinal Hypersensitivity (C1) • Explain the etiology (C2) • Discuss the theories of dentin hypersensitivity (C2) • Describe the clinical features (C2) • Discuss the diagnosis, Prevention and Management (C2)
	Occlusion in Operative Dentistry	• Recall the physiology of occlusion (C1) • Define Centric relation and centric occlusion (C1) • Explain the various occlusal schemes (C2) • Discuss the various guidance of Occlusion (C2) • Recall Normal occlusion and ideal occlusion (C1) • List the mandibular movements (C1) • Discuss various occlusal consideration in restoring individual teeth. (C2)

COURSE LEARNING OUTCOME

BLOCK 2: Taken in IV year BDS (80 hours)

		THEORY
	CONTENT	COMPETENCIES
CONSERVATIVE DENTISTRY AND ENDODONTICS		
	Introduction	• Introduction • Duration and course details • Review of Introduction to Endodontics (C2) • Definition of endodontics (C1) • List the Indications and contraindications of root canal treatment (C1) • Describe the details of Endodontic Therapy (C2) • Discuss the scope and future of endodontics (C2)
	Dental pulp	• Describe the development of dental pulp (C1) • Discuss the structure and functions of Dentin and pulp (C2) • Explain the innervations of the pulp (C2) • Discuss the clinical considerations of pulp (C2) • Explain pulpal repair and age changes in pulp (C2)
	Rationale of endodontics	• Define Inflammation (C1) • Memorize the symptoms of inflammation (C1) • List the cells involved in inflammation (C1) • State the tissue changes following inflammation (C1) • Name the portals of entry of microorganisms (C1)



		• Explain the mechanism and sequelae of Pulpal inflammation (C2) • Describe Zones of Inflammation (C2) • Discuss Kronfield's Mountain Pass theory (C2)
	Internal Anatomy of root apex	• Describe the development of root (C1) • Describe Anatomy of the root apex (C2) • Outline the blood supply, nerve supply and its clinical correlation in endodontic therapy (C1) • Identify the apical landmarks (C1) • Relate the implications of lateral and accessory canals in endodontics (C1) • Recognize the canal configurations (C1) • List the anatomic variations (C1) • Describe the age changes at periapex (C1) • List the physiological and pathological changes of the root apex (C1)
	Internal anatomy of Anterior and Premolars	• List the factors contributing to variations in root canal morphology (C1) • Classify of root canal morphology (C2) • State the methods to study root canal morphology (C1) • Discuss morphology of Maxillary and Mandibular • Incisors with variations and anomalies (C2)
	Internal anatomy of molars	• Discuss morphology of Maxillary and Mandibular premolars and molars with variations and anomalies (C2)
	Pulpal Pathosis	• Explain the causes of pulpal diseases (C2) • State the response of the pulp to bacterial invasion (C1) • Illustrate the sequelae of pulp disease (C3) • Classify diseases of pulp (C2) • Discuss the response of restorative materials on pulp (C2) • Summarize the iatrogenic effects on the dental pulp (C2) • Illustrate Acute and Chronic inflammatory diseases of pulp (C3) • Discuss (C2) • Reversible Pulpitis • Irreversible pulpitis • Pulp polyp • Pulp Degeneration • Pulp Necrosis
	Periradicular Pathosis-I	• List the micro-organisms in periradicular pathosis (C1) • Classify diseases of the periradicular tissues (C2)



		• Explain sequelae of periradicular diseases (C2) • Discuss • Symptomatic apical periodontitis (C2) • Acute alveolar abscess (C2) • Acute periodontal abscess (C2) • Phoenix Abscess (C2) • Periapical granuloma (C2)
	Periradicular Pathosis-II	• Discuss • Asymptomatic apical periodontitis (C2) • Chronic alveolar abscess (C2) • Radicular cyst (C2) • Condensing osteitis (C2) • External root resorption(C2) • Persistent apical periodontitis(C2) Diseases of the periradicular tissues of • Non- odontogenic origin(C2) • Describe apical Scar (C1) • Explain healing of periapical lesions (C1)
	Diagnosis in Endo	• Definition of diagnosis (C1) • Summarize the details of case history (C2) • Explain clinical examination (C2) • Discuss Pulpal and periapical diagnosis (C2) • Summarize the prognosis and informed consent (C2) • Discuss the diagnostic methods in endodontics (C2) • Memorize diagnosis of pain of Non-odontogenic origin (C1)
	Vital pulp therapy	• Outline the features of vital dental pulp (C1) • Describe reparative dentin formation (C1) • Discuss Direct and indirect pulp capping (C2) • Explain Pulpotomy (C2) • Discuss materials used for vital pulp therapy (C2) • List the diagnostic criteria for successful outcome (C1)
	Apexogenesis & apexification	• Describe open apex (Incomplete Rhizogenesis) (C1) • Explain Apexogenesis and apexification (C2) • Define Apexogenesis and Apexification (C1) • Describe single-visit apexification (C1) • Define Revascularization (C1) • Identify the types of open apices :Non blunderbuss and Blunderbuss (C1) • Recall the problems associated with incomplete rhizogenesis (C1) • Discuss the methods for the treatment of teeth with an incompletely formed apex (open apex) (C2)

	Non odontogenic tooth ache	• Define pain (C1) • Recall neurophysiology of pain (C1) • Describe referred pain (C1) • Identify Chronic pain (C1) • Describe the physiological, psychological and behavioral factors modifying pain (C1) • List the pain assessment tools (C1) • Recognize the disorders that mimic odontogenic tooth ache (C1)
	Radiology in Endodontics	• Summarize the applications of radiography in endodontics (C2) • Explain the limitations of radiograph (C2) • Recall the diagnostic and working radiograph (C1) • Memorize the methods to obtain radiograph (C1) • Recall the processing of Radiographs (C1)
	Case selection treatment planning	• Recognize the common medical findings that may influence endodontic treatment planning (C2) • Describe the case difficulty assessment (C1) • Summarize dental evaluation and development of endodontic treatment plan (C2)
	Pre Endodontic Build up and isolation	• Describe preparation for the access and isolation(C1) • State coronal build up and methods(C1) • List the periodontal procedures prior to access (C1)
	Pain management in Endodontics	• Recall the theories of pain (C1) • Memorize the causes of orofacial pain (C1) • Explain the pharmacological management of endodontic pain (C2) • Distinguish various local anaesthesia –techniques in endodontics (C2) • List alternative pain control methods (C1) • Describe management of hot tooth (C1)
	Endodontic Pharmacology-I	• State the role of antibiotics in endodontics (C1) • Describe the various antibiotics and their mechanism of action (C1) • Recall antibiotic combinations (C1) • Outline antibiotic prophylaxis (C1) • Memorize local anaesthesia in pain control (C1)
	Endodontic Pharmacology-II	• Explain the role of non-narcotic analgesics (C2) • List the Steroids in endodontics (C1) • Recall Opioid Analgesics (C1) • Discuss NSAIDs (C2)
	Endodontic microbiology	• Explain theory of focal infection (C2) • List bacteria in endodontic diseases(C1) • State others microorganisms in endodontic infections (C1) • Describe Virulence factors (C1)



		• Discuss endodontic biofilm (C2)
	Culturing medias & techniques	• List Culture methods (C1) • List Microscopy methods (C1) • Memorize Molecular biology methods (C1) • Recall immunological methods (C1) • Describe the microorganisms in unsuccessful endodontic treatment (C1) • List the advanced microbial diagnostic techniques (C1)
	Endodontic instruments-I	• Classify endodontic instruments for shaping and cleaning of the root canal system (C2) • Describe the standardization of endodontic instruments (C2) • Identify the components of an endodontic file (C2)
	Endodontic instruments-II (Hand instruments)	• Distinguish various modifications of endodontic file designs (C2) • Explain the design features of current hand NiTi files (C1) • State the sonics and ultra-sonic instruments (C1) • Summarize the sterilization and maintenance of endodontic instruments (C2)
	Endodontic instruments-III (Rotary instruments)	• Identify the features of Nickel Titanium rotary instruments (C2) • Describe the rotary endodontic instruments for shaping and cleaning (C1) • List Endomotor and Rotary hand pieces (C1)
	Access cavity preparation-I	• State the goals of access cavity preparation (C1) • Express the clinical guidelines for access cavity preparation (C2) • Indicate the clinical considerations (C2) • Describe the Laws governing access opening (C1) • Outline the significance of Straight line access (C1)
	Access cavity preparation-II	• Explain the access cavity designs for Maxillary and Mandibular anterior teeth, premolars and molars (C2)
	Endometrics	• Define working length (C1) • Recall the root apex and anatomic landmarks (C1) • State the importance of achieving optimum working length (C1) • Describe working width (C1) • Explain the methods to determine working length (C2) • Distinguish various devices for measuring root canal length (C2) • Discuss electronic apex locators (C2)
	Irrigation in endodontics-I	• Discuss the objectives of root canal disinfection (C2) • Identify the ideal requirements (C1) • Describe the root canal irrigants in endodontics (C2)



