

## NOTICE

Dated 19.08.2023

SCHEME OF EXAMINATION AND INDICATIVE SYLLABUS FOR VARIOUS  
NON-FACULTY POSTS OF PHASE-II

In reference to Vacancy Notice No. AIIMS/BBSR/RECT/2023/990/B&C/1583 Dated 01.07.2023 & Notice No. AIIMS/BBSR/RECT/2023/990/B&C/2016 Dated 20.07.2023 uploaded on the official website of AIIMS Bhubaneswar for filling up of various Group 'B' and 'C' Non-faculty posts at AIIMS Bhubaneswar, the indicative syllabus and scheme of examination for the Phase-I posts is annexed.

2. The Important terms and conditions are as follows
  - 2.1 The candidates are advised to download their Admit Cards from the website of AIIMS Bhubaneswar i.e. <https://aiimsbhubaneswar.nic.in/>. Only website generated Admit Card will be treated authentic and permissible to appear in the said Examination. No admit card will be sent by Speed Post..
  - 2.2 As per practice, the Online Computer Based Test (CBT) for the advertised posts will be conducted without pre-examination screening of the applications of the candidates with regard to their eligibility. Hence, the candidate will be allowed **PROVISIONALLY** to appear in the online (CBT) Recruitment Examination.
  - 2.3 However, the original documents of all selected candidates related to fulfilment of eligibility criteria, experience etc. will be verified by the Institute before final appointment.
  - 2.4 The city for examination will be allocated on the basis of order of application form, candidates choices and availability of computer nodes. Decision of AIIMS Bhubaneswar in this regard will be final and no further correspondence will be entertained in this regard.
  - 2.5 All applicants are required to visit the institute's website regularly as all subsequent Corrigendum/Addendum/ Updates will only be uploaded on the official website of AIIMS Bhubaneswar i.e. <https://aiimsbhubaneswar.nic.in/>.
  - 2.6 **Resolution of Tie Cases:** In cases where more than one candidate secures equal MARKS, tie will be resolved:
    - a. Accuracy in Skill Test (if applicable), otherwise
    - b. Date of birth shall be used [candidates who are older / born earlier will be placed above candidates who are younger / born later].
  - 2.7 **Medium of Examination:** Hindi/English
  - 2.8 01 mark will be awarded for each correct answer and there will be negative marking of 0.25 marks for each wrong answer.

  
Deputy Director (Admin) (I/c)  
AIIMS Bhubaneswar

RECT/6/2023-RECU SEC  
**SYLLABUS FOR THE POST OF CHIEF CASHIER**

1/5/2023

**A. General Intelligence & Reasoning (10 Marks):**

It would include questions of both verbal and non-verbal type. This component may include questions on analogies, similarities and differences, space visualization, spatial orientation, problem solving, analysis, judgement, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning and figural classification, arithmetic number series, non-verbal series, coding and decoding, statement conclusion, syllogistic reasoning etc. The topics are, Semantic Analogy, Symbolic/Number Analogy, Figural Analogy, Semantic Classification, Symbolic/Number Classification, Figural Classification, Semantic Series, Number Series, Figural Series, Problem Solving, Word Building, Coding & decoding, Numerical Operations, symbolic Operations, Trends, Space Orientation, Space Visualization, Venn Diagrams, Drawing inferences, Punched hole/pattern –folding & unfolding, Figural Pattern – folding and completion, Indexing, Address matching, Date & city matching, Classification of centre codes/roll numbers, Small & Capital letters/numbers coding, decoding and classification, Embedded Figures, Critical thinking, Emotional Intelligence, Social Intelligence, Other sub-topics, if any.

**B. General Awareness (10 Marks):**

Questions in this component will be aimed at testing the candidate's general awareness of the environment around him and its application to society. Questions will also be designed to test knowledge of current events and of such matters of every day observations and experience in their scientific aspect as may be expected of any educated person. The test will also include questions relating to India and its neighbouring countries especially pertaining History, Culture, Geography, Economic Scene, General Policy & Scientific Research.

**C. Quantitative Aptitude (10 Marks):**

The questions will be designed to test the ability of appropriate use of numbers and number sense of the candidate. The scope of the test will be computation of whole numbers, decimals, fractions and relationships between numbers, Percentage. Ratio & Proportion, Square roots, Averages, Interest, Profit and Loss, Discount, Partnership Business, Mixture and Allegation, Time and distance, Time & Work, Basic algebraic identities of School Algebra & Elementary surds, Graphs of Linear Equations, Triangle and its various kinds of centres, Congruence and similarity of triangles, Circle and its chords, tangents, angles subtended by chords of a circle, common tangents to two or more circles, Triangle, Quadrilaterals, Regular Polygons Circle, Right Prism, Right Circular Cone, Right Circular Cylinder, Sphere, Hemispheres, Rectangular Parallelepiped, Regular Right Pyramid with triangular or square base, Trigonometric ratio, Degree and Radian Measures, Standard Identities, Complementary angles, Heights and Distances, Histogram, Frequency polygon, Bar diagram & Pie chart.

**D. English Language & Comprehension(10 Marks):**

Candidates' ability to understand correct English, his basic comprehension and writing ability, etc. would be tested.

**F. Fundamental Principles and Basic Concepts of Accounting (80 Marks):**

Financial Accounting - Nature and scope, Limitations of Financial Accounting, Basic Concepts and Conventions, Generally Accepted Principles. Basic Concepts of Accounting: Single and Double Entry System, Books of Original Entry, Bank Reconciliation, Journal, Ledgers, Trial Balance, Rectification of Errors, Manufacturing, Trading, Profit & Loss Appropriation Accounts, Balance Sheet, Distinction between Capital and Revenue Expenditure, Depreciation Accounting, Valuation of Inventories, Non-profit making organizations' Accounts, Receipts and Payments, Income & Expenditure Accounts, Bills of Exchange, Self-Balancing Ledgers.

RECT/6/2023-RECU\_SEC  
SYLLABUS FOR THE POST OF GAS OFFICER

1/5/2023

**Subject Knowledge (100 Marks):**

**A. Respiratory Anatomy and Physiology (10 Marks):**

- Structure and function of the respiratory tract Nose - Role in humidification
- Pharynx - Obstruction in airways Larynx - Movement of vocal cords, Cord palsies.
- Trachea & Bronchial tree - vessels, nerve supply, respiratory tract, reflexes, bronchospasm  
Alveoli - Layers, Surfactants
- Respiratory Physiology
- Control of breathing
- Respiratory muscles- diaphragm, intercostal
- Lung volumes - dead space, vital capacity, FRC etc.
- Pleural cavity - intrapleural pressure, pneumothorax.
- Work of breathing - airway resistance, compliance
- Respiratory movements under anaesthesia.
- Tracheal tug - signs, hiccup

**B. Pulmonary Gas exchange and disorders (10 Marks):**

- Pulmonary Gas Exchange and Acid Base Status
- Pulmonary circulation - Pulmonary oedema, pulmonary hypertension • Pulmonary function tests.
- Transfer of gases - Oxygen & Carbon dioxide
- Acid base status, definitions, acidosis types, Alkalosis types, buffers in the body.
- Oxygen: properties, storage, supply, hypoxia
- Respiratory failure, type, clinical features, causes.

**C. Cardiac Anatomy and Physiology (10 Marks):**

- Cardiovascular System
- Anatomy - Chambers of the heart, major vasculature.
- Coronary supply, innervations, Conduction system Cardiac output - determinants, heart rate, preload, after load.
- Coronary blood flow & myocardial oxygen supply
- ECG - arrhythmias cardiovascular response to anaesthetic & surgical procedures.

**D. Clinical Pharmacology of Oxygen and Oxygen delivery (10 Marks):**

- Hypotension- causes, effects, management.
- Cardio pulmonary resuscitation.
- Myocardial infarction, hypertension.
- Gases - O<sub>2</sub>, N<sub>2</sub>O, Air
- Gas properties and safety:
  - the hazards of compressed and cryogenic gases;
  - cylinder colours and labelling;
  - actions on finding defective cylinders;
  - operation of cylinder valves;
  - cylinder storage and handling (medical gas/pathology gas stores)
- Preparation of cylinders for use;
- Selection of appropriate equipment and its connection and disconnection to/from cylinders respectively.

**E. Anaesthesia Machine (10 Marks):**

- Hanger and yoke system
- Cylinder pressure gauge
- Pressure regulator
- Flow meter assembly
- Vapourizers - types, hazards, maintenance, filling and draining, etc.
- General considerations: humidity & heat
- Common components - connectors, adaptors, reservoir bags.
- Capnography ; ET CO<sub>2</sub>
- Pulse oximetry
- Methods of humidification

**F. Breathing systems (10 Marks):**

- Classification of breathing system
- Mapleson system
- Jackson Rees system, Bain circuit
- Non rebreathing valves - AMBU valves
- The circle system Components Soda lime, indicators

**G. Gas Distribution Systems (10 Marks):**

- Compressed gas cylinders
- Colour coding
- Cylinder valves; pin index
- Gas piping system
- Recommendations for piping system
- Alarms & safety devices

**H. MGPS Design and Techniques (10 Marks):**

- Statutory obligations and safe system operation
- MGPS design and installation requirements
- Basic fault-finding
- Structure and management of the permit-to work system
- MGPS equipment performance requirements (plant and pipeline) Technical reporting including system capacities/ limitations, upgrading requirements/equipment replacement, system compliance

**I. MGPS Policies and documentation (10 Marks):**

- MGPS documentation
- Emergency procedures
- MGPS operational policy preparation, implementation and monitoring
- MGPS testing and quality control requirements
- Manifold systems
- Cryogenic liquid cylinders
- Bulk cryogenic (VIE) systems
- Alarm requirements

**J. Miscellaneous Systems (10 Marks)**

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RECT/6/2023-RECU SEC  
SYLLABUS FOR THE POST OF JUNIOR ADMINISTRATIVE OFFICER

1/5/2023

**A. General Intelligence & Reasoning (10 Marks):**

It would include questions of both verbal and non-verbal type. This component may include questions on analogies, similarities and differences, space visualization, spatial orientation, problem solving, analysis, judgement, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning and figural classification, arithmetic number series, non-verbal series, coding and decoding, statement conclusion, syllogistic reasoning etc. The topics are, Semantic Analogy, Symbolic/Number Analogy, Figural Analogy, Semantic Classification, Symbolic/Number Classification, Figural Classification, Semantic Series, Number Series, Figural Series, Problem Solving, Word Building, Coding & decoding, Numerical Operations, symbolic Operations, Trends, Space Orientation, Space Visualization, Venn Diagrams, Drawing inferences, Punched hole/pattern –folding & unfolding, Figural Pattern – folding and completion, Indexing, Address matching, Date & city matching, Classification of centre codes/roll numbers, Small & Capital letters/numbers coding, decoding and classification, Embedded Figures, Critical thinking, Emotional Intelligence, Social Intelligence, Other sub-topics, if any.

**B. General Awareness (5 Marks):**

Questions in this component will be aimed at testing the candidate's general awareness of the environment around him and its application to society. Questions will also be designed to test knowledge of current events and of such matters of every day observations and experience in their scientific aspect as may be expected of any educated person. The test will also include questions relating to India and its neighbouring countries especially pertaining History, Culture, Geography, Economic Scene, General Policy & Scientific Research.

**C. Quantitative Aptitude (10 Marks):**

The questions will be designed to test the ability of appropriate use of numbers and number sense of the candidate. The scope of the test will be computation of whole numbers, decimals, fractions and relationships between numbers, Percentage. Ratio & Proportion, Square roots, Averages, Interest, Profit and Loss, Discount, Partnership Business, Mixture and Allegation, Time and distance, Time & Work, Basic algebraic identities of School Algebra & Elementary surds, Graphs of Linear Equations, Triangle and its various kinds of centres, Congruence and similarity of triangles, Circle and its chords, tangents, angles subtended by chords of a circle, common tangents to two or more circles, Triangle, Quadrilaterals, Regular Polygons, Circle, Right Prism, Right Circular Cone, Right Circular Cylinder, Sphere, Hemispheres, Rectangular Parallelepiped, Regular Right Pyramid with triangular or square base, Trigonometric ratio, Degree and Radian Measures, Standard Identities, Complementary angles, Heights and Distances, Histogram, Frequency polygon, Bar diagram & Pie chart

**D. English Language (5 Marks):**

Spot the Error, Fill in the Blanks, Synonyms/Homonyms, Antonyms, Spellings/ Detecting Misspelt words, Idioms & Phrases, One word substitution, Improvement of Sentences, Active/Passive Voice of Verbs, Conversion into Direct/Indirect narration, Shuffling of Sentence parts, Shuffling of Sentences in a passage, Cloze Passage, Comprehension Passage.

**E. Basic concepts of Management & Computers (10 Marks):**

Principles of Management, Organisation behaviour, MS Office, MS Windows, Fundamentals of Computers, Internet etc.

1/5/2023 F. **Central Govt. Service Rules (80 Marks):**

Central Government Rules: Questions relating to CCS (Leave) Rule, CCS (Conduct) Rules, GFR, FR/SR, General Service Condition, Office Procedures, Types of correspondence, General Knowledge about IPC/CRPC, CPC/CAT/High Court, RTI Act, 2005, Establishment, Reservation, Roster, LTC, Travelling Allowance etc.

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**SYLLABUS FOR THE POST OF MEDICAL SOCIAL SERVICE OFFICER GRADE I****Subject Knowledge (100 Marks):****A. Nature and development of social work (10 Marks)****B. Sociological concepts and contemporary concerns (10 Marks):**

Sociological concepts and contemporary concerns urban community development Human rights and social work practice, social policy

**C. Human behaviour and social environment (10 Marks):**

Human behaviour and social environment, state, political economy and governance, social work with communities, social work with individuals, social work with group research in social work: quantitative approaches

**D. Social action and social movements (10 Marks):**

Social action and social movements, social work with the elderly, environment and social work, social work with families and children, occupational social work

**E. Research in social work (10 Marks):**

Research in social work, qualitative approaches

**F. Administration of welfare and development services (10 Marks):**

Administration of welfare and development services, organizational behaviour and employee development, social defense and correctional services, rural community development

**G. Social justice and empowerment (10 Marks):**

Social justice and empowerment, social development, management of development organizations Social work with persons with disabilities, aspects of applied social work in hospitals etc. Human rights and social work practice Social work practice in mental health settings

**H. Social work and disaster management (10 Marks):**

Social work and disaster management, conflict mitigation and peace building, gender and development.

**I. Counselling (10 Marks):**

Counselling theory and practice

**J. HIV/AIDS (10 Marks):**

HIV/AIDS and social work practice, health care social work practice

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**SYLLABUS FOR THE POST OF PROGRAMMER (DATA PROCESSING ASSISTANT)**

**A. General Intelligence & Reasoning (10 Marks):** It would include questions of both verbal and non-verbal type. This component may include questions on analogies, similarities and differences, space visualization, spatial orientation, problem solving, analysis, judgement, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning and figural classification, arithmetic number series, non-verbal series, coding and decoding, statement conclusion, syllogistic reasoning etc. The topics are, Semantic Analogy, Symbolic/Number Analogy, Figural Analogy, Semantic Classification, Symbolic/Number Classification, Figural Classification, Semantic Series, Number Series, Figural Series, Problem Solving, Word Building, Coding & decoding, Numerical Operations, symbolic Operations, Trends, Space Orientation, Space Visualization, Venn Diagrams, Drawing inferences, Punched hole/pattern –folding & unfolding, Figural Pattern – folding and completion, Indexing, Address matching, Date & city matching, Classification of centre codes/roll numbers, Small & Capital letters/numbers coding, decoding and classification, Embedded Figures, Critical thinking, Emotional Intelligence, Social Intelligence, Other sub-topics, if any.

**B. General Awareness (10 Marks):** Questions in this component will be aimed at testing the candidate's general awareness of the environment around him and its application to society. Questions will also be designed to test knowledge of current events and of such matters of every day observations and experience in their scientific aspect as may be expected of any educated person. The test will also include questions relating to India and its neighbouring countries especially pertaining History, Culture, Geography, Economic Scene, General Policy & Scientific Research.

