

DETAILED SYLLABUS FOR THE POST OF ASSISTANT PROFESSOR IN
CONSERVATIVE DENTISTRY IN KERALA MEDICAL EDUCATION SERVICES

Category No.267/2025

Total 100 marks

Module I (10 marks)

APPLIED BASIC SCIENCES:

Applied Anatomy of Head and Neck:

- Development of face, paranasal sinuses and the associated structures and their anomalies,
- cranial and facial bones,
- TMJ anatomy and function,
- arterial and venous drainage of head and neck,
- muscles of face and neck including muscles of mastication and deglutition,
- brief consideration of structures and function of brain.
- Brief consideration of all cranial nerves and autonomic nervous system of head and neck.
- Salivary glands,
- Functional anatomy of mastication, deglutition and speech.
- Detailed anatomy of deciduous and permanent teeth,
- General consideration in physiology of permanent dentition, form, function, alignment, contact, occlusion.
- Internal anatomy of permanent teeth and its significance.
- Applied histology – histology of skin, oral mucosa, connective tissue, bone, cartilage, blood vessels, lymphatics, nerves, muscles, tongue.

Anatomy and Development of Teeth:

- Enamel – development and composition, physical characteristics, chemical properties, structure.
- Age changes – clinical structure.
- Dentin – development, physical and chemical properties, structure type of dentin, innervations, age and functional changes and clinical considerations.
- Pulp – development, histological structures, innervations, functions, regressive changes, clinical considerations.
- Dentin and pulp complex.
- Cementum – composition, cementogenesis, structure, function, clinical considerations.
- Knowledge of internal anatomy of permanent teeth, anatomy of root apex and its implications in endodontic treatment.
- Periodontal ligament – development, structure, function and clinical considerations.
- Salivary glands – structure, function, clinical considerations.

Applied Physiology:

- Mastication, deglutition, digestion and assimilation, fluid and electrolyte balance.
- Blood composition, volume, function, blood groups, haemostasis, coagulation, blood transfusion, circulation, heart, pulse, blood pressure, shock, respiration-control, anoxia, hypoxia, asphyxia, artificial respiration, and endocrinology – general principles of endocrine activity and disorders relating to pituitary, thyroid, parathyroid, adrenals including pregnancy and lactation.
- Physiology of saliva – composition, function, clinical significance.
- Clinical significance of vitamins, diet and nutrition – balanced diet
- Physiology of pain, sympathetic and Para sympathetic nervous system, pain pathways, physiology of pulpal pain, Odontogenic and non Odontogenic pain, pain disorders – typical and atypical.
- Biochemistry such as osmotic pressure, electrolytic dissociation, oxidation, reduction etc. Carbohydrates, proteins, lipids and their metabolism, nucleoproteins, nucleic acid and their metabolism. Enzymes, vitamins and minerals, metabolism of inorganic elements, detoxification in the body, anti metabolites, chemistry of blood lymph and urine.

Pathology:

- Inflammation, repair, degeneration, necrosis and gangrene.
- Circulatory disturbances – ischemia, hyperemia, edema, thrombosis, embolism, infarction, allergy and hypersensitivity reaction.
- Neoplasms – classifications of tumors, characteristics of benign and malignant tumors, spread of tumors.
- Blood dyscrasias.
- Developmental disturbances of oral and Para oral structures, dental caries, regressive changes of teeth, pulp, periapical pathology, pulp reaction to dental caries and dental procedures.
- Bacterial, viral, mycotic infections of the oral cavity.

Microbiology:

- Pathways of pulpal infection, oral flora and microorganisms associated with endodontic diseases, pathogenesis, host defense, bacterial virulence factors, healing, theory of focal infections, microbes relevance to dentistry – strepto, staphylococci, lactobacilli, corynebacterium, actinomycetes, clostridium, neisseria, vibrio, bacterioids, fusobacteria, spirochetes, mycobacterium, virus and fungi.
- Cross infection, infection control, infection control procedure, sterilization and disinfection.
- Immunology – antigen antibody reaction, allergy, hypersensitivity and anaphylaxis, auto immunity, grafts, viral hepatitis, HIV infections and aids. Identification and isolation of

microorganisms from infected root canals. Culture medium and culturing technique (Aerobic and anaerobic interpretation and antibiotic sensitivity test).