	Irrigation in endodontics-II	• State the guidelines for root canal irrigation (C1) • Discuss the factors affecting efficacy of an irrigant (C2) • State the irrigant activation/Agitation-Techniques and devices (C1) • Recall the other methods of endodontic disinfection (C1)
	Cleaning and Shaping -I	• Define Cleaning and shaping (C1) • State the Objectives (C1) • Explain the goals of shaping the radicular space (C2) • Summarize the instrument motions for shaping and cleaning (C2)
	Cleaning and Shaping -II	• List the guidelines for shaping the root canal (C1) • Explain the phases in shaping of root canal (C2) • Outline the instrumentation Guidelines (C1)
	Cleaning and Shaping -III	• Explain the techniques of shaping and cleaning (C2) • Describe rotary Instrumentation (C1)
	Intracanal medicaments	• List the indications of intracanal medicament (C1) • Recall Grossmans requirement of an ideal intracanal medicament (C1) • Explain various Intracanal medicaments used in endodontics (C2)
	Root canal sealers	• Define root canal sealers (C1) • List the requirements of an ideal root canal sealer (C1) • Classify root canal sealers (C2) • Discuss different sealers used in endodontics (C2) • Describe Sealer placement (C1) • Discuss resin sealers (C2)
	Obturation materials	• Define Obturation. (C1) • Classify root canal filling materials (C2) • State the ideal requirements for a root canal filling material (C1) • Describe the properties of various obturating materials (C2)
	Obturation techniques	• List the objectives of Obturation (C1) • Describe the Apical limit of obturation (C2) • Discuss Timing for obturation (C2) • Classify obturation techniques (C2)
	Obturation techniques	• Describe cold lateral and chemically plasticised obturation techniques (C2) • Describe various thermoplastisized obturation techniques (C2)
	Post endodontic restoration	• List the effects of endodontic treatment on the teeth (C1) • Define post and core. (C1) • Discuss various core materials used in post endodontic restoration. (C2)

		- Define ferrule (C1) - Describe different types of ferrule and its applications. (C2)
	Post endodontic restoration	- Classify various endodontic posts (C2) - Describe the factors that can affect the retention of the post (C2) - Compare the advantages and disadvantages of various posts (C2)
	Endodontic mishaps	- Define Endodontic Mishap. (C1) - Classify Endodontic Mishaps. (C2) - Write a note on Access cavity related mishaps and its management. (C3) - Write a note on instrumentation related mishaps and its management. (C3)
	Endodontic mishaps	- Write a note on obturation related mishaps and its management. (C3) - Describe sodium hypochlorite accident and its management. (C3)
	Tooth resorption	- Define tooth resorption. (C1) - Classify tooth resorption. (C2) - Write a note on internal tooth resorption and its management. (C1) - Write a note on external tooth resorption and its management. (C1)
	Tooth resorption	- Write a note on invasive cervical root resorption and its management. (C1) - Write a note on replacement root resorption and its management. (C1) - List differences between Internal and external root resorption.(C1)
	Single visit endodontics	- Define Single visit endodontic. (C1) - List the indication and contraindication of single visit endodontics. (C1) - List the advantages and disadvantages of single visit endodontics (C1) - Compare single visit endodontic and multi visit endodontics. (C4)
	Surgical endodontics	- Define surgical endodontics. (C1) - Classify Endodontic Surgery. (C2) - Classify surgical flaps. (C2) - List the indication and contra indication of endodontic surgery. (C1) - Write a note on incision and drainage. (C1)
	Surgical endodontics	- Describe cortical trephination. (C2) - List the steps in apicectomy procedure (C1) - Classify flap designs (C2)



		• Write a note apicectomy (C2) • List the various root end filling materials. (C3)
	Surgical endodontics	• Describe various suturing techniques • Write a note on bicuspidization, hemisection and root amputation its management. (C2) • Describe the advantages of microsurgical endodontics over conventional surgical endodontics (C2)
	Healing after endodontic therapy	• List the stages of healing (C1) • Classify types of healing (C2) • List the steps in bony healing(C1) • Describe the stages in healing of root fracture (C1) • Describe healing of after vital pulp therapy • Describe healing after root canal treatment in teeth with periradicular lesion (C2)
	Endodontic emergencies	• Define Endodontic Emergency. (C1) • Classify Endodontic Emergency. (C2) • Describe in detail management of Pre-treatment endodontic emergency. (C2) • Describe in detail management of endodontic emergencies during treatment. (C2) • Describe in detail management of post-treatment endodontic emergency. (C2) • Define Endodontic Flare up. (C1) • Describe the prevention and management of endodontic flare-up • Write a note on the use of antibiotics and analgesics during endodontic emergency. (C2)
	Traumatic injuries	• Classify Dental Traumatic Injuries. (C2) • Describe a note on crown fracture and its management. (C2)
	Traumatic injuries	• Describe crown root fracture and its management. (C2) • Describe root fracture and its management. (C2)
	Traumatic injuries	• Describe luxation injuries and its management. (C2) • Write a note on Avulsion and its management.(C2)
	Discoloration management &	• Classify tooth discoloration. (C2) • List the causes for various tooth discoloration (C1) • Describe internal discoloration of tooth and its management. (C2) • Describe external discoloration of tooth and its management. (C2)
	Discoloration management &	• Define tooth bleaching. (C1) • Classify tooth bleaching. (C2) • Describe various non-vital bleaching of the tooth (C2) • Describe various vital bleaching of the tooth. (C2)



	Endo-perio inter-relationship	- List the means of communications between pulp and periodontium (C1) - Describe the effect of pulpal disease and endodontic therapy on periodontal tissue (C1) - Describe the effect of periodontal disease and therapy on pulpal tissue (C1)
	Endo-perio inter-relationship	- Classify Endodontic-Periodontic (Endo-Perio) Lesions (C2) - Differentiate between various classes of Endo –Perio lesions (C4) - Discuss the management of Endo –Perio lesions (C2)
	Laser in conservative dentistry endodontics	- List the characteristics of LASER over ordinary light (C1) - Explain the basic working principle of LASER (C2) - Classify dental LASERs (C2) - Describe various LASER and dental tissue interaction (C2)
	Laser in conservative dentistry endodontics	- Discuss the various uses of LASER in conservative dentistry (C2) - Discuss the various uses of LASER in Endodontics (C2)
	Endodontic failures	- List the outcomes for endodontic treatment (C1) - Describe the factors affecting the outcomes of endodontic therapy (C1) - Discuss the reasons for refractory infection (C2) - Describe the treatment options for failed endodontic treatment (C2)
	Re-treatment in endodontics	- Define endodontic retreatment (C1) - Choose the treatment option for endodontically treated teeth which has failed or has the potential for failing (C3) - List the steps in non-surgical retreatment (C1) - Describe the procedures of dismantling coronal restorations/ coronal disassembly (C1) - Describe the methods of post-removal (C1)
	Re-treatment in endodontics	- Describe the methods of removing root canal filling materials - Describe the methods to correct previous endodontic procedural errors (C2) - Discuss the indications for surgical retreatment (C1) - List the steps involved in surgical retreatment (C1)
	Digital armamentarium in Endodontic practice	- Describe the process of digitization (C1) - List the possible application of digital technology in endodontics (C1) - Describe the application of digital technology in treatment planning, documentation and communication (C2) - Discuss the use of CBCT and CAD/CAM in endodontic practice (C2)



	Smear layer in conservative dentistry and endodontics	• Define smear layer (C1) • List of structure of smear layer (C1) • Describe the clinical significance of smear layer in restorative dentistry (C2) • Discuss the controversy associated with smear layer in adhesive dentistry (C2)
	Smear layer in conservative dentistry and endodontics	• Classify the adhesion strategies based on interaction with smear layer (C2) • Explain the clinical significance of smear layer in endodontics (C2) • Describe the methods to remove smear layer from the root canals (C1)
	Magnification in Endodontics	• List the methods of enhanced visualization during endodontic procedures (C1) • Define the terms associate with magnification (C1) • Describe the benefits of magnification in endodontics (C2) • Discuss the advantages of Dental operating microscope (DOM) over loupes (C2) • Describe the clinical use of DOM (C2)
	Dental Materials and basic Equipment management	• Describe the sterilization procedure for endodontic instruments (C2) • Describe the maintenance endodontic equipment and instruments (C2) • Describe on the stock-check and purchase (C2) • Describe the storage of endodontic materials (C2)
	Ultrasonics in Endodontics	• Define ultrasonic (US) (C1) • List the endodontic ultrasonic instruments (C1) • Describe the application of US in non-surgical root canal treatment (C2) • Describe the application of US in surgical root canal treatment (C2)
	Patient education and communication & ethics in endodontic practice	• Define ethics (C1) • Describe the four pillars of bioethics (C1) • Describe principles of ethics applied to endodontics (C2) • Explain the various modalities of patient education (C2) • Discuss the importance of informed consent (C2) • Discuss the possible medico-legal issues related to endodontic practice (C2)
	Duties towards govt. like payment of professional taxes and income tax and practice management	• Describe Role of dentist towards nation building (C2) • Describe the procedure for paying professional tax (C1) • Compute the income tax to be paid as related to the income earned (C3) • Explain the principles of endodontic practice management (C2)

	Paediatric Endodontics	- Describe the dental pulp history of primary and young permanent dentition (C1) - Describe the tooth canal anatomy of primary teeth (C1) - Discuss the pulp therapy options for the primary dentition (C2) - Discuss the pulp therapy options for the young permanent dentition (C2)
	Regenerative endodontics	- Define regenerative endodontics (C1) - Describe the elements of tissue engineering (C1) - Describe the clinical considerations for a regenerative procedure in endodontics (C1) - Discuss the future of tissue engineering and its applications in dentistry (C2)
	Geriatric Endodontics	- Describe the physiological and pathological changes in the aging dentition (C1) - Discuss the clinical considerations in the elderly undergoing endodontic therapy (C2)
	Endodontic management considerations for medically compromised patients	- Discuss the importance of medical history before endodontic therapy (C2) - Describe the American Society of Anaesthesiologists' (ASA) Health Classification System (C1) - Describe the various medical conditions that could alter endodontic therapy (C2) - Discuss the treatment considerations medically complex endodontic patients (C2)

References	13. Phillips Science of Dental Materials: 1st South Asian Edition, 2014. 14. Sturdevant's Art and Science of Operative Dentistry - 1st South Asian edition; 2013. 15. Text book of operative dentistry, 4th edition, 2015 by Vimal K Sikri. 16. Endodontic practice, Grossman, 13th edition, 2014. 17. Cohen's Pathways of the Pulp Expert Consult Edition, 1st South Asia edition, 2016. 18. Ingles Endodontics. 6th edition, 2008, by John Ingle.
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Question Paper

Exam Date & Time: 18-Sep-2023 (02:15 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

FINAL BDS PART – II FINALDEGREE EXAMINATION – SEPTEMBER 2023

**SUBJECT: CONSERVATIVE DENTISTRY AND ENDODONTICS
(REGULAR BATCH)**

Marks: 60

Duration: 165 mins.

Answer all the questions.

Draw diagrams/flowchart as and where necessary.

- 1) Define Obturation. Mention various methods of Obturation. Write in detail about warm vertical compaction technique. (1+4+5 = 10 marks)
- 2) Define an Inlay. What are the advantages of an Inlay? Explain the steps in tooth preparation for a class II Inlay on mandibular molar. (1+3+6 = 10 marks)
- 3) **Write Short answers on:**
 - 3A) Chlorhexidine in endodontics. (4)
 - 3B) Ferrule in Post and Core. (4)
 - 3C) Ingles working length technique. (4)
 - 3D) Enamel Hatchet. (4)
 - 3E) Secondary retentive features for Class II amalgam cavity. (4)
 - 3F) Classify matrix systems. (4)
 - 3G) Root end preparation in periapical surgery. (4)
 - 3H) Polymerization shrinkage in composite Resins. (4)
 - 3I) Non-Vital bleaching. (4)
 - 3J) Enterococcus faecalis. (4)

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PUBLIC HEALTH DENTISTRY

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Explain the approaches to Public Health, Public Health Dentistry, health care (with emphasis on oral health) delivery system in India, dental practice, fundamentals of epidemiology, epidemiology of oral diseases; research methodology, biostatistics, ethics, medical jurisprudence and its application in Public Health Dentistry (C2, P2, A2)
CO 2:	Identify the role of preventive dentistry, school oral health programs, program planning and evaluation, nutrition, behavioural and social sciences in prevention and control of oral diseases (C3, P3, A3)
CO 3:	Display the ability to identify common oral health problems in patients by recording case history and employing dental indices (C3, P4, A3)

Course learning outcomes – mention term wise for both theory and practical with hours		
Block (between sessional exams)	Topics	Learning Outcomes
Block I	Orientation and Introduction to Dentistry	• Explain the historical perspectives, aims and objectives of dentistry (C2) • Infer the role of The Dentists Act of India, Indian Dental Association and Dental Council of India (C2)
Block I	Introduction to Public Health	• Explain the historical perspectives, fundamental concepts of Public Health (C2) • Outline the fundamental aspects of prevention of diseases (C2) • Infer the role of environment in health of communities (C2) • Identify various methods of waste disposal (C3) • Explain fundamental concepts of health education at individual, group and community level (C2)
Block I	General epidemiology	• Identify the fundamental concepts in epidemiology (C3)
		• Categorize various epidemiological approaches to health and disease in the community (C3)
Block I	Research Methodology and Biostatistics	• Explain fundamental steps in research methodology (C2) • Outline the fundamental concepts in biostatistics (C3) • Explain various statistical tests employed in hypothesis testing (C2)
Block I	Ethics	• Explain the historical perspectives and identify the fundamental principles of ethics (C3) • Apply the principles of ethics in clinical practice, community services and research (C3)
Block I	Occupational Hazards in Dentistry	• Identify various occupational hazards in dentistry (C3) • Explain measures employed towards prevention of occupational hazards in dentistry (C2)
Block I	Infection Control in Dentistry	• Explain the fundamental concepts in infection control (C2) • Apply infection control measures in the practice of dentistry (C3)
Block I	Clinical postings	• Explain the fundamental aspects of dental indices in measurement of oral diseases (C3, P3, A3) • Identify common oral diseases by employing dental indices (C3, P3, A3)
Block I	Clinical postings	• Explain the fundamental aspects of dental indices in measurement of oral diseases (C2, P3, A3)



		Identify common oral diseases by employing dental indices (C3, P3, A3)
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TEACHING SCHEDULES		
A. LECTURE SCHEDULE		
BLOCK	TOPIC	OBJECTIVES
Block II	Introduction to Public Health Dentistry	- Explain the fundamental concepts of Public Health Dentistry (C2) - Infer the role of Indian Association of Public Health Dentistry (C2)
	Health care delivery	- Explain the fundamental concepts of health care delivery system (C2) - Explain the role of health agencies around the world
	Medical jurisprudence	Explain the fundamental concepts of Public Health Dentistry (C2)
	Nutrition and oral health	- Explain the fundamentals of nutrition (C2) - Infer the role of nutrition in oral health (C2)
	Behavioural and social sciences	- Explain the fundamentals of Behavioral and social sciences (C2) - Infer the role of Behavioral and social sciences in oral health (C2)
	Epidemiology of common oral diseases	Explain the epidemiologic factors for common oral diseases such as dental caries, periodontal diseases, malocclusion and oral cancer (C2)
	Planning and evaluation	- Explain the fundamentals of planning and evaluation (C2) - Outline the steps in planning and evaluation of oral health programs (C2)
	Survey procedures	- Explain the fundamentals of survey procedures (C2) - Identify steps in survey procedures (C3)
	Dental manpower	Explain various types of dental auxiliaries and their role in dentistry (C2)
	Finances in dental care	Explain various types of payment mechanisms for dental care and its role in India (C2)
	School oral health program	- Explain the fundamental concepts related to school oral health programs (C2) - Infer various school oral health programs (C2)
	Preventive dentistry	Identify various approaches for prevention of oral diseases (C3)
	Establishing and maintaining dental office	Identify various aspects in establishing and maintaining dental office (C2)
	Mobile dental clinics	Identify various aspects in establishing and maintaining mobile dental clinics (C2)

B. CLINICAL SCHEDULE	
S. No.	Description
01	Understand the fundamental concepts of recording case history, diagnosis and treatment planning based on levels of prevention (C3, P4, A3)
02	- Understand the fundamental aspects of dental indices in measurement of oral diseases (C2, P3, A3) - Record various dental indices for measurement of common oral diseases (C3, P4, A3)
04	Visit to primary health center to acquaint with activities and primary health care delivery (C3, A3, P3)
05	Visit to water purification plants/public health laboratory/center for treatment of waste and sewage water (C3, A3, P3)
06	- Deliver a health talk about common oral diseases (C3, A3, P4) - Prepare a pamphlet addressing common oral diseases (C3, A3, P3) - Deliver a street play addressing common oral diseases (C3, A3, P3)
07	End posting exam - Detailed case history including treatment plan - Recording of Two relevant Indices - Viva-voce
Total number of hours	



Question Paper

Exam Date & Time: 26-Mar-2024 (02:15 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION
FINAL BDS PART - I DEGREE EXAMINATION - MARCH / APRIL 2024
SUBJECT: PUBLIC HEALTH DENTISTRY
(OBE SCHEME - REGULAR BATCH)

Marks: 60

Duration: 165 mins.

Answer ALL questions.

Draw Diagrams and flowcharts wherever appropriate.

Essay questions.

1A) Classify sealant materials. (2)

1B) Explain in detail the techniques for the placement of sealants (8)

2A) Define Health (2)

2B) Write in detail about the changing concepts of health. (8)

3) Short Essay Type

3A) Fluoride toxicity (4)

3B) Expanded Function Dental Auxiliary (EFDA) (4)

3C) School water fluoridation programs (4)

3D) Ethical principles in dentistry (4)

3E) Advantages and disadvantages of incremental care (4)

3F) Hardness of water (4)

3G) Ideal requirements of a sample (4)

3H) Paired t-test (4)

3I) Principles of primary health care (4)

3J) Models health education (4)

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COMPULSORY ROTATORY INTERNSHIP

Name of the Institution / Department:

Course Outcomes (COs):	On successful completion of this course, students will be able to
CO 1:	Display ability to diagnose and provide comprehensive treatment for oral health ailments including preventive and restorative procedures, esthetics, oral prophylaxis, minor oral surgical procedures using comprehensive clinical, radiological and/or histopathological evaluation of the entity. (C5, P4, A3)
CO 2:	Evaluate the oral health care needs of the community and engage in community service (C5, P4, A3)
CO 3:	Apply scientific principles to learning and oral health care delivery, including use of critical thinking, evidence or outcomes-based clinical decision-making, and technology-based information retrieval systems. (C4, P4)

Subject Code	Subject Title	Learning Outcomes
	Orthodontics & dentofacial orthopaedics	- Assist post graduates during orthodontic treatment (C2, P3, A1) - Fabrication & management of cases using removable appliances (C4, P4, A2) - Perform a screening impression (C4,P4,A2)
	Oral Medicine & Radiology	- Assess a patient by performing clinical examinations, investigations and formulate a treatment plan (C6, P5, A2) - Evaluate the need for radiographs and perform the necessary radiographs (C6, P5) - Enlist the various orofacial features which aid in Forensic medicine (C2) - Describe the role of dental radiographs in age estimation (C2) - List the steps in bite mark analysis (C2) - Demonstrate steps of palatal rugae analysis (C3, P3) - Determine the age of the mixed dentition OPG based on chronology. (C3, P3) - Calculate the age of an individuals based on radiograph using Demirjians methods (C3, P3) - Calculate the age of an individuals based on radiograph using Kvaals methods (C3, P3)
	Paediatric Preventive Dentistry &	- Show the skills at following areas- history taking, examination and investigations (C3, P2, A2) - Develop a treatment plan for commonly encountered soft and hard tissue dental diseases/ disorders in children up to adolescence (C3, P2, A1) - Initiate management of dental emergencies related to pulpal and periradicular diseases (C2, P2, A2) - Perform preventive treatment procedures on the patient such as oral prophylaxis, fluoride application and pit and fissure sealants (C3, P3, A2) - Perform corrective treatment procedures on the patient such as restorations and extractions (C3, P3, A2) - Demonstrate the ability to use appropriate non-pharmacological behaviour management techniques during the process of diagnosis and treatment procedures (C3, P3, A2) - Explain the oral hygiene practices to the children and their parents (C2, P2, A1) - Demonstrate the ability to perform oral examinations and oral health educations at schools (C3, P3, A2)
	Periodontology	- To assist Post Graduates in examining and recording patient histories(P3) - To identify endo-perio lesions, formulate a treatment plan and assist the post graduates in the same(C2P4)

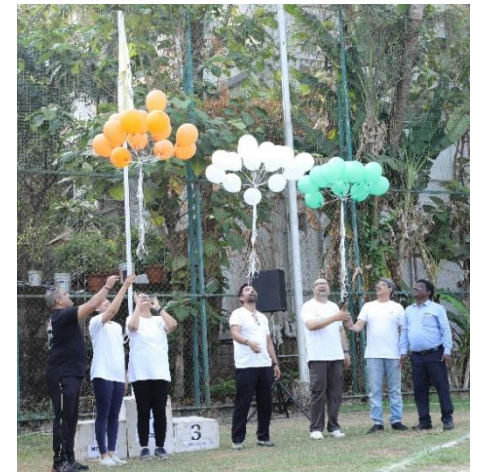
		- To perform oral prophylaxis using ultrasonic instruments on patients(C4P4) - Perform Subgingival scaling and curettage under local anaesthesia using curettes (C4 P4) (3 nos.) under supervision and guidance of faculty - Assist/ Perform isolated gingivectomy/plasty using LASER/electrocautery (C4, P4) - Assist Faculty/Post-Graduates in Periodontal surgeries (C4,P4)
	Oral & Maxillofacial Surgery	- Perform History taking, examination, diagnosis and recording treatment plan of cases. C3P4 - Perform simple tooth extractions under local anesthesia C3P4 - Perform alveoloplasty, Transalveolar extractions, Biopsy, Incision & drainage, C3P4 - Demonstrate proper use of antibiotics, anti-inflammatory drugs and other therapeutic modalities C3P4 - Assist with minor oral surgery procedures like Impactions, Frenectomy, Biopsy, Inter maxillary fixation, Incision & drainage, Biopsy.C3P3 - Observe and assist with management of emergencies like toothache, Trigeminal neuralgia, post extraction bleeding, syncope, Ludwig's angina, tooth fracture. C3P3
	Prosthodontics and Crown & Bridge	- Assist the prosthodontist in case history taking and relate the clinical, radiographic findings during the diagnostic procedure. (P3, A3) - Demonstrate effective communication with peers in the dental health professions & patients (P3, A3) - Demonstrate proficiency by fabricating the permanent removable prosthesis. (C3, P3) - Demonstrate competency to manage completely edentulous and partially edentulous patients independently. (C4, P3, A3) - Demonstrate proficiency in treating postinsertion problems & denture modification. (C5, P4, A3) - Demonstrate teamwork skills in managing oral healthcare for edentulous patients in community camps. (C5, P3, A3) - Assist the prosthodontist and understand the tooth preparation & impression making procedures for patients receiving Fixed prosthodontic treatment.(C3, P2, A2)
	Conservative Dentistry and Endodontics	- Assist post graduates in operative and endodontic diagnosis (P3) - Perform Root canal therapy on extracted teeth (C4, P4) - Perform anterior Root canal Therapy on patients (C4,P5) - Perform deep caries management on patients teeth (C4,P4) - Perform Class I, class II, class III, class IV, class V, class VI cavity preparations and restorations (C4,P4)
	Public Health Dentistry	Identify common oral health problems afflicting patients, especially at outreach centres. (C3, P3)

		• Develop an appropriate treatment plan addressing the needs of patients. (C3, P3) • Display skills related to routine dental treatment procedures such as oral prophylaxis, fillings, extraction and replacement of missing teeth as a part of comprehensive oral health care. (C4, P4) • Organize data related to screening and treatment procedures performed in outreach programs. (C3, P3)
	Oral Pathology and Microbiology	• Assist the pathologist in grossing and relate the clinical, radiographic findings of the received biopsy during the grossing procedure. (P3) • Perform exfoliative cytology procedure and understand the staining principle, procedure and the need for Papanicolaou stain, Per-iodic Acid Schiff stain, and Gram's stain. (C4, P4) • Perform routine haematology along with the use of Leishman stain. Estimation of haemoglobin and interpretation of Total Leucocyte Count (TLC) and Different Leucocyte Count (DLC). (C4, P4) • Prepare a ground section of an extracted tooth and estimation of age using these sections. (C4, P4) • Visualization of routine histological sections of teeth. (C3, P3) • Create Mind-maps on any topic allotted in the subject of Oral Pathology. (C5)





Our curriculum imparts holistic development to the student by incorporating extracurricular and co-curricular activities in the academic calendar. Soft skills development in the form of effective patient communication, gender sensitization, learning of the local language are part of the personality development programme. Students do their bit of social service by contributing to VSO (Voluntary Service Organization). A week long cultural and literary extravaganza identifies the hidden talents of the students. Extra-curricular activities include Inter- University sports meet and 'UTSAV' an annual cultural fest organised by the university which nurtures the student talents.





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**MANIPAL COLLEGE
OF DENTAL SCIENCES**
MANGALORE
(A constituent unit of MAHE, Manipal)



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(Institution of Eminence Deemed to be University)