**C. Quantitative Aptitude (10 Marks):** The questions will be designed to test the ability of appropriate use of numbers and number sense of the candidate. The scope of the test will be computation of whole numbers, decimals, fractions and relationships between numbers, Percentage. Ratio & Proportion, Square roots, Averages, Interest, Profit and Loss, Discount, Partnership Business, Mixture and Allegation, Time and distance, Time & Work, Basic algebraic identities of School Algebra & Elementary surds, Graphs of Linear Equations, Triangle and its various kinds of centres, Congruence and similarity of triangles, Circle and its chords, tangents, angles subtended by chords of a circle, common tangents to two or more circles, Triangle, Quadrilaterals, Regular Polygons, Circle, Right Prism, Right Circular Cone, Right Circular Cylinder, Sphere, Hemispheres, Rectangular Parallelepiped, Regular Right Pyramid with triangular or square base, Trigonometric ratio, Degree and Radian Measures, Standard Identities, Complementary angles, Heights and Distances, Histogram, Frequency polygon, Bar diagram & Pie chart

**D. English Language (10 Marks):** Spot the Error, Fill in the Blanks, Synonyms/Homonyms, Antonyms, Spellings/ Detecting Mis-spelt words, Idioms & Phrases, One word substitution, Improvement of Sentences, Active/Passive Voice of Verbs, Conversion into Direct/Indirect narration, Shuffling of Sentence parts, Shuffling of Sentences in a passage, Cloze Passage, Comprehension Passage.

**E. Subject Knowledge (80 Marks):**

Problem-Solving and Programming using C/C++ ( Problem - Solving Techniques, Design of Algorithms, Efficiency, Complexity, Data Structure/Representation, Loops (simple/complex), Multilevel Decision making), Computer Organization ( The Basic Computer, The Data Representation, Logic Gates, Memory System, I/O Technology including latest in use, Input/output System, Secondary Storage System, Theory of Computing, Discrete Mathematics (Propositional Calculus, Boolean Algebra and Circuits), Systems Analysis and Design,



1/5/2023

Implementation and Maintenance of Systems, Internet Concepts and Web Design (The Internet, Intranet, World Wide Web, HTML, JavaScript, XML), Data and File structures, Operating System Concepts and Networking Management/Concepts, Database Management Systems (Basic Concepts, Relational and ER Models, NORMALIZATION, Structured Query Language (SQL) and Transaction Management, Stored Procedure, Backup, Recovery and Security, Distributed and Client Server Databases, SQL, Server/Postgres, Technology/Concepts, SQL/MYSQL), Python .DOT, Object Oriented NET(C#/ASP.NET), Software Engineering. Data Communication and Networks, Artificial Intelligence and Knowledge Management.

**SYLLABUS FOR THE POST OF PSYCHIATRIC SOCIAL WORK**

**A. General Intelligence & Reasoning (10 Marks):** It would include questions of both verbal and non-verbal type. This component may include questions on analogies, similarities and differences, space visualization, spatial orientation, problem solving, analysis, judgement, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning and figural classification, arithmetic number series, non-verbal series, coding and decoding, statement conclusion, syllogistic reasoning etc. The topics are, Semantic Analogy, Symbolic/Number Analogy, Figural Analogy, Semantic Classification, Symbolic/Number Classification, Figural Classification, Semantic Series, Number Series, Figural Series, Problem Solving, Word Building, Coding & decoding, Numerical Operations, symbolic Operations, Trends, Space Orientation, Space Visualization, Venn Diagrams, Drawing inferences, Punched hole/pattern –folding & unfolding, Figural Pattern – folding and completion, Indexing, Address matching, Date & city matching, Classification of centre codes/roll numbers, Small & Capital letters/numbers coding, decoding and classification, Embedded Figures, Critical thinking, Emotional Intelligence, Social Intelligence, Other sub-topics, if any.

**B. General Awareness (10 Marks):** Questions in this component will be aimed at testing the candidate's general awareness of the environment around him and its application to society. Questions will also be designed to test knowledge of current events and of such matters of every day observations and experience in their scientific aspect as may be expected of any educated person. The test will also include questions relating to India and its neighbouring countries especially pertaining History, Culture, Geography, Economic Scene, General Policy & Scientific Research, Basic concepts of Management & Computers.

**C. Quantitative Aptitude (10 Marks):** The questions will be designed to test the ability of appropriate use of numbers and number sense of the candidate. The scope of the test will be computation of whole numbers, decimals, fractions and relationships between numbers, Percentage. Ratio & Proportion, Square roots, Averages, Interest, Profit and Loss, Discount, Partnership Business, Mixture and Allegation, Time and distance, Time & Work, Basic algebraic identities of School Algebra & Elementary surds, Graphs of Linear Equations, Triangle and its various kinds of centres, Congruence and similarity of triangles, Circle and its chords, tangents, angles subtended by chords of a circle, common tangents to two or more circles, Triangle, Quadrilaterals, Regular Polygons, Circle, Right Prism, Right Circular Cone, Right Circular Cylinder, Sphere, Hemispheres, Rectangular Parallelepiped, Regular Right Pyramid with triangular or square base, Trigonometric ratio, Degree and Radian Measures, Standard Identities, Complementary angles, Heights and Distances, Histogram, Frequency polygon, Bar diagram & Pie chart

**D. English Language (10 Marks):** Spot the Error, Fill in the Blanks, Synonyms/Homonyms, Antonyms, Spellings/ Detecting Mis-spelt words, Idioms & Phrases, One word substitution, Improvement of Sentences, Active/Passive Voice of Verbs, Conversion into Direct/Indirect narration, Shuffling of Sentence parts, Shuffling of Sentences in a passage, Cloze Passage, Comprehension Passage.

**E. Subject Knowledge (80 Marks):**

**PSYCHIATRIC SOCIAL WORK**

- The Field of Psychiatric Social Work: basic concepts and theoretical framework, historical development, major approaches in psychiatric social work and value concepts underlying psychiatric social work practice in mental health. Problem formulation- various approaches to social diagnosis.
- Therapeutic Models in Psychiatric Social Work : Various theoretical approaches in individual treatment and processes of individual techniques.
- Principles and Practices of Group Treatment.
- Family Therapy : historical background approaches and methods of practice. Family as a social system: theoretical frame work.
- Teaching methodologies : teaching for a professional programme. Social work educator as a role model and enabler. Field instructions, supervision, recording, documentation and evaluation in psychiatric social work practice.
- Practice of Psychiatric Social Work in Different Settings: family service agencies, child welfare agencies, school settings, correctional institutions, general hospital settings and deaddiction centres, industrial settings, nontraditional mental health services, national and international charitable organizations.
- Law, Ethics and Psychiatric Social Work.

- The Mental Healthcare Act, 2017. The Protection of Children from Sexual Offences (POSCO) Act, 2012. The Rights of Persons with Disabilities (RPWD) Act, 2016, Domestic Violence (Prohibition) Act, 2005.

### **PSYCHOSOCIAL PERSPECTIVES ON MENTAL HEALTH**

- Introduction To Psychology : theories of intelligence, memory and forgetting, attention, concentration, personality an overview.
- Principles of Learning : classical conditioning, instrumental conditioning and social learning theory.
- Development Factors: Motor development, cognitive development, social development, emotional development and development of moral values.
- Motivation and Emotion : theories of motivation, frustration and fulfillment of motives. Maslow's theory, emotion and its measurement and stress theory.
- Social Psychology : Leadership, attitudes and attitude change.
- Social pathology : crime and delinquency, suicide, addictive behavior, social aggression with special reference to Indian contexts.
- Recent Trends in Psychosocial Perspectives on Mental Health Research and Their Implications.

### **PSYCHIATRIC SOCIAL WORK RESEARCH**

- Scientific methods of social research in Psychiatric Social Work : nature of scientific method. Cause and effect relationship: general principles in detecting causal relations and Mill's Canons.
- Basic Elements of Psychiatric Social Work Research : concept and hypothesis, abstraction, conceptualization, and reconceptualisation. Hypothesis, Research Hypothesis, Alternative Hypothesis.
- Designs of Research : observational research, exploratory, descriptive researches and experimental research.
- Sampling Techniques : Sampling and non sampling errors, Random and non random samples, Different methods of sampling, methods of minimizing non sampling errors.
- Group Research Designs: Logic of group designs and group designs in psychiatric social work practice.
- Methods and Tools of Data Collection : interview schedule, interview guide, mailed questionnaire and observation schedule. Standardisation of terms and methods of dealing with response errors, methods of dealing with sensitive questions and methods of dealing with non response.

### **STATISTICS**

- Basic Statistics  
Levels of Measurement, Descriptive Statistics, Basic Probability Theory, Probability Distributions, Test of Hypothesis, sampling from normal distribution.
- Correlation and Regressions
- Basic principles in test of Hypothesis and tests based on Chi-square, Student 't' and 'f' Statistics.
- Analysis of Variance one-way and two-way and Basic Concepts of Analysis of Covariance.
- Non Parametric Statistics – Principles and Commonly used methods, Sign test, Wilcoxon Signed Rank test, Mann-Whitney test, Median test, Rank Correlation.

### **SOCIAL ISSUES AND MENTAL HEALTH**

- Concept of Social Issues : Social issue and social Change.
- Context of Social issues in India : Multiculturalism (caste, language, religious differentiation ), democratic system (federal structure, political mobilization, and people's participation); education (colonial legacy, relevance of modern education system) and globalization (neo colonialism, role of international agencies).
- Women Rights : legal issues, women empowerment, Working women, violence against women & cultural constraints.

- Adoption, child labour, child abuse, street children, institutional, & non-institutional care, single child, infanticide, school issues, children and legal issues.
- Religious and Spiritual Well Being : health practices and religion, religious institutions, contemporary marriage and family issues, retirement, ageing, health and adjustment, family relation and care of the aged.
- Legal Issues : ecological issues, air, water, sound and eco friendly measures.

## **PSYCHIATRIC SOCIAL WORK INTERVENTIONS**

### **Working With Individuals**

- Understanding psychosocial development of the individual, healthy personalities, characteristics and contributing factors.
- Components of Case Work: definition, nature, scope and process.-Case work relationships, interview, listening, recording, termination and briefcase work.
- Groups : characteristics, types, purposes, group dynamics, group work process, and principles and techniques. Skills of group worker, group intervention, promotive /preventive programmes (therapeutic and rehabilitative activities).

### **Working with Families**

- Origin, development, process, family dynamics, socialization, predominant characteristics of family (forces), family dynamics and interaction.
- Principles of Working with Families : family life cycle, promotional/ preventive activities (family and marital environments) and families in crisis.
- Family life Education : problem families and intervention strategies.
- Family Intervention Techniques: approaches to family intervention, family therapy (different models) and family case work. Working With Community ;
- Community: concept, dynamics, types, characteristics and functions.
- Training of professionals, paraprofessionals and volunteers.
- Intersect oral approach in prevention and promotive aspects.
- Community Participation and Education: understanding and utilizing social supports in the community.
- Role of voluntary social service organizations, community action groups for advocacy and social action.
- Family counseling centre- family courts, student counseling centres, special schools, child development institutions, home for the aged, self help groups, halfway home, day care centres, correctional institution, counseling services in industry, NGOs and respite care centres

## **PSYCHIATRY, INCLUDING COMMON NEUROLOGICAL PROBLEMS**

- Recent advances in knowledge about causation of mental illness, treatment and rehabilitation of mentally ill.
- Psychiatric Illness: Psychosis , affective disorders, drug dependence, suicide, psychosomatic disorders, Personality disorders, anxiety disorders, stress related disorders, Child And Adolescent Psychiatric Disorders.
- Psychotherapies
- Psychiatric Rehabilitation

**SYLLABUS FOR THE POST OF PUBLIC HEALTH NURSE****Subject Knowledge (100 Marks):****A. ANATOMY AND PHYSIOLOGY**

- Bones: Types, Structures, Function
- Joints: Classification, Structure and Function
- Blood: Composition, clotting and blood group, cross matching. Blood products and their use.
- Heart: Position, Structure, conduction system, Function and cardiac cycle.
- Normal respiration and its deviations.
- Metabolism: meaning and metabolism of food constituents.
- Regulation of body temperature.
- Fluid and electrolyte balance.
- Central Nervous System: Structure and functions.
- Autonomic Nervous System: Structure and functions
- Structure and functions of pituitary, pancreas, thyroid parathyroid, thymus and supra renal glands.
- Physiology of vision, hearing and equilibrium.
- Process of reproduction, menstrual cycle and menopause

**B. MICROBIOLOGY**

- Pathogenic and non- pathogenic organisms.
- Portals of entry and exit of microbes
- Transmission of infection
- Collection of specimens
- Types of immunity
- Hypersensitivity and autoimmunity
- Sterilization: dry heat, moist heat, chemicals and radiation
- Disinfection: Physical, natural, gases, chemicals used and preparation of lotions
- Bio-safety and waste management

**C. SOCIOLOGY**

- Social problems: unmarried mothers, dowry system, prostitution, drug addiction, alcoholism, delinquency, handicapped, child abuse, women abuse.

**D. NURSING FOUNDATIONS***Basic Needs and Care in Special Conditions*

- Care of patient with fever, unconscious patient, patient with fluid imbalance, patient with dyspnoea.
- Care of terminally ill patient.
- Care of physically handicapped.

*Dying Patient:*

- Signs and symptoms of approaching death, needs of the dying patient and his relatives, care of the dying, last offices, packing of dead bodies in non-communicable and communicable diseases.

**DRUG ADMINISTRATION**

1/5/2023

- Classification Administration & General action of drugs.
- Nursing implications in administration of drugs

#### *First Aid in Emergency Situations*

- Fire, burn, fracture, accidents, poisoning, drowning, hemorrhages, insect bites, foreign bodies.
- Transportation of the injured

#### **E. COMMUNITY HEALTH NURSING-I**

- Dimensions of health.
- Health determinants.
- Indicators of health
- Levels of health care
- Evolution and development of community health nursing in India and its present concept.
- Family health services- Maternal, child care and family welfare services.
- Water borne disease.
- Water purification
- Nurse's Role in National Health Programmes

#### **F. NUTRITION**

- Method of calculating normal food requirements, influence of age, sex and activity.
- Commercially prepared food and its adulteration.
- Nutritional needs for special groups, infants, children, pregnant woman, lactating mothers, old people etc.
- Methods of improving an ill-balanced diet.

#### **G. MEDICAL SURGICAL NURSING**

- Graft versus host disease.
- Fluid and electrolyte imbalance and their therapeutic management
- Therapeutic approaches to pain.
- Anaesthesia: classification, anesthetic and role of a nurse in anaesthesia.
- Post-operative complications: observation, prevention and management
- Management of patient with impaired respiratory functions.
- Respiratory intensive care.
- Management of endocrinal disorders.
- Renal failure and dialysis
- Management of patient with neurological dysfunction.
- Health problems in elderly
- Medical surgical emergencies.
- Classification of Cancer, Detection, prevention, Treatment modalities (Chemotherapy, Radiation)
- Infestations, infectious and non-infectious diseases and their management
- Burn and its management.
- Diseases and disorders of eyes, nose and throat and their management.
- Management of patients with cardio-vascular disease.
- Management of patient in ICU AND C.C.U
- Management of patient with cardio-vascular surgery.
- Adverse blood transfusion reaction and their management.
- Management of various infectious diseases.
- Disorders and diseases of bone, muscle, cartilage, ligaments and their management.

1/5/2023 - Nursing Management of Patients with Sexually transmitted diseases

## H. PSYCHIATRIC NURSING

- Definition of terms used in psychiatry.
- Trends in psychiatric nursing.
- Prevention of mental illness (Preventive Psychiatry) during childhood, adolescence, adulthood and old age.
- Classification of mental disorder.
- Schizophrenic disorders.
- Mood (affective) disorders.
- Main Depressive Psychosis.
- Anxiety states.
- Phobic disorders, obsessive compulsive disorders, depressive neurosis, conversion disorders, dissociative reaction, hypochondriasis, psychoactive disorders, alcohol, drugs and other psychoactive substance abuse.
- classification of drugs, antipsychotic, antidepressant, antimanic, antianxiety agents and Role of nurses in psychopharmacology
- Types of therapies: individual and group therapy, behavior therapy, occupational therapy and Role of the nurse in these therapies.
- Psychiatric Emergencies and Crisis Intervention
- Forensic Psychiatry / Legal Aspects

## I. MIDWIFERY AND GYNAECOLOGICAL NURSING

- Embryology and foetal development
- Physiological changes in pregnancy.
- Diagnosis of pregnancy: history, signs and symptoms and investigations.
- Influence of hormones.
- Prenatal care: objectives, history taking, calculation of expected date of delivery, routine examinations.
- Management of women in Labour
- Complications of Pregnancy and its management
- High Risk Pregnancy and its management
- High Risk labour and its management
- Fertility and Infertility

## J. PAEDIATRIC NURSING

- Characteristics of New Born and Physiologic status of the new born.
- Emerging challenges, nursing process related to paediatric nursing.
- Concept of preventive paediatrics.
- High risk new born
- Growth and development: Definition, principles, factors affecting growth and development, techniques of assessment of growth and development, importance of learning about growth and development of all age group
- Nursing interventions and adaptations in nursing care of sick child
- Care of Children with congenital defects / mal formations
- Children with various systemic and functional disorders

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**SYLLABUS FOR THE POST OF RADIOTHERAPY TECHNICIAN GRADE-II**

**A. General Intelligence & Reasoning (10 Marks):** It would include questions of both verbal and non-verbal type. This component may include questions on analogies, similarities and differences, space visualization, spatial orientation, problem solving, analysis, judgement, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning and figural classification, arithmetic number series, non-verbal series, coding and decoding, statement conclusion, syllogistic reasoning etc. The topics are, Semantic Analogy, Symbolic/Number Analogy, Figural Analogy, Semantic Classification, Symbolic/Number Classification, Figural Classification, Semantic Series, Number Series, Figural Series, Problem Solving, Word Building, Coding & decoding, Numerical Operations, symbolic Operations, Trends, Space Orientation, Space Visualization, Venn Diagrams, Drawing inferences, Punched hole/pattern –folding & unfolding, Figural Pattern – folding and completion, Indexing, Address matching, Date & city matching, Classification of centre codes/roll numbers, Small & Capital letters/numbers coding, decoding and classification, Embedded Figures, Critical thinking, Emotional Intelligence, Social Intelligence, Other sub-topics, if any.

**B. General Awareness (10 Marks):** Questions in this component will be aimed at testing the candidate's general awareness of the environment around him and its application to society. Questions will also be designed to test knowledge of current events and of such matters of every day observations and experience in their scientific aspect as may be expected of any educated person. The test will also include questions relating to India and its neighbouring countries especially pertaining History, Culture, Geography, Economic Scene, General Policy & Scientific Research.

**C. Quantitative Aptitude (10 Marks):** The questions will be designed to test the ability of appropriate use of numbers and number sense of the candidate. The scope of the test will be computation of whole numbers, decimals, fractions and relationships between numbers, Percentage. Ratio & Proportion, Square roots, Averages, Interest, Profit and Loss, Discount, Partnership Business, Mixture and Allegation, Time and distance, Time & Work, Basic algebraic identities of School Algebra & Elementary surds, Graphs of Linear Equations, Triangle and its various kinds of centres, Congruence and similarity of triangles, Circle and its chords, tangents, angles subtended by chords of a circle, common tangents to two or more circles, Triangle, Quadrilaterals, Regular Polygons, Circle, Right Prism, Right Circular Cone, Right Circular Cylinder, Sphere, Hemispheres, Rectangular Parallelepiped, Regular Right Pyramid with triangular or square base, Trigonometric ratio, Degree and Radian Measures, Standard Identities, Complementary angles, Heights and Distances, Histogram, Frequency polygon, Bar diagram & Pie chart

**D. English Language (10 Marks):** Spot the Error, Fill in the Blanks, Synonyms/Homonyms, Antonyms, Spellings/ Detecting Mis-spelt words, Idioms & Phrases, One word substitution, Improvement of Sentences, Active/Passive Voice of Verbs, Conversion into Direct/Indirect narration, Shuffling of Sentence parts, Shuffling of Sentences in a passage, Cloze Passage, Comprehension Passage.

**F. Subject Knowledge (80 Marks):**

**Subject Knowledge**

1. General knowledge of important systems of body as Gastrointestinal, Nervous, Skeletal, Urinary system.
2. General Anatomical and Medical Terms as Medial, Sagittal, axial, dorsal and ventral etc
3. Radiological Anatomy Particularly of Head and Neck and Pelvis



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4. Tumors benign and malignant. Basic concept of what is cancer and the difference between benign and cancerous lesions. Full form and basic difference between terms as FNAC, Biopsy, IHC, NGS
5. Staging of Cancers - TNM in Head and Neck, FIGO in Cervix
6. Ionizing and Non-ionizing Radiations - real life examples and basic differences
7. Definition and basics of structure of Atom and charge and weight of Electron, Proton, Neutron. The concept of electron density of material.
8. X-rays and their production - only basics.
9. Half value Layer (HVL) and various shields. Cerro bend.
10. Interaction of matter with Radiations - particularly photoelectric effect and Compton Effect.
11. Introduction and basics of mechanism of action of ionizing radiations - direct and indirect effect, free radicles etc.
12. General terms in Electrical and Electronics important for RTT - Volt, Ampere, Ohms Law, capacitance, inductance and stepper motors (used in MLC and couch). Full form of MOSFET, PNP junction transistor.
13. Radiotherapy Equipment - Telecobalt Machine, Linear Accelerator, Ct Simulator
14. Immobilization techniques - Thermoplastic cast, Vaclocs etc.
15. Special requirements before CT Simulation of patients - The bladder protocol (Partial Bladder) for patients with uterine / cervical / prostate tumors.
16. Precautions in the usage of IV contrast during CT Simulation. The anaphylactic shock and knowledge of adrenaline and hydrocortisone during the same.
17. Room lasers and fiducial in the CT Simulation
18. Beam directing, modifying devices like wedge, MLCs, Breast Cone and Blocks etc.
19. Treatment Planning System - Definitions of contouring, Planning, Plan implementation etc.
20. The CT center, the Treatment Plan Isocenter.
21. The record and verification system including patient scheduling, names of fractionation as Conventional, Hypo-fractionation & Hyper fractionation, CHART
22. Differences between 2D, 3D Radiation Therapy, IMRT, IGRT etc.
23. SAD and SSD techniques
24. Image guidance in radiation therapy - Orthogonal X rays, Cone Beam CT Scan, MV imaging, EPID
25. Image registration and online verification using CBC
26. Daily QA of a LINAC - Technologist as assistant to Medical Physicist
27. Patient Specific QA of LINAC
28. Patient motions -translational and rotational (Pitch, yaw and roll). Motion management technologies as RPM, ABC, Surface Guidance etc.
29. Brachytherapy particularly HDR brachytherapy, IR-192 source & its half-life. The Fletcher Applicator and its parts. The inverse square law in Brachytherapy.
30. QA of Brachytherapy Machine
31. Radiation Safety - Concept of TDS, TLD, OSLD, Gamma Zone Monitor, Survey Meter, Ion Chamber, RFA, Pocket Dosimeter etc. Regulatory agencies in India as AERB.

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32. Measurement and Units in Radiation - Roentgen, Gray, Sievert, Monitor Units
33. Phantoms in QA of Radiation Equipment including solid water
34. The 6MV and 15 MV photon beam, max and practical knowledge.
35. The 5 R's of Radiotherapy
36. Acute and Late side effects of Radiation particularly - Acute Skin and Mucosal Toxicity and RTOG grading. Late side effects as Xerostomia, Fibrosis and Myelopathy etc.
37. Palliative Radiation for - Single fraction and usual doses for bone metastasis, 300cGy/10Fr for various palliation as WBRT, Soft tissue mets etc. Hemibody Radiation in palliation.
38. Few standard portals as German Helmet for WBRT, portal for seminoma treatment, portal for 2D AP-PA Cancer cervix, portals for box technique for cancer cervix, tangential beams for cancer breast, the electron boost of breast tumor etc.
39. Introduction to concurrent chemotherapy using Cisplatin. Weekly and 3 weekly schedules. Requirement and normal values of Total Leucocyte Counts, Platelets, urea and creatinine values. Concurrent chemotherapy with Temozolomide for high grade brain tumor and time gap before treatment of such patients.
40. Prevention of cancer - awareness about tobacco and need to quit the same. Cancer screening for oral cancers using oral examination. Precancerous oral lesions as leukoplakia, Erythroplakia, submucosal fibrosis. Mammography and Self-Breast Examination. PAP smear. Risk factors as tobacco, pollution, obesity, alcohol etc.

**SYLLABUS FOR THE POST OF SENIOR NURSING OFFICER**

**A. General Intelligence & Reasoning (10 Marks):** It would include questions of both verbal and non-verbal type. This component may include questions on analogies, similarities and differences, space visualization, spatial orientation, problem solving, analysis, judgement, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning and figural classification, arithmetic number series, non-verbal series, coding and decoding, statement conclusion, syllogistic reasoning etc. The topics are, Semantic Analogy, Symbolic/Number Analogy, Figural Analogy, Semantic Classification, Symbolic/Number Classification, Figural Classification, Semantic Series, Number Series, Figural Series, Problem Solving, Word Building, Coding & decoding, Numerical Operations, symbolic Operations, Trends, Space Orientation, Space Visualization, Venn Diagrams, Drawing inferences, Punched hole/pattern –folding & unfolding, Figural Pattern – folding and completion, Indexing, Address matching, Date & city matching, Classification of centre codes/roll numbers, Small & Capital letters/numbers coding, decoding and classification, Embedded Figures, Critical thinking, Emotional Intelligence, Social Intelligence, Other sub-topics, if any.

**B. General Awareness (10 Marks):** Questions in this component will be aimed at testing the candidate's general awareness of the environment around him and its application to society. Questions will also be designed to test knowledge of current events and of such matters of every day observations and experience in their scientific aspect as may be expected of any educated person. The test will also include questions relating to India and its neighbouring countries especially pertaining History, Culture, Geography, Economic Scene, General Policy & Scientific Research.

**C. Quantitative Aptitude (10 Marks):** The questions will be designed to test the ability of appropriate use of numbers and number sense of the candidate. The scope of the test will be computation of whole numbers, decimals, fractions and relationships between numbers, Percentage, Ratio & Proportion, Square roots, Averages, Interest, Profit and Loss, Discount, Partnership Business, Mixture and Allegation, Time and distance, Time & Work, Basic algebraic identities of School Algebra & Elementary surds, Graphs of Linear Equations, Triangle and its various kinds of centres, Congruence and similarity of triangles, Circle and its chords, tangents, angles subtended by chords of a circle, common tangents to two or more circles, Triangle, Quadrilaterals, Regular Polygons, Circle, Right Prism, Right Circular Cone, Right Circular Cylinder, Sphere, Hemispheres, Rectangular Parallelepiped, Regular Right Pyramid with triangular or square base, Trigonometric ratio, Degree and Radian Measures, Standard Identities, Complementary angles, Heights and Distances, Histogram, Frequency polygon, Bar diagram & Pie chart

**D. English Language (10 Marks):** Spot the Error, Fill in the Blanks, Synonyms/Homonyms, Antonyms, Spellings/ Detecting Mis-spelt words, Idioms & Phrases, One word substitution, Improvement of Sentences, Active/Passive Voice of Verbs, Conversion into Direct/Indirect narration, Shuffling of Sentence parts, Shuffling of Sentences in a passage, Cloze Passage, Comprehension Passage.

**E. Subject Knowledge (80 Marks):**

**Anatomy:**

- ✓ Introduction to Anatomy
- ✓ Introduction to Anatomical terms organization of the human body
- ✓ The Skeletal System
- ✓ The Muscular System
- ✓ The Nervous System
- ✓ The Sensory Organs

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- ✓ Circulatory and lymphatic system
- ✓ The Respiratory System
- ✓ The Digestive system
- ✓ The Excretory System (Urinary)
- ✓ The Endocrine system
- ✓ The Reproductive system including breast
- ✓ The Integumentary system

**Physiology:**

- ✓ Cell Physiology
- ✓ Skeletal System
- ✓ Muscular System
- ✓ Control System - Nervous System, The Endocrine System
- ✓ Blood & Circulatory System
- ✓ The Respiratory System
- ✓ The Digestive System
- ✓ The Excretory System
- ✓ The Sensory Organs
- ✓ The Reproductive System
- ✓ Defense: Neural, Lymphatic and Immunological
- ✓ **Nutrition** - Introduction to Food & Nutrition, Carbohydrates, Fats, Proteins, Vitamins, Minerals Water & Electrolytes, Cookery rules & preservation of nutrients
- ✓ Normal Nutrition/ Balanced diet Therapeutic
- ✓ Nutrition

**Biochemistry:**

- ✓ Introduction
- ✓ Structure and functions of Cell membrane
- ✓ Composition and metabolism of carbohydrates
- ✓ Composition and metabolism of Lipids
- ✓ Composition and metabolism of Amino acids and proteins
- ✓ Composition of Vitamins and Minerals
- ✓ Immunochemistry

**Nursing Foundations:**

- ✓ Health and Wellness
- ✓ Nursing as a Profession
- ✓ Hospital Admission and Discharge
  
- ✓ Communication and Nurse Patient Relationship
- ✓ The Nursing Process
- ✓ Documentation and Reporting
- ✓ Vital Signs -
  - Introduction

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- Body temperature
- Pulse
- Respiration
- Blood pressure
- Recording of vital signs
- ✓ Health Assessment
- ✓ Machinery, Equipment and Linen in Patient Care Meeting Needs of Hospitalized Patient
  - Patient safety
  - Hygiene
  - Comfort.
  - Sleep and rest
  - Nutrition
  - Urinary elimination
  - Bowel elimination
  - Mobility and exercise
  - Oxygenation
  - Fluid, electrolyte and acid base balances
  - Skin integrity
  - Psychosocial needs
- ✓ Infection Control in Clinical Settings
- ✓ Administration of Medications
- ✓ Meeting Needs of Perioperative Patients
- ✓ Care of terminally ill patient
- ✓ Theoretical Foundations of Nursing Practice
- ✓ Concept and Principles of First Aid
- ✓ First aid in emergencies
- ✓ Palliative Care & Geriatrics Care

**Psychology:**

- ✓ Introduction
- ✓ Biology of behavior
- ✓ Cognitive Processes
- ✓ Motivation and Emotional processes
- ✓ Personality
- ✓ Psychological assessment & tests
- ✓ Psychological assessment & tests
- ✓ Mental hygiene and mental Health

**Microbiology:**

- ✓ Introduction & Historical background
- ✓ Definitions-Medical Microbiology, which includes the branches, Bacteriology, Virology, Mycology, Parasitology and Immunology. Infection, Pathogen, Commensal,

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Symbiosis, Host, Vector, Contagious Disease, Infectious disease, Epidemic, Endemic, Pandemic & Zoonosis, Flora of the human body.

- ✓ Source, Mode of infection, route of infection and spread, Endogenous and exogenous infection, reservoir of infection
- ✓ Infection Control-
  - Sterilization and Disinfection
  - Chemotherapy
  - Waste Disposal
  - General characteristics of Bacteria-
  - Morphology of Bacteria
  - Physiology of Bacteria
  - Identification of Bacteria
  - Bacterial Genetics
  - Normal Flora
- ✓ Systemic Bacteriology
- ✓ Parasitology
- ✓ Mycology
- ✓ Virology
- ✓ Immunology
- ✓ Applied Microbiology

#### **Pharmacology:**

- ✓ Introduction to pharmacology
- ✓ Chemotherapy
- ✓ Pharmacology of common used antiseptics, disinfectant and insecticides
- ✓ Drugs acting on G.I system
- ✓ Drugs used on respiratory systems
- ✓ Drugs used on urinary system
- ✓ Miscellaneous-
  - ✓ Drugs used on skin and mucous membranes
  - ✓ Drugs acting on nervous system
  - ✓ Cardiovascular drugs
  - ✓ Drugs used for hormonal, disorders and supplementation, contraception
  - ✓ And medical termination of pregnancy
  - ✓ Introduction to drugs used in alternative systems of medicine

#### **Pathology:**

- ✓ Introduction
- ✓ Cellular growth, Neoplasms
- ✓ Special pathology - Respiratory tract, Cardio-vascular system, Blood Disorders, Gastro Intestinal Tract, Liver, Gall bladder & pancreas, Kidneys & Urinary tract, Male genital systems, Female genital system, Cancer Breast, Central Nervous system, Metastatic tumour, Skeletal system

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- ✓ Clinical pathology - Various blood and bone marrow tests in assessment and monitoring of disease conditions
- ✓ Examination of body cavity fluids, transudates and exudates Urine and faeces.

**Genetics:**

- ✓ Introduction
- ✓ Maternal, prenatal and genetics
- ✓ Genetic testing in the neonates and children
- ✓ Genetic conditions of adolescents and adults
- ✓ Services related to Genetics

**Medical - Surgical Nursing- I:**

- ✓ Introduction
- ✓ Common signs, symptoms, and management
- ✓ Nursing management of patients with respiratory problems
- ✓ Nursing management of patients with disorders of digestive system
- ✓ Nursing management of patients with cardiovascular problems
- ✓ Nursing management of patients with haematologic problems
- ✓ Nursing management of patients with genito-urinary problems-
  - Urological obstructions
  - Disorders of Kidney
  - Disorders of ureter, urinary bladder and urethra
- ✓ Nursing management of disorders of male reproductive system
- ✓ Nursing Management of patient with disorders of endocrine system-
  - Disorders of Thyroid
  - Disorders of Parathyroid
  - Disorders of Pituitary gland
  - Disorders of adrenal gland
- ✓ Nursing management of patient with disorders of Integumentary system
- ✓ Nursing management of patient with musculoskeletal problems - Disorders of musculoskeletal System
- ✓ Nursing management of patient with Immunological problems
- ✓ Peri operative nursing

**Community Health Nursing-I:**

- ✓ Introduction
- ✓ Determinants of health
- ✓ Epidemiology
- ✓ Epidemiology and nursing management of common
- ✓ Communicable disease - Respiratory infections,
- ✓ Intestinal Infections, Arthropod infections, Viral, Bacterial, Rickettsial diseases, Parasitic zoonoses,
- ✓ Surface infection.
- ✓ Epidemiology and Nursing management of Non-communicable diseases

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- ✓ Demography
- ✓ Population and its control

**Sociology:**

- ✓ Introduction
- ✓ Individual & society
- ✓ Culture
- ✓ Social groups and processes
- ✓ Population
- ✓ Family and marriage
- ✓ Social stratification
- ✓ Types of communities in India - (Rural, urban and regional)
- ✓ Social change
- ✓ Social organization and social system
- ✓ Social control
- ✓ Social problems

**Medical Surgical Nursing-II:**

- ✓ Nursing management of patient with disorders of ear, nose and throat - Disorders of External ear, Disorders of Middle ear, Disorders of Inner ear, Disorders of Nose, Disorders of Throat
- ✓ Nursing management of patient with disorders of eye
- ✓ Nursing management of patient with neurological disorders - Disorders of Spine & Spinal Cord, Disorders of Brain, Infections, Movement disorder,
- ✓ Myasthenia gravis,
- ✓ Nursing Management of Patient with burns, reconstructive and cosmetic surgery
- ✓ Nursing Management of Patients with oncological conditions
- ✓ Nursing management of patient in emergency and disaster situations - Disaster Management, Emergency Nursing
- ✓ Nursing management of patient in critical care units - Nursing assessment, Organization, Special equipments
- ✓ Nursing care of the elderly- Nursing assessment,
- ✓ Demography

**Child Health Nursing:**

- ✓ Integrated management of neonatal and childhood management
- ✓ Nursing management in common childhood diseases
  - Management of behavior and social problems in children, cardiovascular system, Digestive system, Genitourinary urinary system, Endocrine system,
- ✓ Haematological condition, Genetic Disorders, Nutritional deficiency diseases, inborn error of metabolism
- ✓ Management of behavior and social problems in children

**Mental Health Nursing:**



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- ✓ Introduction
- ✓ Principles & concept of Mental Health Nursing
- ✓ Assessment of mental health status
- ✓ All India Institute of Medical Sciences, Jodhpur Examination Cell
- ✓ Therapeutic communication & nurse relationship
- ✓ Treatment modalities & therapies used in mental disorders
- ✓ Nursing management of patient with schizophrenia, & other psychotic disorders
- ✓ Nursing management of patient with mood disorders Nursing management of patient with neurotic, stress related & somatoform disorders
- ✓ Nursing management of patient with substance use disorders
- ✓ Nursing management of patient with personality, sexual & eating disorders
- ✓ Nursing management of childhood & adolescent disorders including mental deficiency
- ✓ Nursing management of organic brain disorders
- ✓ Psychiatric emergencies & crisis intervention
- ✓ Legal issues in mental health nursing
- ✓ Community mental health nursing

**Obstetrical & Gynecological Nursing including Midwifery:**

- ✓ Introduction to midwifery and obstetrical nursing
- ✓ Review of anatomy and physiology of female reproductive system and fetal development
- ✓ Assessment and management of pregnancy in antenatal period
- ✓ Assessment and management of intra-natal period
- ✓ Assessment and management of women during postnatal period
- ✓ Assessment and management of normal neonates
- ✓ Assessment and management of high-risk pregnancy
- ✓ Assessment and management of abnormal labour
- ✓ Abnormalities during post-natal period
- ✓ Assessment and management of high-risk newborn
- ✓ Pharmaco-therapeutics in Obstetrics
- ✓ Family welfare Programme
- ✓ Nursing Management of Patient with Disorders of female reproductive system (Gynecological disorders)

**Communication & Educational Technology:**

- ✓ Review of communication Process
- ✓ Interpersonal relations
- ✓ Human relations
- ✓ Guidance & counselling
- ✓ Principles & philosophies of Education
- ✓ Teaching-Learning Process
- ✓ Methods of teaching
- ✓ Educational media, Audio Visual Aids

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- ✓ Assessment & Evaluation
- ✓ Information, Education & communication for health (EC)

### **Community Health Nursing - II:**

Introduction

Health Planning and Policies and problems

Delivery of community health services

Community health nursing approaches, concepts and roles and responsibilities of nursing personnel Assisting individuals and groups to promote and maintain their health

National health and family welfare programmes and the role of a nurse

### **Nursing Research:**

- ✓ Research and research process
- ✓ Research problem/ question
- ✓ Review of literature
- ✓ Research approaches and designs
- ✓ Population, Sample and Sampling
- ✓ Data collection methods and tools
- ✓ Analysis of data
- ✓ Communication and utilization of research

### **Statistics:**

- ✓ Introduction to statistics - Definition, use of statistics, scales of measurement. Frequency of distribution and graphical presentation or data
- ✓ Measures of central tendency - Mean, median, mode, Measures of Variability: Standard deviation, Coefficient of correlation, Normal probability.
- ✓ Tests of significance - t' test, chi square, Statistical packages and its application - SPSS

### **Nursing Management:**

- ✓ Introduction to management & Administration i nursing ward management
- ✓ Management Process - Planning, Organization, Human resource management, Directing. Controlling, Budgeting, Material management
- ✓ Management of nursing services in the Hospital and Community - Nursing Management, Nursing Management, Organization, Human resource management, Directing and leading, Controlling/ Evaluation, Budgeting, Material Management Organizational behaviour and human relations Management of nursing educational institutions
- ✓ Regulatory Bodies, Legal and Ethical Issues

## SYLLABUS FOR THE POST OF TECHNICAL OFFICER (OPHTHAL) (REFRACTIONIST)

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Subject Knowledge (100 Marks):

**ANATOMY AND PHYSIOLOGY**

- **Basic Human Anatomy:** 1. Cell and various tissues of the body. 2. Skeletal system of human body. 3. Muscular system. 4. Embryology and development (including Embryology of the eye).
- **Basic Human Physiology:** 1. Cardio-vascular system. 2. Digestive system. 3. Respiratory system. 4. Endocrine organs. 5. Excretory system. 6. Reproductive system. 7. Central nervous system. 8. Peripheral nervous system. 9. Autonomic nervous system. 10. Organs of taste, smell and hearing.
- **Ocular Anatomy:** 1. Orbit & its immediate relations. 2. Lids & their glands. 3. Conjunctiva, Cornea, Sclera and Limbus. 4. Iris & Ciliary body. 5. Lens and Vitreous. 6. Retina & Choroid. 7. Ocular muscles. 8. Visual pathways. 9. Lacrimal apparatus. 10. Higher visual centres.
- **Ocular Physiology:** 1. An introduction to general physiology of the eye. 2. Maintenance of transparency of the cornea. 3. Maintenance of transparency of the lens. 4. Visual acuity & form sense. 5. Pupillary reflexes. 6. Accommodation. 7. Convergence. 8. Intra-ocular pressure. 9. Night vision. 10. Colour vision. 11. Visual fields. 12. Extrinsic muscles, actions and ocular movements. 13. Higher visual centres and righting reflexes. 14. Electro-physiological aspects (ERG, EOG & VER). 15. Functions of lacrimal apparatus and tears.

**OCULAR PATHOLOGY, MICROBIOLOGY AND BIOCHEMISTRY**

- **Ocular Pathology:** 1. Blood sample collection and preservation. 2. Routine Haematological examinations: Hb, BT, CT, TLC, DLC and ESR. 3. Peripheral Blood Film (PBF)- staining & its significance. 4. Urine sample collection methods. 5. Urine: Physical, Chemical & Microscopic examination. 6. Grossing of tissue. 7. Tissue processing. 8. Fixation of tissue. 9. Section cutting. 10. Staining: Haematoxylin, Eosin & Special stains.
- **Ocular Microbiology:** 1. Introduction to Microbiology & classification. 2. Normal flora of eye. 3. Sterilization /Aseptic techniques. 4. Culture media for Bacteria, fungi & Virus. 5. Bacteria: Gram positive & negative. 6. Fungi: Saprophytic and Pathogenic. 7. Virus. 8. Chlamydia & parasites. 9. Microbial diseases of the eye. 10. Staining procedures: Gram & KOH.
- **Ocular Bio-chemistry:** 1. Introduction to basic Biochemistry (carbohydrates, lipids, proteins and vitamins). 2. Tear film. 3. Metabolism of cornea and lens. 4. Aqueous & Vitreous. 5. Rhodopsin cycle.

**BASIC ORTHOPTICS**

- **Basic Orthoptics:** 1. General introduction. 2. Binocular vision & Space perception (Fusion, Diplopia, Correspondence, Stereopsis, Panum's area, Fixation disparity, Horopter, BSV, Retinal rivalry, Physiological diplopia, Stereopsis & monocular clues, Egocentric localization, Theories of Binocular vision). 3. Extra-ocular muscles Anatomy and Physiology. 4. Laws of ocular motility. 5. Uni-ocular & Binocular movements (Version & Vergence, Fixation & field of fixation). 6. Near vision complex (Accommodation, Convergence & Pupillary constriction). 7. Confusion & Diplopia. 8. Suppression. 9. Stereopsis. 10. Asthenopia & Diplopia. 11. Visual acuity assessment in children. 12. Cover, cover-uncover & alternate cover tests. 13. Heterophoria: Classification, examination & management. 14. Orthoptic instruments: Near point ruler, Prism-Bar, Maddox-rod, Maddox-wing, Synoptophore.

**OPTICS & REFRACTION**

- **Physical & Visual Optics:** 1. Elementary basis of light (Interference, Diffraction, Scattering, Dispersion, Polarization & Spectrum). 2. Illumination & Photometry. 3. Laws of reflection. 4. Principles of refraction. • Refraction by Glass plate with parallel sides. • Refraction by Prisms (including nomenclature of prisms). • Refraction at Curved surfaces (Convex, Concave, Cylindrical & Sphero-cylindrical/Sturm's conoid). • Refraction by Optical systems (Combination of lenses, Compound homocentric system & Thick lenses). 5. Power specification (Refractive, Approximate, Back Vertex, Front Vertex, Equivalent & Effective Power). 6. Power

1/5/2023 measurement (Hand neutralization, lensometry & Lens surface power measurement/ Geneva lens measure). 7. Optical system of eye (Corneal & Lenticular system). 8. Catoptric images (Principle and utility of Purkinje's image in keratometry and pachymetry). 9. Schematic & Reduced eye. 10. Physiological optical defects of eye. 11. Correction of Ammetropia: Myopia, Hypermetropia and Astigmatism (Spectacle magnification & Relative spectacle magnification). 12. Anisometropia and Aniseikonia. 13. Optics of Retinoscopy & Ophthalmoscopy.

- **Dispensing Optics:** 1. Ophthalmic lens materials and their characteristics. 2. Ophthalmic Prisms & Decentration (Prentice's rule). 3. Manufacturing of various types of spectacle lenses (Glass). 4. Manufacturing of various types of spectacle lenses (Plastic). 5. Aberrations & Ophthalmic lens design. 6. Transpositions – Simple and Toric. 7. Absorptive lenses & Lens coatings. 8. Bifocals & Trifocals. 9. Multi-focal lenses/ Progressive addition lenses (PALs). 10. Lenses for High refractive errors. 11. Spectacle frame materials & their characteristics. 12. Spectacle frame types & its parts. 13. Measurement for ordering spectacle, I.P.D. (Distance & near), Marking/centration, V.D. Calculation. 14. Frame selection: Cosmetic & fitting considerations. 15. Spectacle frames fitting, alignment & adjustment. 16. Special purpose spectacles.

### OCULAR PHARMACOLOGY

1. Ocular Pharmacology: 1. Ocular Pharmacology: an introduction. 2. Autonomic nervous system. 3. Routes of drug administration. 4. Miotics, Mydriatics & Cycloplegics. 5. Anti-bacterial drugs & therapy. 6. Anti-fungal drugs & therapy. 7. Anti-viral drugs & therapy. 8. Anti-inflammatory drugs & therapy. 9. Anti-glaucoma drugs & therapy. 10. Ocular Preservatives. 11. Ocular Lubricants. 12. Local Anaesthetics. 13. Ocular dyes. 14. Ocular Antiseptics & Disinfectants. 15. Anti-Vascular Endothelial Growth Factor (Anti-VEGF) drugs. 16. Contact lens solutions.

### CLINICAL REFRACTION & CONTACT LENSES

- **Clinical Refraction:** 1. Myopia 2. Hypermetropia 3. Astigmatism 4. Aphakia & Pseudophakia 5. Presbyopia 6. Keratoconus 7. Anisometropia and Aniseikonia 8. Accommodation and convergence. 9. Refraction room & test chart standards. 10. Retinoscopy (Principle & Method)- Static and Dynamic 11. Objective methods of refraction (Ophthalmoscopy, Auto-refraction & Keratometry). 12. Monocular subjective refraction methods. 13. Binocular subjective refraction methods. 14. Near correction methods. 15. Recent refraction methods: Phorometry. 16. Prescription of glasses.
- **Contact Lenses:** 1. Historical development of Contact lenses. 2. CL material & manufacturing of soft & RGP. 3. Optics of CL. 4. Design of CL & effect of parameter changes in the fitting. 5. Verification & Modification of CL. 6. Review of Anatomy & Physiology of anterior segment. 7. Cornea & CL wear. 8. Routine pre-fitting examinations. 9. Slit Lamp Techniques. 10. Fitting philosophies of Soft & RGP CL. 11. Care & Maintenance.

### CLINICAL ORTHOPTICS

- **Clinical Orthoptics:** 1. General introduction. 2. Binocular vision & Space perception (Fusion, Diplopia, Correspondence, Stereopsis, Panum's area, Fixation disparity, Horopter, BSV, Retinal rivalry, Physiological diplopia, Stereopsis & monocular clues, Egocentric localization, Theories of Binocular vision). 3. Extra-ocular muscles Anatomy and Physiology. 4. Laws of ocular motility. 5. Uni-ocular & Binocular movements (Version & Vergence, Fixation & field of fixation). 6. Near vision complex (Accommodation, Convergence & Pupillary constriction). 7. Confusion & Diplopia. 8. Suppression. 9. Stereopsis. 10. Asthenopia & Diplopia. 11. Visual acuity assessment in children. 12. Cover, cover-uncover & alternate cover tests. 13. Heterophoria: Classification, examination & management. 14. Amblyopia: Definition, types,

1/5/2023 examination & management. 15. Anomalous retinal correspondence (ARC): types & examination. 16. Pseudotropia & measurement of angle kappa. 17. Measurement of ocular deviation: Objective & subjective methods. 18. Exotropia: Classification, examination & management. 19. Esotropia: Classification, examination & management. 20. Alphabet Phenomena/ Pattern. 21. Cyclo-vertical deviations: Classification, examination & management. 22. Orthoptic instruments.

### **BASIC INVESTIGATIVE OPTOMETRY:**

- **Basic Investigative Optometry:** 1. Syringing and lacrimal function tests. 2. Ophthalmoscopy: Direct & Indirect. 3. Tonometry: Schiottz, Applanation & Non-contact. 4. Colour vision testing. 5. Contrast sensitivity. 6. Glare testing. 7. Perimetry: Goldmann, Humphrey & FDT. 8. Pachymetry: Optical & Ultrasonic. 9. Keratometry. 10. Auto-refraction. 11. Lensometry. 12. Exophthalmometry. 13. Specular microscopy. 14. Fluorescein staining techniques. 15. Slit lamp Biomicroscopy.

### **COMMUNITY OPTOMETRY AND EYE BANKING**

- **Community Optometry:** 1. Concepts of community Optometry. 2. Epidemiology of Blindness (General Principles). 3. Epidemiology of Blindness (Disease specific strategies). 4. Survey methodology. 5. Screening procedures in Optometry. 6. School Eye screening programme. 7. Primary eye care. 8. Organization of Out-reach services. 9. Organization of Reach-in programmes. 10. Rehabilitation of the visually impaired. 11. National programme for the control of Blindness (NPCB). 12. Vision 2020: The right to sight.
- **Eye Banking:** 1. Publicity. 2. How to donate your eyes. 3. Collection of donor eyes. 4. Preservation of eyes. 5. General concepts about corneal transplantation.

### **ADVANCED CONTACT LENSES AND LOW VISION**

- **Advanced Contact lenses:** 1. Historical development of Contact lenses. 2. CL material & manufacturing of soft & RGP. 3. Optics of CL. 4. Design of CL & effect of parameter changes in the fitting. 5. Verification & Modification of CL. 6. Review of Anatomy & Physiology of anterior segment. 7. Cornea & CL wear. 8. Routine pre-fitting examinations. 9. Slit Lamp Techniques. 10. Fitting philosophies of Soft & RGP CL. 11. Care & maintenance. 12. CL fitting in astigmatism. 13. CL fitting in Keratoconus. 14. Bifocal & Multifocal CL. 15. CL in aphakia. 16. Paediatric CL fitting. 17. Disposable CL & Frequent Replacement Program. 18. Cosmetic & Prosthetic CL. 19. Therapeutic CL. 20. CL fitting in Post-refractive surgery cases. 21. CL for sports vision. 22. Scleral lens fitting. 23. Ortho-Keratology (Ortho-K). 24. Complications of soft CL & their management. 25. Complications of RGP CL & their management. 26. Diagnosis & management of Dry eye in CL wear. 27. Review of contact lenses available in INDIA.
- **Low Vision:** 1. Low vision: definition & psychosocial implications. 2. Classification & Management of functional visual deficit: Cloudy media, Central field deficit & Peripheral field deficit. 3. Low vision examination 4. Specialized testing in low vision. 5. Magnification associated with low vision devices. 6. Low vision devices (Distance). 7. Low vision devices (Near). 8. Low vision devices (Non-optical). 9. Rehabilitation of low vision patient.

### **ADVANCED OPTICS AND ORTHOPTICS**

- **Advanced Optics:** 1. Physiological optical defects of eye. 2. Correction of Ammetropia: Myopia, Hypermetropia and Astigmatism (Spectacle magnification & Relative spectacle magnification). 3. Anisometropia and Aniseikonia. 4. Optics of Retinoscopy & Ophthalmoscopy. 5. Aberrations & Ophthalmic lens design. 6. Absorptive lenses & Lens coatings. 7. Bifocals & Trifocals. 8. Multi-focal lenses/ Progressive addition lenses (PALs). 9. Lenses for High refractive errors. 10. Special purpose spectacles.

- 1/5/2023 • **Advanced Orthoptics:** 1. General introduction. 2. Binocular vision & Space perception (Fusion, Diplopia, Correspondence, Stereopsis, Pannum's area, Fixation disparity, Horopter, BSV, Retinal rivalry, Physiological diplopia, Stereopsis & monocular clues, Egocentric localization, Theories of Binocular vision). 3. Extra-ocular muscles Anatomy and Physiology. 4. Laws of ocular motility. 5. Uni-ocular & Binocular movements (Version & Vergence, Fixation & field of fixation). 6. Near vision complex (Accommodation, Convergence & Pupillary constriction). 7. Confusion & Diplopia. 8. Suppression. 9. Stereopsis. 10. Asthenopia & Diplopia. 11. Visual acuity assessment in children. 12. Cover, cover-uncover & alternate cover tests. 13. Heterophoria: Classification, examination & management. 14. Amblyopia: Definition, types, examination & management. 15. Anomalous retinal correspondence (ARC): types & examination. 16. Pseudotropia & measurement of angle kappa. 17. Measurement of ocular deviation: Objective & subjective methods. 18. Exotropia: Classification, examination & management. 19. Esotropia: Classification, examination & management. 20. Alphabet Phenomena/ Pattern. 21. Cyclo-vertical deviations: Classification, examination & management. 22. Orthoptic instruments. 23. Neurogenic palsies (acquired & congenital). 24. Myogenic palsies (Myasthenia gravis, Chronic progressive external Ophthalmoplegia & Orbital pseudotumour). 25. Mechanical disorders of ocular motility (Duane's retraction syndrome, Brown's syndrome, Strabismus fixus & Adherence syndrome). 26. Nystagmus: Classification, examination & management. 27. Principles of non-surgical treatment.

### **CLINICAL INVESTIGATIVE OPTOMETRY**

**Clinical Investigative Optometry:** 1. Syringing and lacrimal function tests. 2. Ophthalmoscopy: Direct & Indirect. 3. Tonometry: Schiottz, Applanation & Non-contact. 4. Colour vision testing. 5. Contrast sensitivity. 6. Glare testing. 7. Perimetry: Goldmann, Humphrey & FDT. 8. Pachymetry: Optical & Ultrasonic. 9. Keratometry. 10. Auto-refraction. 11. Lensometry. 12. Exophthalmometry. 13. Specular microscopy. 14. Fluorescein staining techniques. 15. Slit lamp Biomicroscopy. 16. Gonioscopy. 17. Corneal Topography. 18. Ultrasonography. 19. Fluorescein angiography. 20. ERG, EOG & VER. 21. Dark adaptometry. 22. Ocular Photography (Anterior segment). 23. Laser-interferometry/ PAM (Potential Acuity Meter) 24. Refractive surgery (RK, PRK, Excimer laser & Lasik). 25. Paediatric eye examination. 26. Recent advances.

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RECT/6/2023-RECU SEC  
SYLLABUS FOR THE POST OF TECHNICAL OFFICER (TECHNICAL SUPERVISOR) FOR  
MEDICAL LAB TECHNOLOGY

1/5/2023

**A. General Intelligence & Reasoning (5 Marks):**

It would include questions of both verbal and non-verbal type. This component may include questions on analogies, similarities and differences, space visualization, spatial orientation, problem solving, analysis, judgement, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning and figural classification, arithmetic number series, non-verbal series, coding and decoding, statement conclusion, syllogistic reasoning etc. The topics are, Semantic Analogy, Symbolic/Number Analogy, Figural Analogy, Semantic Classification, Symbolic/Number Classification, Figural Classification, Semantic Series, Number Series, Figural Series, Problem Solving, Word Building, Coding & decoding, Numerical Operations, symbolic Operations, Trends, Space Orientation, Space Visualization, Venn Diagrams, Drawing inferences, Punched hole/pattern –folding & unfolding, Figural Pattern – folding and completion, Indexing, Address matching, Date & city matching, Classification of centre codes/roll numbers, Small & Capital letters/numbers coding, decoding and classification, Embedded Figures, Critical thinking, Emotional Intelligence, Social Intelligence, Other sub-topics, if any.

**B. General Awareness (5 Marks):**

Questions in this component will be aimed at testing the candidate's general awareness of the environment around him and its application to society. Questions will also be designed to test knowledge of current events and of such matters of every day observations and experience in their scientific aspect as may be expected of any educated person. The test will also include questions relating to India and its neighbouring countries especially pertaining History, Culture, Geography, Economic Scene, General Policy & Scientific Research.

**C. Quantitative Aptitude (5 Marks):**

The questions will be designed to test the ability of appropriate use of numbers and number sense of the candidate. The scope of the test will be computation of whole numbers, decimals, fractions and relationships between numbers, Percentage. Ratio & Proportion, Square roots, Averages, Interest, Profit and Loss, Discount, Partnership Business, Mixture and Allegation, Time and distance, Time & Work, Basic algebraic identities of School Algebra & Elementary surds, Graphs of Linear Equations, Triangle and its various kinds of centres, Congruence and similarity of triangles, Circle and its chords, tangents, angles subtended by chords of a circle, common tangents to two or more circles, Triangle, Quadrilaterals, Regular Polygons, Circle, Right Prism, Right Circular Cone, Right Circular Cylinder, Sphere, Hemispheres, Rectangular Parallelepiped, Regular Right Pyramid with triangular or square base, Trigonometric ratio, Degree and Radian Measures, Standard Identities, Complementary angles, Heights and Distances, Histogram, Frequency polygon, Bar diagram & Pie chart.

**D. English Language (5 Marks):**

Candidates' understanding of the Basics of English Language, its vocabulary, grammar, sentence structure, synonyms, antonyms and its correct usage, etc. his/her writing ability would be tested.

**E. Subject Knowledge (80 Marks):**

**Biochemistry –**

- Cleaning and care of general laboratory glass ware and equipment. Types of pipettes, calibration of pipettes.
- Distilled water. Method of preparation and storage of distilled water. Type of water distillation plants.

1/5/2023

- Preparation of solutions – units of weights and volume, Calculation of concentration and methods of expressing concentration of solution.
- Units of Measurement - S.I unit and CGS units. Normality, Molarity, Molality
- Calibration of volumetric apparatus
- Principle, working and maintenance of Analytical balance
- Quality control and quality assurance in a clinical biochemistry laboratory
- Laboratory organization, management and maintenance of records
- Principles of assay procedures, Normal range in blood, Serum, Plasma and Urine and reference values.
- pH – Definition, Henderson Hasselbach equation, Pka value, pH indicator, Methods of measurement of pH, pH paper, pH meter, Principle, working, maintenance and calibration of pH meter
- Volumetric analysis- Normal and molar solutions, Standard solutions, Preparation of reagents, Storage of chemicals
- Working principles Types and applications of Electrophoresis – Paper, Agarose Gel, Cellulose Acetate and PAGE.
- Working principles, types and applications of Chromatography - Paper Chromatography, TLC, Ion Exchange, Affinity Gel, Filtration, Gas Chromatography and HPLC.
- Working principles, types and application of centrifugation
- Working Principles and application of photometry, and atomic absorption, Spectrophotometry and colorimetry.
- Definition, basic concepts of classification mechanism of action and properties of enzymes, factors influencing enzyme action
- Basic and elementary concepts of chemistry and properties of carbohydrates as applicable to the human body. (Classification, Digestion and Absorption, Metabolism, Disorders of metabolism)
- Overview of metabolism of carbohydrates – Methods for determining glucose, ketones, lactate, pyruvate reducing sugars and mucopolysaccharides and their clinical significance. Biochemistry, types, criteria parameters in diagnosis and prognosis of Diabetes mellitus.
- Basic and elementary concepts of chemistry and properties of lipids as applicable to the human body. (Classification, Digestion and Absorption, Metabolism, Disorders of metabolism)
- Overview of lipid. Importance of lipids in the body in body basic metabolic aspects and analytical importance. Disorders of lipid metabolism. Lipoproteins patterns in disease – analytical methods and procedures applicable to detecting and monitoring such disorders.
- Basic and elementary concepts of chemistry and properties of proteins & amino acids as applicable to the human body. (Classification, Digestion and Absorption, Metabolism, Disorders of metabolism)
- Overview of metabolism of amino acids and proteins – current methodologists for their determination and identification in biological specimens – disease associated with alternation in or deficiencies of amino acids and proteins.
- Basic and elementary concepts of chemistry and properties of nucleic Acids as applicable to the human body.
- Basic concepts of principles of nutrition and nutrients macro and micro nutrients. Vitamins & Minerals. Vitamins- Fat soluble vitamins , Water soluble vitamins sources, Biochemical role, RDA, deficiency manifestations Minerals – Calcium, Phosphorous, Iron, Copper, Zinc, Magnesium, Manganese, Iodine.
- Analytical methods and recommendations for testing and assessing nutritional deficiency – Methods for assessing concentration of vitamins in biological samples.
- General requirements for laboratory assessment of trace elements including specimen collection, handling, selection of analytical methodology and establishing quality.



1/5/2023

- Overview of Biochemical roles of major electrolytes and blood gases and their changes in pathological states – relationship between major electrolytes and acid base balance – application of physical and chemical principles to biological system – laboratory measurements of electrolytes and blood gases. Acid base balance disorders
- Overview of current concepts in endocrinology RIA, ELISA, chemiluminescence assay procedure for hormones – physiological effects produced by normal and abnormal levels of various hormones. Thyroid function test and Adrenal function test.
- Introduction to molecular Biology. Recombinant DNA technology, Role of recombinant DNA technology as diagnostic tool. Polymerase chain reaction.
- Overview of porphyrins, their precursors, primary and secondary disorders of porphyrin metabolism – diagnostic laboratory methodologies including appropriate specimen collection and preservation techniques related to porphyrins
- Laboratory tests and analytical methods used in identification and evaluation of hepatobiliary disorders, renal disorders and disorders of Stomach, pancreas and intestinal tract
- Overview of calcium and inorganic phosphate metabolism current laboratory analytical

### **Microbiology –**

- History of Medical Microbiology - Host-Microbe relationship.
- Safety Measures in clinical microbiology
- Cleaning, care and handling of glassware
- Care and maintenance of Equipment in Microbiology.
- Microscopy: Principle, types and uses of microscope
- Sterilization and Disinfection - Definition, Types, principles, mode of action and methods. Qualities of a good disinfectant. Assay for various disinfectants .
- Biomedical waste management in a lab
- General characteristics & classification of Microbes : Classification of microbes. Morphological classification of bacteria, Bacterial anatomy (Bacterial cell structures)
- Growth and nutrition of bacteria, Culture media and culture methods-aerobic and anaerobic
- Quality control and safety in microbiology.
- Handling and care of laboratory animals.
- Antimicrobial agents, Antimicrobial susceptibility tests.
- Stains used in bacteriology Principle, procedures, significance and interpretation - Simple staining, Gram stain, Ziehl –Neelsen staining, Albert’s stain, Capsule staining.
- Principle, procedures and interpretation of the biochemical tests for identification of different bacteria.
- Immunity – innate and acquired immunity, humoral and cell mediated.
- Antigen antibody reactions and their applications
- Complement
- Hypersensitivity
- Vaccines
- Gram positive & Gram negative cocci – Staphylococci, Streptococci, Enterococci, Pneumococci, Neisseria
- Gram positive bacilli – Corynebacterium, Mycobacterium, Actinomyces, Listeria, Bacillus, Clostridia
- Gram negative bacilli – Enterobacteriaceae, Pseudomonas, Vibrio, Aeromonas, Plesiomonas, Campylobacter, Bacteroides, Fusobacterium, Brucella, Haemophilus, Bordetella. Pasteurella, Francisella
- Spirochaetes, Chlamydia, Rickettsia, Mycoplasma, L forms
- General properties of viruses – Structure, classification and replication.

- 1/5/2023
- Laboratory diagnosis of virus
  - DNA virus –Adenovirus, Papova virus, Herpes virus, Varicella zoster virus, Cytomegalo virus, Hepatitis B virus
  - RNA virus – Polio virus, Influenza virus, Para influenza virus, Mumps virus, Measles virus, Rubella virus, Respiratory syncytial virus, Rhinovirus, Rotavirus, Hepatitis virus, Arbo viruses prevalent in India (Dengue, West Nile, Japanese Encephalitis, KFD), HIV, Rabies virus, SARS virus.
  - Bacteriophage
  - Introduction to Parasitology –Common definitions, Types and Classification of parasites.
  - Collection transport and preservation of specimens for parasitological examination
  - Protozoa: Entamoeba Trichomonas, Trypanosomes, Leishmania, Giardia, Plasmodium, Isospora, Balantidium, and Toxoplasma.
  - Cestodes - Diphyllbothrium, Taenia, Echinococcus, Hymenolepis.
  - Trematodes - Schistosoma, Fasciola, Fasciolopsis, Clonorchis, Paragonimus
  - Intestinal Nematodes - Ascaris, Ancylostoma, Necator, Strongyloides, Trichinella Enterobius, Trichuris
  - Tissue Nematodes - Wucherei, Brugia, Loa loa, Onchocerca, Dracunculus
  - Collection and preservation of specimens for parasitological examination, preservation of specimens of parasitic eggs and embryos, Preserving Fluids, Transport of specimens.
  - Morphology and classification of fungus
  - Laboratory diagnosis of fungus- Culture media used in mycology, Direct microscopy in Medical mycology laboratory, Processing of clinical samples for diagnosis of fungal infections i.e. Skin, nail, hair, pus, sputum, CSF and other body fluids.
  - Superficial fungal infections
  - Subcutaneous fungal infections
  - Deep fungal infections
  - Opportunistic fungal infections
  - Techniques used for isolation and identification of medically important fungi
  - Methods for identification of yeasts and moulds
  - Preservation of fungal cultures

### **Pathology –**

- General-Haematology: Origin, development, morphology, maturation, function and fate of blood cells, nomenclature of blood cells.
- Various methods of blood collection, anticoagulants-mechanism and uses.
- Basic concepts of automation in haematology
- Counting chamber- hemocytometry. Enumeration of RBC including various counting chambers, diluting fluids for RBC count.
- Haemoglobinometry. Principles and methods of quantitating Hb. Concentration of blood including knowledge of errors and quality control in various method. Abnormal hemoglobin and its investigation.
- ESR: introduction, factors affecting ESR, principles and methods of determining ESR, increasing and decreasing conditions of ESR.
- WBC: introduction, development of WBC, diluting fluids. Absolute eosinophil count, errors in sampling, mixing, diluting and counting.
- Cell counting, advantages and disadvantages, uses and mechanism of cell counting, quality control in cell counts.
- Preparation of peripheral smear and bone marrow smear. Thin smear, thick smear. Buffy coat smear, wet preparation. Romanowsky stain. Preparation advantages and disadvantages.
- Principle and methods of staining of Blood smears and bone marrow smears. Supravital stain. Reticulocyte count. Heinz bodies.

- 1/5/2023- Description of morphology of normal and abnormal red cells. Blood differential WBC counting. Recognition of abnormal cell. Anaemia – definition etiology classification and laboratory diagnosis.
- Methods of identification and estimation of abnormal hemoglobin including spectroscopy. HB electrophoresis. Alkali denaturation Test. Sickle cell preparation.
  - Various benign leucocyte reaction – Leukocytosis. Neutrophilia, Eosinophilia, Lymphocytosis. Infectious mononucleosis. leucopenias.
  - Leukemias – definition, causes, classification, detection of leukemia. Total leucocyte count in leukemias. Multiple myeloma.
  - Blood Coagulation and disorders of hemostasis. Classification of coagulation factors, Principles and methods of assessment of coagulation. BT, CT, Prothrombin time, partial thromboplastin time, thromboplastin regeneration time
  - Thrombocytopenia, thrombocythemias, platelet function test, platelet count. Clot retraction test. Platelet factor III Test.
  - LE cell – definition, morphology causative agents. Various methods of demonstrating LE cells. Blood parasites. Malaria, LD bodies, microfilaria and methods of demonstration.
  - Preparation of donor and collection of blood. Solution and apparatus used. Storage of blood. Preparation and storage of plasma. Preparation of packed red cells.
  - Principles involved in Blood grouping. ABO system and the methods used. Factors influencing the results of blood grouping, Rh system. Rh antigen. Principles and methods used.
  - Cross matching. Compatibility test, direct and indirect Coomb's test – Principle involved and the methods used. Blood transfusion and its Hazards.
  - Definition, sources and types histological specimens, kinds of histological presentations
  - Labelling, fixation, properties of fixing fluids, classification and composition of fixing fluids. Advantages and disadvantages of secondary fixatives. Post chroming.
  - Tissue processing, dehydration and cleaning.
  - Embedding. Water soluble substances, embedding in paraffin nitrocellulose
  - Equipment for sectioning microtome, knife, honing and stropping. Types, care and use of microtome.
  - Technique for sectioning – frozen section. Technique for sectioning – Paraffin embedded tissue. Errors in sectioning and remedies. Attaching blocks to carriers.
  - Technique of processing bone for histological studies. Mounting and covering. Mounting media.
  - Staining – theory, types of staining agent. Mordents and differentiation. H & E staining. Types of hematoxillin and its preparation. Eosin stock stain and other counter stain used.
  - Demonstration of collagen, reticulin, elastin, fat, amyloid, glycogen, mucin, pigments and minerals (malarial, mercury, bile, lipofuscin, calcium, iron, copper).
  - Principles of histochemistry and its application
  - Demonstration of neuron, neuroglia, myelin and axon. Processing of eye ball for histology.
  - Demonstration of fat, iron, amyloid, bile in large sections of tissue.
  - Cytology – introduction, definition, types of cytological specimen, preparation of slide for microscopic studies, stains used.
  - Museum technique. Preparation, setting up of and arrangement of museum.
  - Preparation of cell blocks, mailing of slides.
  - FNAC, definition, techniques involved in preparation of smear and staining. PAP smear.
  - Calibration and Validation of Clinical Laboratory instruments

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**SYLLABUS FOR THE POST OF TECHNICAL OFFICER (TECHNICAL SUPERVISOR)  
FOR OT/ANAESTHESIA**

**A. General Intelligence & Reasoning (10 Marks):** It would include questions of both verbal and non-verbal type. This component may include questions on analogies, similarities and differences, space visualization, spatial orientation, problem solving, analysis, judgement, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning and figural classification, arithmetic number series, non-verbal series, coding and decoding, statement conclusion, syllogistic reasoning etc. The topics are, Semantic Analogy, Symbolic/Number Analogy, Figural Analogy, Semantic Classification, Symbolic/Number Classification, Figural Classification, Semantic Series, Number Series, Figural Series, Problem Solving, Word Building, Coding & decoding, Numerical Operations, symbolic Operations, Trends, Space Orientation, Space Visualization, Venn Diagrams, Drawing inferences, Punched hole/pattern –folding & unfolding, Figural Pattern – folding and completion, Indexing, Address matching, Date & city matching, Classification of centre codes/roll numbers, Small & Capital letters/numbers coding, decoding and classification, Embedded Figures, Critical thinking, Emotional Intelligence, Social Intelligence, Other sub-topics, if any.

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**C. Quantitative Aptitude (10 Marks):** The questions will be designed to test the ability of appropriate use of numbers and number sense of the candidate. The scope of the test will be computation of whole numbers, decimals, fractions and relationships between numbers, Percentage. Ratio & Proportion, Square roots, Averages, Interest, Profit and Loss, Discount, Partnership Business, Mixture and Allegation, Time and distance, Time & Work, Basic algebraic identities of School Algebra & Elementary surds, Graphs of Linear Equations, Triangle and its various kinds of centres, Congruence and similarity of triangles, Circle and its chords, tangents, angles subtended by chords of a circle, common tangents to two or more circles, Triangle, Quadrilaterals, Regular Polygons, Circle, Right Prism, Right Circular Cone, Right Circular Cylinder, Sphere, Hemispheres, Rectangular Parallelepiped, Regular Right Pyramid with triangular or square base, Trigonometric ratio, Degree and Radian Measures, Standard Identities, Complementary angles, Heights and Distances, Histogram, Frequency polygon, Bar diagram & Pie chart

**D. English Language (10 Marks):** Spot the Error, Fill in the Blanks, Synonyms/Homonyms, Antonyms, Spellings/ Detecting Mis-spelt words, Idioms & Phrases, One word substitution, Improvement of Sentences, Active/Passive Voice of Verbs, Conversion into Direct/Indirect narration, Shuffling of Sentence parts, Shuffling of Sentences in a passage, Cloze Passage, Comprehension Passage.

**E. Subject Knowledge (80 Marks):**

1. **BASIC ANATOMY OF HUMAN BODY**

**Systemic Anatomy**

- Respiratory System: Parts, Nasal cavity and Paranasal air sinuses, trachea, Gross and microscopic structure of lungs, Diaphragm and Pleura
- Cardiovascular System: Circulatory system – Structure of the Heart, Structure of Blood Vessels – arterial and venous system
- Nervous System: Structure of Neuroglia and neurones Parts and classification
  - CNS – Structure of Brain and spinal cord and their functions.
  - PNS - Cranial nerves and spinal nerves
  - ANS - Sympathetic and Parasympathetic
- Musculoskeletal system: Bones – types, structure, Axial & appendicular skeleton.
  - Bone formation and growth,
  - Joints – classification and structure.
  - Types and structure of muscles. Movements at the joints and muscles producing movements.

**2. PHYSIOLOGY**

- **Blood:** Blood cells, names of developmental stages of RBC, functions and fate of RBC. Functions of WBC and platelets. Hemoglobin, Haematocrit & ESR, blood groups- ABO & Rh, basics of coagulation, classification of anaemia.
- **Respiratory System:** Principles of respiration, respiratory muscles, lung volumes and capacities, collection and composition of inspired alveolar and expired airs. Transport of oxygen and carbon dioxide. Brief account of respiratory regulation. Definition of hypoxia, Cyanosis, asphyxia. Methods of artificial respiration.
- **Cardiovascular system:** Cardiac cycle, heart sounds, definitions of cardiac output, stroke volume, principles of measurements of cardiac output. ECG – methods of recording and ECG waves. Normal values of blood pressure, heart rate and their regulation in brief.
- **Nervous System:** Structure of neuron, nerve impulse, myelinated and non-myelinated nerve. Brief account of resting membrane potential, action potential and conduction of nerve impulse Neuro-muscle transmission. Various parts of nervous system, C.S.F., Functions of muscle spindle and motor tracts including reflexes , cutaneous receptors, joint receptors, sensory pathways. Ascending reticular formation, EEG, functions of cerebellum, basal ganglia, thalamus & hypothalamus, vestibular apparatus and functions. Autonomic nervous system.
- **Sensory System:** Vision: Structure of eyeball, retina, visual pathway, accommodation, visual acuity, error of refraction, color vision. Hearing: Brief account external, middle and inner ear, hearing tests. Taste & smell: receptors, pathways, method of transduction.
- **Endocrine System :** Names of endocrine glands & their secretions, functions of various hormones, Brief account of endocrine disorders

**3. BIOCHEMISTRY**

- Carbohydrates – Glucose and Glycogen Metabolism
- Proteins-Classification of proteins and functions
- Lipids- Classification of lipids and functions

**4. BIOMEDICAL SCIENCE**

- Operating Rooms & Anesthetic Equipments
- List of OR equipment (Anesthesia machine, Monitor, Defibrillators, Electrocautery, Laparoscopes, Pulse Oximeter, Suction Apparatus etc)
- Gas Plant, Oxygen Concentrator Plant- Introduction, usage, safety features & application
- Electrodes, Sensors & Transducers: Signal acquisition, transduction, active & passive sensors, sensor technology, electrodes for biophysical sensing, medical surface electrodes, and micro electrodes. Strain Gauges, inductive transducers, quartz pressure sensors, capacitive transducers, temperature transducers and piezoelectric transducers.
- Introduction to Electronics &Semi-conductors:Basic terminology & definitions –Voltage, Current, resistance, capacitance, inductance, conductor, semi-conductor, power, energy, rectifier, transformer, impedance.Ohm’s law, difference between resistance & impedance, basic network analysis concepts, types of current-AC & DC; electrical receptacle; difference between AC & DC, fuses & circuit breakers.

**5. APPLIED BASIC SCIENCES RELATED TO ANAESTHESIA****5.1 ANATOMY AND PHYSIOLOGY****Respiratory System**

- Trachea & Bronchial tree - vessels, nerve supply, respiratory tract, reflexes, bronchospasm.

- Respiratory movements under anesthesia
- Pulmonary Gas Exchange and Acid Base Status
- Pulmonary circulation
- Pulmonary oedema
- Pulmonary function tests
- Respiratory failure, type, clinical features, causes.
- Cardiovascular system
- Anatomy
- Chambers of the heart, major vasculature
- Coronary supply, innervation.
- Cardiac output - determinants, heart rate, preload, after load
- ECG: Arrhythmias, cardiovascular response to anesthetic & surgical procedures.
- Hypotension - causes, effects, management
- Cardio-pulmonary resuscitation
- Myocardial infarction, hypertension
- Fluids and electrolytes

## 5.2 CLINICAL PATHOLOGY

- Oedema, hyperemia or congestion, thrombosis, embolism, infarction shock, ischemia, over hydration, dehydration
- Hemorrhage, various types of anemia, leucopenia, leukocytosis, bleeding disorders coagulation mechanism

## 6. PRINCIPLES OF ANAESTHESIA

### Medical Gas Supply

- Compressed gas cylinders
- Color coding
- Cylinder valves; pin index
- Gas piping system
- Recommendations for piping system
- Alarms & safety devices
- Scavenging of waste anesthetic gases

### Anesthesia machine

- Hanger and yoke system
- Cylinder pressure gauge
- Pressure regulator
- Flow meter assembly
- Vaporizers - types, hazards, maintenance, filling and draining, etc

### Breathing system

- General considerations: humidity & heat
- Common components - connectors, adaptors, reservoir bags
- Capnography
- Pulse oximetry
- Methods of humidification
- Classification of breathing system
- Mapleson system - a b c d e f
- Jackson Rees system, Bain circuit
- Non rebreathing valves - AMBU valves

- The circle system

### **Face masks & Airway laryngoscopes**

- Types, sizes
- Endotracheal tubes - Types, sizes
- Cuff system
- Fixing, removing and inflating cuff, checking tube position, complications

### **Anesthesia ventilator and working principles**

### **Monitoring**

- Electrocardiography(ECG)
- Pulse oximetry(SpO<sub>2</sub>)
- Temperature- central and peripheral
- End tidal carbon dioxide( EtCO<sub>2</sub>)
- Anesthesia gas monitoring
- Non-invasive blood pressure (NIPB) and Invasive blood pressure(IBP)
- Central venous pressure(CVP)
- PA Pressure, LA Pressure & cardiac output
- Anesthesia depth monitor

### **Basic techniques of anesthesia**

#### **Resuscitation techniques**

- Basic life support (Airway, breathing, circulation) and the equipment used for it
- Drugs used in CPR
- AED and Defibrillators

#### **Anesthesia drugs and techniques**

- Techniques of general anesthesia
- Various intravenous and inhalational agents
- Regional anesthesia, spinal and epidural, posture and drugs
- Local Anaesthetic agents
- Neuro muscular blocking agents
- Principles of oxygen administration along with the apparatus
- Care of patient in the recovery room
- Post-operative pain: evaluation and management
- Types of fluid and therapy
- Blood and blood components transfusion
- Preparation of anesthesia machine, intubation kit, suction machine, anesthesia drugs

## **7. PRINCIPLES OF ANAESTHESIA AND BASIC ANAESTHETIC TECHNIQUES (INCLUDING MEDICAL ETHICS AND MEDICINE)**

- Airway management including tracheostomies
- Positioning issues under anesthesia
- Impact of co-existing diseases on anesthesia
- Specifics of invasive and non-invasive monitoring
- Monitored anesthesia care
- Anesthesia in remote locations
- Principles of organ protection

### **Medical Ethics**

- Autonomy and informed consent - Right of patients

## 8. CLINICAL PHARMACOLOGY & MICROBIOLOGY

### CLINICAL PHARMACOLOGY

- Antisialagogues: Atropine, Glycopyrrolate
- Sedatives & Anxiolytics: Diazepam, Midazolam, Phenergan, Lorazepam, Chlorpromazine, and Triclofos
- Narcotics: Morphine, Pethidine, Fentanyl, Pentazozine, tramadol
- Antiemetics: Metoclopramide, Ondansetron, Dexamethasone
- Induction Agent: Thiopentone, Diazepam, Midazolam, Ketamine, Propofol, Etomidate
- Muscle Relaxants: Depolarizing – Suxamethonium; Non depolarizing – Pancuronium, Vecuronium, Atracurium, Rocuronium
- Inhalational Gases: Gases-O<sub>2</sub>, N<sub>2</sub>O, Air; Volatile Agents-Halothane, Isoflurane, Sevoflurane, Desflurane
- Reversal Agents: Neostigmine, Glycopyrrolate, Atropine, Naloxone, Flumazenil
- Local Anesthetics: Xylocaine, Bupivacaine; Topical, Prilocaine-jelly, Emla - Ointment, Etidocaine. Ropivacaine.
- Emergency Drugs : Mode or administration, dilution, dosage and effects
- Adrenaline, Atropine
- Ephedrine, Mephentramine, phenyl-epherine
- Bicarbonate, calcium, potassium
- Inotropes: dopamine, dobutamine, noradrenaline
- Anti-arrhythmics- amiodarone, xylocard
- Aminophylline, hydrocortisone, antihistaminics
- Antihypertensive –Beta-blockers, Ca-channel blockers, ACE inhibitors
- Vasodilators- nitroglycerin & sodium nitroprusside
- Respiratory system- Bronchodilators
- Renal system- Diuretics, frusemide, mannitol.

### CLINICAL MICROBIOLOGY

- Sterilization and Disinfection
  - Principles and use of equipment of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization, antiseptic and disinfectants

## 9. PRINCIPLES OF SURGERY

- Haemorrhage-signs and symptoms of internal and external; classification and management; Identification of types of tourniquets reasons for use and duration of application, dangers of use
- Operating tables: structure, material used, maintenance, control, Hydraulic system and Electrical system
- Total thyroidectomy—with emphasis on proper positioning
- Breast surgery
- Positioning of patient for different operations: Problems and hazards
- Hypothermia and hyperthermia

### CSSD PROCEDURES

- Principles of sterilization and disinfection
- Methods of sterilization
- Dry Sterilization
- Wet sterilization
- Gaseous sterilization
- Chemical sterilization



- Sterilization by radiation (Gamma rays, ultraviolet rays)
- Techniques of sterilization of rubber articles. (LMA, FOB, ETT, Laryngoscopes, Anesthesia machines and circuits.)
- Methods of disinfection
- Boiling
- Chemical disinfection
- Hazards of sterilization
- Prevention of hazards of sterilization
- Precautions to be taken during sterilization
- Recent advances in the methods of sterilization

## 10. ADVANCED ANAESTHESIA TECHNIQUES AND ANAESTHESIA FOR SPECIALITY SURGERY

### Advanced anesthesia techniques

- Cardiac Arrhythmias (atrial fibrillation, ventricular tachycardia, extra systoles)
- Circulatory shock and its physiology
- Measurement of blood flow
- Artificial ventilation and related equipment:
  - Physiology of IPPV (Intermittent positive pressure ventilation)
  - General care of a patient on ventilator

### ANAESTHESIA FOR SPECIALTY SURGERY

#### Neuro-anaesthesia

- Glasgow coma scale
- Reinforced Endotracheal tubes
- I.C.P
- Dealing with the head injury patient

#### Obstetrics anaesthesia

- Differences between a pregnant and a normal lady
- Risks for anaesthesia including full stomach
- Check list (WHO Check list)
- Regional v/s General Anaesthesia
- Antepartum haemorrhage (APH)
- Postpartum hemorrhage (PPH)

#### Paediatric Anaesthesia

- NYHA classification

## 11. BASIC INTENSIVE CARE

- Care and maintenance of ventilators, suction machine, monitoring devices
- Air conditioning and control of pollution in ICU
- Care of unconscious adult and pediatric patients
- Assist in setting up central venous access, and other forms of invasive monitoring
- DVT prophylaxis
- Care of bed sores
- Antibiotics in the ICU
- Indications for blood and component transfusion
- Sepsis and septic shock syndrome

## 12. Book keeping and Stock maintenance.

**A. General Intelligence and Reasoning (10 Marks):**

It would include questions of both verbal and non-verbal type. This component may include questions on analogies, similarities and differences, space visualization, spatial orientation, problem solving, analysis, judgement, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning and figural classification, arithmetic number series, non-verbal series, coding and decoding, statement conclusion, syllogistic reasoning etc. The topics are, Semantic Analogy, Symbolic/Number Analogy, Figural Analogy, Semantic Classification, Symbolic/Number Classification, Figural Classification, Semantic Series, Number Series, Figural Series, Problem Solving, Word Building, Coding & decoding, Numerical Operations, symbolic Operations, Trends, Space Orientation, Space Visualization, Venn Diagrams, Drawing inferences, Punched hole/pattern –folding & unfolding, Figural Pattern – folding and completion, Indexing, Address matching, Date & city matching, Classification of centre codes/roll numbers, Small & Capital letters/numbers coding, decoding and classification, Embedded Figures, Critical thinking, Emotional Intelligence, Social Intelligence, Other sub-topics, if any.

**B. General Awareness (5 Marks):**

Questions in this component will be aimed at testing the candidate's general awareness of the environment around him and its application to society. Questions will also be designed to test knowledge of current events and of such matters of every day observations and experience in their scientific aspect as may be expected of any educated person. The test will also include questions relating to India and its neighbouring countries especially pertaining History, Culture, Geography, Economic Scene, General Policy & Scientific Research.

**C. Quantitative Aptitude (10 Marks):**

The questions will be designed to test the ability of appropriate use of numbers and number sense of the candidate. The scope of the test will be computation of whole numbers, decimals, fractions and relationships between numbers, Percentage. Ratio & Proportion, Square roots, Averages, Interest, Profit and Loss, Discount, Partnership Business, Mixture and Allegation, Time and distance, Time & Work, Basic algebraic identities of School Algebra & Elementary surds, Graphs of Linear Equations, Triangle and its various kinds of centres, Congruence and similarity of triangles, Circle and its chords, tangents, angles subtended by chords of a circle, common tangents to two or more circles, Triangle, Quadrilaterals, Regular Polygons, Circle, Right Prism, Right Circular Cone, Right Circular Cylinder, Sphere, Hemispheres, Rectangular Parallelepiped, Regular Right Pyramid with triangular or square base, Trigonometric ratio, Degree and Radian Measures, Standard Identities, Complementary angles, Heights and Distances, Histogram, Frequency polygon, Bar diagram & Pie chart

**D. English Language (5 Marks):**

Spot the Error, Fill in the Blanks, Synonyms/Homonyms, Antonyms, Spellings/ Detecting Mis-spelt words, Idioms & Phrases, One word substitution, Improvement of Sentences, Active/Passive Voice of Verbs, Conversion into Direct/Indirect narration, Shuffling of Sentence parts, Shuffling of Sentences in a passage, Cloze Passage, Comprehension Passage.

**E. Anatomy and Physiology (10 Marks):**

- Structure of the body–cells, tissues. Musculoskeletal System: Skull, Vertebral column, Shoulder Girdle Bones of upper extremities, Bones of lower extremities, pelvis and its muscles, Ossification.
- Cardiovascular System: Heart–blood– Arteries–Veins.
- Lymphatic System: Circulation of Lymph, Lymph glands
- Respiratory System: Nose, Larynx Trachea-Lungs Bony-case.
- Nervous System: Brain-meninges ventricles-Spinal cord and nerves.

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- Eye: Structure and its function.
- Ear: Structure and function.
- Surface Anatomy and Cross-sectional Anatomy.
- Reproductive System: Female & Male organs.
- Urinary System: Kidneys, Ureters, Bladder, Prostate and Urethra.
- Skin: Structure and its function.
- Endocrine System: Pituitary gland, Penial gland, Thymus gland, thyroid and parathyroid gland, suprarenal glands

**F. Dark Room Techniques (10 Marks):**

- Photographic Process: Light image, Image produced by radiation, Light Sensitive materials, latent image.
- Film Material: The structure of X-ray & Imaging films, Resolving power, Grains of films, sensitivity of film, contrast of films, Type of films.
- X-ray Film Storage: Storage of unexposed films.
- Screens: Construction of intensifying screens.
- Choice of fluorescent material.
- Intensification factor, Detail, Sharpness. Speed, Screen contact, care of intensifying screens, Types of Screens. Cassettes: Cassette designs, Care of cassette, mounting of intensifying screen in the cassettes, various types of cassettes.
- Safe Light: Constituents, filter, testing. Film Processing: Constituents of processing solution and replenishes.
- Factors affecting the development. Types of developer and fixer, Factors affecting the use of fixer. Silver recovery methods.
- Film Rising, Washing and
- Drying: Intermediate rinse-washing and drying.
- Film Processing Equipment: Manual and Automatic processing. Dark Room Design: Outlay and materials used.
- Radiographic Image: The sharpness, contrast, detail, definition, viewing conditions & artifacts.
- Miscellaneous: Trimming, identification of films, legends, records filing, report distribution.

**G. General Physics (10 Marks):**

- Elementary idea of thermionic emission, Electron-idea of mass and nature of charge, Coulomb's law, Electric field, Unit of potential.
- Ohm's law, Units of resistance, potential and current, Earthing of electrical equipment.
- Magnetic fields, Lines of force, Construction and working of galvanometer, voltmeter, A.C. and D.C. currents-effective current, Electromagnetic induction – Laws, fields, influence. Transformers – Principles, construction, and uses of step down and High tension transformers.
- Diode values and their use in rectifiers solid-state rectifiers, its various rectifying circuits uses in X-ray machines, production of X-rays and their properties, X-ray tube-Stationary anode and rotating anode & therapy tubes, X-ray circuit, interlocking circuits, relay and timers.

**H. Radiographic Techniques (10 Marks):**

- Upper Limb: Fingers individual and as a whole hands, Carpal bones wrists, Forearm, elbow-head of radius, humerus, shoulder joint, Acromioclavicular joint, scapula, sternoclavicular joint, small joints.
- Lower Limb: Toes, foot, calcaneum & other tarsal bones, ankle joint, legs, knees, patella, fibula, femur, intercondylar notch.
- Hip & Pelvis: Hip, Neck of femur, threatre procedure, for hip pinning or reduction, pelvis, sacro-iliac joints, pubic bones, acetabulum.
- Vertebral Column: Curves, postures, relative levels atlanto, occipital region, odontoid process, Cervical spine, thoracic Inlet, Cervico, thoracic spine,

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- lumbosacral spine, sacrum, coccygosis, kyphosis, flexion, extension and neutral.
- Bones of the thorax: Sternum ribs. Skull: Land marks, Cranium, facial bones, maxilla, mandible, zygoma, T.M.
- joints, mastoids, petrous bones, optic foramen, sella turcica, P.N.S.
- Chest: Chest in teleradiography, chest supine & portable, Lordotic, apicogram and MMR.
- Abdomen: Preparation, indication and contraindication, acute abdomen, pregnancy abdomen for multiplicity maturity and foetal abnormality.
- Pelvimetry.
- Soft tissue: Neck and breast.
- Emergency Radiography: Bedside radiography, O.T. Radiography.
- Radiography for age evidence: Bone age evidence.
- Dental Radiography: Occlusal view, Dental X-ray, Panoramic view.

#### **I. Radiographic Procedures (10 Marks):**

- Contrast media.
- Urinary Tract: I.V.P., Retrograde Pyelography, Cystourethrography. Presacral Insufflation.
- Biliary Tract: Oral cholecystography, I.V.C, Trans hepatic percutaneous cholangiography preoperative cholangiography – T-tube cholangiography, E.R.C.P.
- Tomography: Principle, equipment and types of movements, procedure.
- Venography:
- Mammography and Xeroradiography.
- Female Genital Tract: Hystero Salpingography, Gynecography, Placentography & Pelvimetry.
- Angiography: Carotid angiography, Femoral arteriography, Aortography, Selective angiography etc.
- Sialography
- Sinography
- Arthrography

#### **J. Radiation Physics and related equipments (10 Marks):**

- Latent images formation and its processing.
- Various units used for measuring radiation—Roentgen, rad and rem. Construction of X-ray tube, X-rays—its production and properties.
- Ionization chambers, G.M. Counter and Scintillation Counter, Interaction of X-ray with matter.
- Quality and quantity of X-rays, HVT, linear absorption coefficient, Grid, Cones and Filters.
- Inverse square law, scattered radiations and appliances used to reduce it.
- II. Radioactivity
- Curie, Half-life, decay factor. Details about radium, cobalt and caesium.
- Doses—dose and dose rate, exposure dose, exit dose, surface dose, depth dose, isodose charts and their uses.
- Radiation Hazards, Protection against it, film badge, pocket ionization chamber, maximum permissible dose.
- High-tension control equipment – Diagnostic H.T. circuits,
- Production of X-ray tubes and high tension circuits for the production of control panel and control safety device and interlocks, basic principles of mega voltage X-ray machines.
- Fluoroscopy – Tube filtration, diaphragm, tilting couch screen grid and exploratory and control safety devices, compressors, protection, electrical radiographic and mechanical control, use and care of couch accessory fittings. Special equipment – body section radiography, apparatus and controls simultaneous multi section accessories specialized couches, skull table, mobile units. Image intensifiers, principles, optical systems, for viewing and recording final image electrical and x-ray supply protection, applications, including cine radiography, mass miniature radiography, special radiography, equipment for high speed serial techniques (etc.) rapid cassette changer rapid films changer, roll films, full size and miniature, biplane

equipment, grids, protection, problems of processing and presentation, care and maintenance – general principle and routine use of charts supplied by manufactures, radiographic calibration procedure.

- Care of patient: - first contact with patient in the department handling of chair and stretcher patients, lifting of ill and injured patients, elementary hygiene, personal cleanliness, hygiene in relation to patients. E.g. clean linen and receptive nursing care, temperature. First Aid: - Shock, asphyxia, convulsions, artificial respiration, electric shock, burns, scalds,
- Haemorrhage, pressure point, tourniquet, fractures, splints, bandaging, foreign bodies, poisons, drug, reactions, administration of oxygen.
- Preparation of a patient for general X-ray examinations. Departmental instruction to out patients or ward staff, use of aperients, enema and colonic irrigation, flatulence and flatus causes and methods of relief, principles of catheterization and intubations, premeditation, its uses and methods, anaesthetised patients, nursing care before and after special X-ray examinations e.g. in neurological, vascular and respiratory conditions diabetic patients, special attention to food, trauma hazards.
- Preparation of patients for special x-ray examinations barium enema, barium meal, intravenous pyelography cholecystography etc. and their administration.
- Principles and aspects: - Methods of sterilization, care and identification of instruments and surgical dressings in common use, setting of trays and trolleys for various examinations etc.
- Intravenous pyelography, biopsy, elementary operating theatre produce. Drugs in department- storage, labelling checking, regulations regarding
- Contrast media- barium preparations, iodine
- Radiographic Photography:
- Photographic aspects of radiography– the fundamentals of the photographic process, light sensitive salts of silver, the photographic emulsion gelatin as suspension medium, size and frequency of the silver halide grain in relation to sensitivity and contrast, formation of the latent image, chemical development, construction of x-ray film base material, substratum coating, emulsion, coating anti-abrasive super coating sensitivity, storage of unexposed film.
- Characteristics and detail freedom from chemical fog and staining, long life possibility of degeneration.

**K. Specialized investigations (10 Marks):**

- Computed Tomography
- Principles of CT – Basic Physics
- Recent developments, applications etc.
- Positioning in CT
- Different types of contrast materials.
- Emergency treatment.
- Radiation hazards
- Disposal of unused matter. Magnetic Resonance Imaging Principle – Physics – Techniques
- Types of coils – Basic term used in MRI Operations, Applications, etc.
- Positioning in MRI.
- Different types of contrast materials.
- Emergency treatment.
- MRI hazards.
- Factors affecting quality of imaging. Ultrasound
- Physics – Types of ultrasound – Techniques of ultrasound scanning in different parts – positioning and filming – Principles of Doppler effect and colour Doppler.