Pharmacology:

- Dosage and route of administration of drugs, actions and fate of drug in body, drug addiction, tolerance of hypersensitivity reactions.
- Local anesthesia – agents and chemistry, pharmacological actions, fate and metabolism of anaesthetic, ideal properties, techniques and complications.
- General anesthesia – pre medications, neuro muscular blocking agents, induction agents, inhalation anesthesia, and agents used, assessment of anesthetic problems in medically compromised patients.
- Anaesthetic emergencies
- Antihistamines, corticosteroids, chemotherapeutic and antibiotics, drug resistance, haemostasis, and haemostatic agents, anticoagulants, sympathomimetic drugs, vitamins and minerals (A, B, C, D, E, K IRON), anti sialogogue, immunosuppressants, drug interactions, antiseptics, disinfectants, anti-viral agents, drugs acting on CNS

Module II (10 marks)

Biostatistics:

- Introduction, Basic concepts, Sampling, Health information systems – collection, compilation, presentation of data. Elementary statistical methods – presentation of statistical data, Statistical averages – measures of central tendency, measures of dispersion, Normal distribution. Tests of significance – parametric and non – parametric tests (Fisher exact test, Sign test, Median test, Mann Whitney test, Kruskal Wallis one way analysis, Friedmann two-way analysis, ANOVA, Regression analysis), Correlation and regression, Use of computers.

Research Methodology:

- Essential features of a protocol for research in humans
- Experimental and non-experimental study designs
- Ethical considerations of research

Module III (10 marks)

Applied Dental Materials:

- Physical and mechanical properties of dental materials, biocompatibility.
- Impression materials, detailed study of various restorative materials, restorative resin and

recent advances in composite resins, bonding- recent developments, tarnish and corrosion, dental amalgam, direct filling gold, casting alloys, inlay wax, die materials, investments, casting procedures, defects, dental cements for restoration and pulp protection (luting, liners, bases) cavity varnishes.

- Dental ceramics-recent advances, finishing and polishing materials.
- Dental burs – design and mechanics of cutting – other modalities of tooth preparation.
- Methods of testing biocompatibility of materials used.

Module IV(10 marks)

Conservative Dentistry

1. Examination, diagnosis and treatment plan
2. Occlusion as related to conservative dentistry, contact, contour, its significance. Separation of teeth, matrices used in conservative dentistry.
3. Dental caries- epidemiology, recent concept of etiological factors, pathophysiology, histopathology, diagnosis, caries activity tests, prevention of dental caries and management – recent methods.
4. Hand and rotary cutting instruments, development of rotary equipment, speed ranges, hazards.
5. Dental burs and other modalities of tooth preparation- recent developments (air abrasions, lasers etc.)
6. Infection control procedures in conservative dentistry, isolation equipments etc.
7. Direct concepts in tooth preparation for amalgam, composite, GIC and restorative techniques, failures and management.
8. Biologic response of pulp to various restorative materials and operative procedures.

Module V(10 marks)

1. Direct and indirect composite restorations.
2. Indirect tooth-colored restorations- ceramic, inlays and onlays, veneers, crowns, recent advances in fabrication and gingival tissue management.
3. Impression procedures used for indirect restorations.
4. Cast metal restorations, indications, contraindications, tooth preparation for class II inlay, onlay, full crown restorations. Restorative techniques, direct and indirect methods of fabrication including materials used for fabrication like inlay wax, investment materials and casting.
5. Direct gold restorations.
6. Recent advances in restorative materials.

7. Esthetics including smile design
8. Management of non-carious lesions.

Module VI(10 marks)

1. Management of discolored tooth
2. Minimal intervention dentistry.
3. Recent advances in restoration of endodontically treated teeth and grossly mutilated teeth.
4. Hypersensitivity-theories, causes and management.
5. Lasers in Conservative Dentistry.
6. CAD-CAM in restorative dentistry.
7. Digital imaging and its applications in restorative dentistry.
8. Clinical Photography.

Module VII(10 marks)

Endodontics

1. Rationale of endodontics.
2. Pulp and periapical pathology.
3. Pathobiology of periapex.
4. Diagnostic procedures – Orofacial dental pain emergencies: endodontic diagnosis and management, recent advances used for diagnosis.
5. Case selection and treatment planning.
6. Endodontic microbiology.

Module VIII(10 marks)

1. Infection control procedures used in Endodontics (aseptic techniques such as rubber dam, sterilization of instruments etc.)
2. Endodontic emergencies and management.
3. Access cavity preparation – objectives and principles
8. Endodontic instruments and instrumentation – recent developments, detailed description of hand, rotary, sonic, ultra sonic etc.
9. Working length determination, cleaning and shaping of root canal system and recent developments in techniques of canal preparation.
10. Root canal irrigants and intra canal medicaments.

Module IX (10 marks)

1. Obturation materials, techniques and recent advances.
2. Traumatic injuries and management – endodontic treatment for young permanent teeth.
3. Endodontic surgeries, recent developments in technique and devices and wound healing.

4. Endo-Perio interrelationship and management.
5. Lasers in Endodontics.
6. Multidisciplinary approach to endodontic situations.
7. Radiology and CBCT in endodontic practice.

Module X (10 marks)

1. Procedural errors in endodontics and their management.
2. Endodontic failures and retreatment.
3. Resorptions and its management.
4. Microscopes and Microsurgery in endodontics.
5. Single visit endodontics, current concepts and controversies.
6. Regenerative Endodontics
7. Vital Pulp Therapy.

NOTE: It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper.