



# All India Institute of Medical Sciences, Jodhpur

## Indicative Syllabus for the Post of Technical Officer (Dental)/Dental Technician

(Syllabus is only indicative. The questions can assess any aspect of knowledge, aptitude, attitude and practical skills, which is expected from a trained person to work efficiently at the advertised post)

### **Section A**

40% Questions covering the following topics: -

**General Intelligence & Reasoning:** It would include questions of non-verbal type. The test will include questions on similarities and differences, space visualization, problem solving, analysis, judgment, decision making, visual memory, discriminating observation, relationship concepts, figure classification, arithmetical number series, non-verbal series etc. The test will also include questions designed to test the candidate's abilities to deal with abstract ideas and symbols and their relationship, arithmetical computation and other analytical functions.

**Quantitative Aptitude:** This paper will include questions on problems relating to Number Systems, Computation of Whole Numbers, Decimals and Fractions and relationship between Numbers, Fundamental arithmetical operations, Percentages, Ratio and Proportion, Averages, Interest, Profit and Loss, Discount, use of Tables and Graphs, Mensuration, Time and Distance, Ratio and Time, Time and Work, etc.

**Computer Knowledge:** Candidates' understanding of the Basics of Computer Knowledge, its parts, functions, emails, MS office, etc.

### **Section B (SUBJECT KNOWLEDGE)**

60% Questions to be based on DENTAL HYGIENISTS & Dental Mechanics course covering the following topics:

## 30% Questions to be based on Technical Officer (Dental)/Dental Technician (DENTAL HYGIENISTS)

### **1. ANATOMY, GENERAL AND DENTAL**

#### **Lectures**

- General structure of mucous membrane (tongue, pharynx, lips), bones, muscles, blood vessels, lymphatics, glands & nerves. Blood and nerve supply in relation to face in general and\_ teeth and associated structures in particular.
- Elementary knowledge of development of the jaws and teeth.
- Structure, nomenclature and morphology of human teeth.
- Eruption; resorption & occlusion of teeth.
- Relationship of teeth with investing tissues.
- Muscles of mastication and facial expression.
- Tempromandibular Articulation.
- Course and distribution of V<sup>th</sup> and VII<sup>th</sup> Cranial nerves.



## Practical

- Osteology of head and neck in general and face, including jaws in particular Morphology of teeth.
- Alveolar process of jaw bones.
- Section of tooth in situ

## 2. PHYSIOLOGY & HISTOLOGY, GENERAL & DENTAL

### Lectures

- Cell structure of the human body.
- Brief description of the histology and function of various dental and oral tissues e.g. Gingiva, Periodontal membrane, Alveolar process, Cementum-; Enamel, Dentine, Nasmyths membrane Pulp etc.
- Salivary glands, ducts and their functions.
- Composition and function of Saliva.
- Blood: Composition & functions
- Mastication, deglutition & Phonation.
- General outlines of the physiological processes of the human body-particularly circulatory.

### Practical

- Study of prepared histological slides of oral and dental tissues, sections of a tooth.
- Routine blood examination

## 3. PHARMACOLOGY, GENERAL & DENTAL:

### Lectures

- Brief description, nomenclature, derivation, dosage, pharmacological action and therapeutic uses of drugs commonly used in dentistry Obtundent, astringent, mouth wash, antiseptics.

### Practical

- Preparation of gum paints, mouth washes and dentifrices

## 4. PATHOLOGY & MICROBIOLOGY, GENERAL AND DENTAL:

### Lectures

- General principles of Pathology
- Inflammation, degeneration and repair.
- Application of general principles of pathology to tooth and surrounding tissues.
- Dental Anomalies.
- Attrition, Abrasion and Erosion.
- Oral manifestation of systemic diseases like diabetes, syphilis, anaemia, vitamin deficiencies and infectious diseases like AIDS & Hepatitis B
- Infection Control in Dental Operatory and Bio-Medical Waste Management and Handling Neoplasm with reference to oral cavity.
- Elementary knowledge of Bacteriology, Asepsis, Infection, Immunity, Brief description of Pathology and Bacteriology of Dental Caries and Gingival infections.

### Practical

- Study of prepared pathological and bacteriological slides relating to oral and dental conditions.
- Clinical demonstration of oral and dental manifestation of systemic disorders

## 5. DENTAL RADIOLOGY:

### Lectures



- Fundamental and elementary principle of Dental Radiology including X- Ray machine, its components and maintenance.
- Basic knowledge of Radio Visio. Grapy technique & extra oral radiographs including Panoramic (Ortho- pantographs and cephalostats.
- Automatic Film processing
- Cataloguing & Indexing of IOPA Films.
- Knowledge of occlusal, bitewing and digital radiography
- Technical aspects of Dental Radiographs i.e. the taking, processing and mounting of Dental Radiographs.
- Characteristics of acceptable image, factors that influence finished radiographs, rules of radiation protection. Radiation Hazards.

#### Practical

- Taking, processing and mounting of Infra & Extra Oral Radiographs.

### 6. FOOD AND NUTRITION:

#### Lectures

- Basic 'food chemistry' in relation to general and Oral Health.
- Physical nature of diet in prevention of dental diseases.
- Carbohydrates, fats, proteins, vitamins, minerals and water in relation to dental and oral Health.
- General food requirements for growth, maintenance and repair of the body.
- Assessment & charting of individual diet & counselling.
- Effect of malnutrition on oral health.
- Special diet and its administration in maxillofacial injury cases.

### 7. DENTAL HYGIENE AND ORAL PROPHYLAXIS

#### Lectures

- Definition of Hygiene
- Objectives of Dental Hygiene
- Oral Prophylaxis - Various methods.
- Oral Propholaxis: treatment system
- Stains on teeth - extrinsic, intrinsic and their management.
- Dental plaque.
- Brushing & Flossing Technique
- Dental Calculus
- Technical knowledge of ultrasonic scaling
- Brief description and the role of Oral Prophylaxis in Gingivitis, Periodontitis, Periodontal and Alveolar abscess.

#### Clinical

- Instruments, technique of Oral Prophylaxis
- Destaining and polishing of teeth.
- Topical application of fluorides.
- Care of oral cavity and appliances during treatment of maxillofacial cases.

### 8. DENTAL HEALTH EDUCATION, COMMUNITY PUBLIC HEALTH DENTISTRY & PREVENTIVE DENTISTRY:

#### Lectures

- Definition of Health and Dental Health
- Aims and objectives of Dental Health Education.
- Dental Health and Children.
- Steps in preventive program, patient counselling.



- Dental Health Education-Parents, mothers (anti and post-natal), infant's pre-school Children and grownup Handicapped children.
- Dental caries- Prevalence and Prevention.
- Prevention by fluoridation.
- Periodontal Diseases.
- Saliva in relation to dental health and disease.
- Dietary habits and Dental Health.
- Habits and Malocclusion.
- Oral Cancer.
- Brief outline of historical background of public Health, History of dentistry and Public Health Services. Dental Health Team in relation to community health.
- Technical knowledge of Topical Fluoride Application

#### Practical

- Preparation of models of jaws and teeth-normal and pathological dental conditions.
- Designing, drawing and painting of-posters on 'dental health education.
- Procedure for arranging. Short talks, skits and features on dental and oral health, visual aids.
- Collection of Oral Health related statistics by conducting a small survey of an area

### 9. DENTAL ETHICS, JURISPRUDENCE AND ORIENTATION IN DENTISTRY

#### Lectures

- Difference between ethics and law, types of law.
- Legal impositions in relation to dental practice, code of ethics.
- Unlicensed practice of dentistry.
- Regulatory and professional organisation.
- Place and function 'of dental profession in the society and discussion of economic problems involved therein.
- Social factors in Dental Progress, income and living standard of people.
- Objective and scope of dentistry.
- Dental specialities.



### 10. DENTAL MATERIALS

#### Lectures

- General knowledge of various material used in Dentistry such as impression material, gypsum products, waxes, investing materials and various filling materials, Temporary and Permanent cements, orthodontic material and implant materials, materials used in maxillofacial and surgical prosthesis.
- Recognition and knowledge of various dental equipment and stores used in dental establishment.
- Organisation of dental stores, storage and accounting, handling and maintenance of dental items, assembly and minor repair of dental equipment.

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#### 11. APPLIED PHYSICS:

- Specific gravity, density, properties of matter, including cohesion, capillarity, surface tension viscosity, elasticity, diffusion and osmosis.



- Heat: Temperature and its measurements Thermometers and Pyrometers. General account of expansion by heat of solids, liquids and gases, Thermostats, Pressure gas and hydraulic. Boyle's and Charles Laws. Unit of heat, thermal capacity and specific Heat, Change of State; Latent heat; Melting Point. Properties of vapours, conduction, convection and radiation.
- Principles of electro-technology applied to dental work room, small motors, constructional features and characteristics, electric furnaces, heaters, thermostats, pyrometers, spot welders, electroplating, electre-fornkag, and anodizing, wiring regulations relating to low voltage supplies.

#### Exercises/ Demonstrations

- Balance - weighing correct to a milligram.
- Determination of specific gravity by the principle of Archimedes (Solids and liquids).
- Determination of surface tension of a liquid by capillary rise.
- Determination of Linear expansion of solids (level method)
- Determination of the specific heats of solids and liquids by the method of mixtures.
- Small motors-constructional features and characteristics (Demonstration only) Determination of the electro-chemical - equivalent of copper.

#### 12. Applied Mechanics:

- Forces, Parallelogram and triangle of forces. Moments, Couples, Centre of gravity, Principles of lever and cantilever work, Energy; Power, Friction, inclined plane, Screw Stress, Strain, Sheating Strain, Torsion, Bending movements, Strength and stiffness of materials.

#### Exercises/Demonstrations

- Verification of the parallelogram and triangle laws of forces.
- Inclined plane Determination of mechanical advantage.
- Determination of Young's Modulus by bending of beams.

#### 13. Applied Chemistry:

- Distinction between physical and chemical change; elements, mixtures, and compounds; composition of the atmosphere; Oxygen oxides, burning and rusting; water solvent properties and crystallization; action of water on metals; composition of water hydrogen; Laws of chemical combination; meaning of chemical symbols valency; simple chemical equations; acids, bases and salts.
- Electrolysis, The ionic theory of solution. The electro potential series, electroplating, General characteristics of the metals including an elementary study of the common metals and their alloys with special reference to those used in the dental work room.
- Alcohol, ethers, aldehydes and ketones, fatty acids and their more important derivatives, amines. Simple treatment of carbohydrates, fats and proteins, Benzenes and its homologues. General characteristics of aromatic substances. Synthetic resins and plastics used in Dentistry.

#### Exercises/Demonstrations:

- Tests for Acids and alkalis radicals.
- Acid-baseitration- Neutralisation of acids with alkalies. Titration of N/ 10 NaOH with N/10 H2SO4 Phenophthalin or Methyl red as indicator 24-
- Total Nitrogen determination in organic nitrogenous materials, digestion and distillation.
- Total Nitrogen determination in In-organic (ammoniacal) solutions (or salts) by direct distillation with Mg.
- Determination of Phosphorus in in-organic materials by precipitation.
- Determination of Potassium in aqueous solution by perchlorate method.
- Electrolytic deposition (electrolysis and electroplating of metals). (c)
- Deposition of Copper by electrolysis of copper Sulphate solution
- Calculation of E.C.E.



#### 14. APPLIED ORAL-ANATOMY:

- Elementary anatomy and structure of denture/bearing area.
- Human dentition and occlusion.
- Functions of teeth and morphology of Crowns of teeth.
- Muscles of mastication and facial expression.
- Mastication deglutition and phonation.
- Movements of tempera-mandibular joint. Exercise/Demonstrations
- Tooth Carving in wax and plaster. (Crown and root, scale and enlarged models)

#### 15. DENTAL MECHANICS (PRIMARY)

- Infection control measures for impressions and models
- Impression Preservation and Boxing-in.
- Cast: Preparation, Trimming, including Orthodontic casts.
- Cast duplication - various methods.
- Construction of special trays – spacers
- Bite blocks- base plates and wax rims.
- Articulators: Classification, daily uses, and care of articulators.
- Adjustments, Mounting of casts.
- Articulation, Occlusal plane, protrusive balance, working bite, balancing bite, curve of space, compensating curve, lateral curve.
- Principles of selection of teeth.
- Setting of teeth and wax finishing. –
- Flasking, Dewaxing, Packing, curing and Deflasking.
- Finishing and polishing of dentures.
- Additions, repairs, relining and revasing of dentures.
- Immediate denture construction.
- Making of acrylic teeth.
- Kennedy's classification of partial dentures.
- Principles of partial denture, design, clasp surveyor, surveying, path of insertion and removal. Establishment of clasp seat. Clasp's parts, classification, function and reciprocation.
- Principles of wire bending, Preparation of wrought clasps, occlusal rests and lingual bars.

#### 16. DENTAL MECHANICS (Final)

- Casting machines: Centrifugal and pressure casting machines, Furnaces, Principles of casting
- Casting techniques of partial denture (Skeletal) Clasps, bars, occlusion rest.
- Setting of teeth and completion of dentures on metal skeletons.
- Mechanical principles of Orthodontic appliances, anchorage, force, tissue changes and retention.
- Stainless steel wire-preparation of clasps, springs and Arch wires for Orthodontic appliances.
- Use of various types of expansion screws.
- Designing - Implant supported Prosthesis (if facilities available for Dental Implants)
- Ceramic, laminates and Veneers.
- Fabricating—Maxillofacial prosthesis such as eye, nose ear, cheek, obturator and splint
- Indirect Resin Restoration preparation techniques.
- Porcelain firing techniques
- Preparation of removable Orthodontic appliances, Activators, Retention appliances and Oral screen.
- Construction of fixed Orthodontic appliances, bands, tubes and arches.
- Soldering and spot welding-Soldering of clasps, tags, Strengtheners and lingual bars.
- Inlays and Crowns-classification and construction facing & backings. Casting Procedures.
- Principles of bridge work-types of abutments - abutments and ponticsconstruction of bridges using porcelain and acrylic pontics.



## 17. DENTAL MATERIALS AND METALLURGY

### Dental Materials:

- Composition, Properties, Uses, Advantages & Disadvantages of the following materials: - Plaster of Paris; Dental Stone, Die Stone
- Investment Materials
- All Impression Materials
- Tray Materials
- Denture Base Materials, both for cold curing and heat curing, Tooth Materials Waxes, Base Plate
- Zinc Oxide
- Dental Luting Cements Dental Ceramics and indirect resin restoration materials.

### Dental Metallurgy:

- Metallurgical Terms,
- General
- Study of:
  - Metals used in Dentistry Particularly Gold, Silver, Copper, Zinc, Tin, Lead and Aluminium.
  - Alloys used in Dentistry particularly, Casting Gold Wrought Gold Silver Alloys, Stainless Steel, Chrome Cobalt Alloys.
- Heat treatment-annealing and tempering.
- Solders, Fluxes, Anti Fluxes.
- Tarnish and Corrosion.
- Electric Deposition.
- Dental implant materials.

## 18. BASIC KNOWLEDGE.OF COMPUTERS

- General office routine economics, record-keeping services, Professional referrals and computing skill;
- Record keeping of materials indented and Audit of use.
- Receipt and dispatch of work from clinicians.