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**A. General Intelligence & Reasoning (10 Marks):**

It would include questions of both verbal and non-verbal type. This component may include questions on analogies, similarities and differences, space visualization, spatial orientation, problem solving, analysis, judgement, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning and figural classification, arithmetic number series, non-verbal series, coding and decoding, statement conclusion, syllogistic reasoning etc. The topics are, Semantic Analogy, Symbolic/Number Analogy, Figural Analogy, Semantic Classification, Symbolic/Number Classification, Figural Classification, Semantic Series, Number Series, Figural Series, Problem Solving, Word Building, Coding & decoding, Numerical Operations, symbolic Operations, Trends, Space Orientation, Space Visualization, Venn Diagrams, Drawing inferences, Punched hole/pattern –folding & unfolding, Figural Pattern – folding and completion, Indexing, Address matching, Date & city matching, Classification of centre codes/roll numbers, Small & Capital letters/numbers coding, decoding and classification, Embedded Figures, Critical thinking, Emotional Intelligence, Social Intelligence, Other sub-topics, if any.

**B. General Awareness (10 Marks):**

Questions in this component will be aimed at testing the candidate's general awareness of the environment around him and its application to society. Questions will also be designed to test knowledge of current events and of such matters of every day observations and experience in their scientific aspect as may be expected of any educated person. The test will also include questions relating to India and its neighbouring countries especially pertaining History, Culture, Geography, Economic Scene, General Policy & Scientific Research.

**C. Quantitative Aptitude (10 Marks):**

The questions will be designed to test the ability of appropriate use of numbers and number sense of the candidate. The scope of the test will be computation of whole numbers, decimals, fractions and relationships between numbers, Percentage. Ratio & Proportion, Square roots, Averages, Interest, Profit and Loss, Discount, Partnership Business, Mixture and Allegation, Time and distance, Time & Work, Basic algebraic identities of School Algebra & Elementary surds, Graphs of Linear Equations, Triangle and its various kinds of centres, Congruence and similarity of triangles, Circle and its chords, tangents, angles subtended by chords of a circle, common tangents to two or more circles, Triangle, Quadrilaterals, Regular Polygons, Circle, Right Prism, Right Circular Cone, Right Circular Cylinder, Sphere, Hemispheres, Rectangular Parallelepiped, Regular Right Pyramid with triangular or square base, Trigonometric ratio, Degree and Radian Measures, Standard Identities, Complementary angles, Heights and Distances, Histogram, Frequency polygon, Bar diagram & Pie chart.

**D. English Language (10 Marks):**

Candidates' understanding of the Basics of English Language, its vocabulary, grammar, sentence structure, synonyms, antonyms and its correct usage, etc. his/her writing ability would be tested.

**E. Subject Knowledge (80 Marks):**

- (i) General Science (10+2 level): Questions based on Physics, Chemistry and Biology subjects of 10+2 standard.
- (ii) ITI (Mechanical Engineering/Pump Mechanic): Questions based on the syllabus of NCVT ITI (Mechanical Engineering/ Pump Mechanic) trade certificate.
- (iii) Practical Knowledge of Medical Gas System:
  1. Gas Distribution Systems: Compressed gas cylinders, Colour coding, Cylinder valves; Pin index, Gas piping system, Recommendations for piping system, Alarms & safety devices.

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2. MGPS Design and Techniques: Statutory obligations and safe system operation, MGPS design and installation requirements, Basic fault-finding, Structure and management of the permit-to work system, MGPS equipment performance requirements (plant and pipeline); Technical reporting including system capacities/limitations, upgrading requirements/equipment replacement, system compliance.
3. MGPS Policies and documentation: MGPS documentation; Emergency procedures; MGPS operational policy preparation, implementation and monitoring; MGPS testing and quality control requirements; Manifold systems; Cryogenic liquid cylinders; Bulk cryogenic (VIE) systems Alarm requirements.
4. Piping materials and specification of W.I. & steel pipes, Pipe threads, Pipe fittings, Specifications of fittings, Brief description of different types of pipe joints, Pipe fittings, Flanges, Unions, Valves etc., Different types of pipes lay out systems, Different types of pipe joints.
5. Working principals of valves and their description.
6. Mechanical faults on terminal outlets, Line regulators, Zone valve boxes and faults on electrically controlled line, Pressure alarms.
7. Oxygen acetylene welding procedure of medical gas pipeline using inert gas shielding
8. Installation, maintenance and repair of liquid oxygen plant and high-pressure cylinder manifolds
9. Types of many gas manifolds.
10. Manifolds selection criteria.
11. Manifolds assemblies.
12. Semi- automatic manifolds.
13. Manifolds accessories.
14. Manifolds valves etc.

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**A. General Intelligence and Reasoning (50 Marks):**

It would include questions of both verbal and non-verbal type. The test will include questions on Semantic Analogy, Symbolic operations, Symbolic/Number Analogy, Trends, Figural Analogy, Space Orientation, Semantic Classification, Venn Diagrams, Symbolic/Number Classification, Drawing inferences, Figural Classification, Punched hole/pattern-folding & unfolding, Semantic Series, Figural Pattern-folding and completion, Number Series, Embedded figures, Figural Series, Critical Thinking, Problem Solving, Emotional Intelligence, Word Building, Social Intelligence, Coding and decoding, Other sub-topics, if any Numerical operations.

**B. General Awareness (50 Marks):**

Questions are designed to test the candidate's general awareness of the environment around him and its application to society. Questions are also designed to test knowledge of current events and of such matters of everyday observation and experience in their scientific aspect as may be expected of an educated person. The test will also include questions relating to India and its neighbouring countries especially 10 pertaining to History, Culture, Geography, Economic Scene, General policy and scientific research.

**C. Quantitative Aptitude (50 Marks):**

*Number Systems:* Computation of Whole Numbers, Decimal & Fractions, and Relationship between Numbers

*Fundamental arithmetical operations:* Percentages, Ratio and Proportion, Square roots, Averages, Interest (Simple and Compound), Profit and Loss, Discount, Partnership Business, Mixture and Allegation, Time and distance, Time and work. *Algebra:* Basic algebraic identities of School Algebra and Elementary surds (simple problems) and Graphs of Linear Equations.

*Geometry:* Familiarity with elementary geometric figures and facts: Triangle and its various kinds of centres, Congruence and similarity of triangles, Circle and its chords, tangents, angles subtended by chords of a circle, common tangents to two or more circles.

*Mensuration:* Triangle, Quadrilaterals, Regular Polygons, Circle, Right Prism, Right Circular Cone, Right Circular Cylinder, Sphere, Hemispheres, Rectangular Parallelepiped, Regular Right Pyramid with triangular or square Base

*Trigonometry:* Trigonometry, Trigonometric ratios, Complementary angles, Height and distances (simple problems only) Standard Identities like  $\sin^2\theta + \cos^2\theta = 1$  etc.

*Statistical Charts:* Use of Tables and Graphs: Histogram, Frequency polygon, Bar- diagram, Piechart

**D. English Language (50 Marks):**

Spot the Error, Fill in the Blanks, Synonyms/Homononyms, Antonyms, Spellings/ Detecting Misspelt

words, Idioms & Phrases, One word substitution, Improvement of Sentences, Active/Passive Voice of Verbs, Conversion into Direct/Indirect narration, Shuffling of Sentence

parts, Shuffling of Sentences in a passage, Cloze Passage, Comprehension Passage.



**PART-I**

**A. General Intelligence and Reasoning (10 Marks):**

It would include questions of both verbal and non-verbal type. The test will include questions on Semantic Analogy, Symbolic operations, Symbolic/Number Analogy, Trends, Figural Analogy, Space Orientation, Semantic Classification, Venn Diagrams, Symbolic/Number Classification, Drawing inferences, Figural Classification, Punched hole/pattern-folding & unfolding, Semantic Series, Figural Pattern-folding and completion, Number Series, Embedded figures, Figural Series, Critical Thinking, Problem Solving, Emotional Intelligence, Word Building, Social Intelligence, Coding and de-coding, Other sub-topics, if any Numerical operations.

**B. General Awareness (10 Marks):**

Questions are designed to test the candidate's general awareness of the environment around him and its application to society. Questions are also designed to test knowledge of current events and of such matters of everyday observation and experience in their scientific aspect as may be expected of an educated person. The test will also include questions relating to India and its neighbouring countries especially 10 pertaining to History, Culture, Geography, Economic Scene, General policy and scientific research.

**C. Quantitative Aptitude (10 Marks):**

Number Systems: Computation of Whole Number, Decimal & Fractions, Relationship between numbers

Fundamental arithmetical operations: Percentages, Ratio and Proportion, Square roots, Averages, Interest (Simple and Compound), Profit and Loss, Discount, Partnership Business, Mixture and Allegation, Time and distance, Time and work.

Algebra: Basic algebraic identities of School Algebra and Elementary surds (simple problems) and Graphs of Linear Equations.

Geometry: Familiarity with elementary geometric figures and facts: Triangle and its various kinds of centres, Congruence and similarity of triangles, Circle and its chords, tangents, angles subtended by chords of a circle, common tangents to two or more circles.

Mensuration: Triangle, Quadrilaterals, Regular Polygons, Circle, Right Prism, Right Circular Cone, Right Circular Cylinder, Sphere, Hemispheres, Rectangular Parallelepiped, Regular Right Pyramid with triangular or square Base

Trigonometry: Trigonometry, Trigonometric ratios, Complementary angles, Height and distances (simple problems only) Standard Identities like  $\sin^2\theta + \cos^2\theta = 1$  etc.

Statistical Charts: Use of Tables and Graphs: Histogram, Frequency polygon, Bar-diagram, Pie-chart

**D. English Language (10 Marks):**

Spot the Error, Fill in the Blanks, Synonyms/Homonyms, Antonyms, Spellings/ Detecting Misspelt words, Idioms & Phrases, One word substitution, Improvement of Sentences, Active/Passive Voice of Verbs, Conversion into Direct/Indirect narration, Shuffling of Sentence parts, Shuffling of Sentences in a passage, Cloze Passage, Comprehension Passage.

**E. Basic concepts of Management & Computers (10 Marks):**

Principles of Management, Organisation behaviour, MS Office, MS Windows, Fundamentals of Computers, Internet etc.

**Subject Knowledge (70 Marks):**

- Hospital and Patient-care Appraisal  
Objectives of Hospital, Parameters of Good Medical Care/Patterns of Patient Care, Functions of Hospital
- Role of a Hospital in Health is- Delivery Systems (HCDS)
- Classification of Hospitals
- Hospitals Organization and its analysis  
Chart of Organization, Board and Committees, Duties and responsibilities thereof
- Departmental Administration  
Delegation, Decentralization
- Patient Care Appraisal (PCA)  
History of Medical Audit, Tools and Techniques, Various Phases of Medical Audit
- Departments and Service Units  
Clinical Departments, Diagnostic and therapeutic Services (including Clinical Laboratories, Radiology, Physical Medicine and Rehabilitation and Pharmacy Services), Nursing Department, Dietary Department, Outpatient Department, Accident and Emergency Services Department, Medical Social Service Department (viii) General and Medical Stores, Blood Bank, Medical Library Services, Service units in a Hospital Laundry, Housekeeping, CSSD, Miscellaneous Services : Engineering, Mortuary and Transport Services.
- Basic Anatomy  
Definition of Anatomy & Physiology, Types of Anatomy (including systemic), Definition of topographic term/term used to describe the body, Descriptions of various regions of the body.
  - Basic Physiology  
Introductory Lectures or specialization of tissues, Homeostasis and its importance in mammals, Blood and lymphatic system Cardiovascular system, Excretory system, Skin and temperature regulation, Respiratory System, Digestive system and metabolism Endocrinology, Reproductive System, Digestive System and Metabolism Endocrinology, Reproductive System, Nervous System, Special Senses, Muscles
  - Basic Pathology and Microbiology  
Definitions and Classification of diseases: Inflammatory diseases- viral and fungal, inflammatory diseases- Parasitic, Degenerative diseases, Fatty degeneration, Amyloid etc.  
  
Tumors- Definition, etiology & classification, Disturbances in blood flow, Pigment disorders, Hereditary diseases, C.V.S. Blood vessels, V.S. Heart, Respiratory System, G.I. tract, Liver Lymphatic System, Genitourinary System, Skeletal System, Blood, Central Nervous System, Endocrine System
  - Clinical Pathology: Normal Composition of blood, disease of RBCs, WBCs, Platelets, Coagulation factors and disorders, Blood groups and cross matching, Blood transfusion, Urine Composition: variation in common disease, CSF and body fluids, Gastris and Duodenal contents, Fasces, Parasites, Introduction and historical background, Classification special, Characteristics of organisms bacteria's, Asepsis, Disinfection Antiseptics, Allergy study of pathogenic organisms, Non-pathology organisms, Virus and fungus, Parasitic diseases- their stance in India with lab Diagnosis.

## 1/5/2023 Medical Terminology:

- Objective
- Basic
- Elements of Medical Terms:  
Roots, Prefixes, Suffixes, Colours, Numerals, Symbols, Abbreviation

Terms pertaining to Body as a whole.

Terms relate to Investigations, and operation, treatment of conditions, disorders-

Skin and Breast (integumentary system), Musculoskeletal, Neurological and Psychiatric, Cardio-vascular, Blood and blood forming organs, Respiratory, Digestive, Uro-genital, Gynecological, Maternal, Antenatal and Neonatal conditions, Endocrine and Metabolic, Sense organs of: Vision, Hearing

Systemic: Infectious diseases, Immunological diseases, Diseases of the Connective Tissues, Diseases of the Connective Tissues

Geriatrics and Psycho geriatrics.

Supplementary terms: Selected terms relating-

Oncology, Anesthesiology, Physical Medicine and Rehabilitation, Nuclear Medicine, Plastic Surgery of Bums and Maxillofacial, Radio-diagnosis, Radiotherapy

- Biostatistics:

- Introduction to Statistics
- Methods of collection of data
- Measures of central tendency (simple average, G.M., H.M., Mode and Median)
- Measures of dispersion (Standard deviation, Range, variance, average deviation)
- Sampling; Definition, Methods of sampling (random systematic, stratified, cluster)
- Correlation and regression: Significance, linear correlation, correlation coefficient, linear regression.
- Time series analysis- concept and its utility, component of time series.
- Test of significance.
- Graphical presentation of data.
- Probability- concept and definition.
- Uses of statistics.
- Sources of hospital statistics (In- Patient census, Out — Patient Deptt, and Special Clinics).
- Definitions (live, birth, foetal death, immaturity, cause of death, underlying cause of death inpatient bed etc)
- Analysis of hospital services and discharges.
- Indices (Bed occupancy, average length of stay, bed turn — over internal, death rate birth rate etc.)
- Vital statistics.
- Uses and Limitations of hospital data.
- Method of compilation of various Health Returns/Statistical Returns.

- Healthcare Organization:

Introduction to Principles of Management and Administration

Scope and importance of management, Principles of Management, Functions of a Manger (POSDCORB-E). Management Techniques, Material Management, Personal Administration Financial Administration

1/5/2023 Public Health Structure in India:

With relation to public Health & medical Care, Constitutional lists, various five years plans and priorities

Role of Voluntary Health Organization

Basic facts of Health in India.

Current Objectives and strategies:

Population Dynamics, Community Health Worker schemes.

National Health Programmes of Medicine and Homeopathy.

Other programmes of relevance to Health Sector:

Family Welfare, Medical Termination of Pregnancy, National Population Policy, Maternity and Child Health.

- Medical Record Science

Introduction to Medical Record Science, Development, Analysis and Uses of Medical Record.

Development Medical Record Forms, basic and special.

Order of Arrangements:

Ward, Medical Record Department, Source Oriented Medical Record, Problem oriented Medical Record, Integrated Medical Record.

Analysis of Medical Record:

Quantitative, Qualitative.

Uses of Medical Records:

As a personal document, As impersonal document.

Values of the Medical Record

- International classification of Diseases

Classification of diseases as per I.C.D

## **PART-II**

### **Skill Test:**

The Skill Test will be of qualifying nature. Candidates will have to qualify the test for English or Hindi at the prescribed speed on Computer as per the advertisement.

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## SYLLABUS FOR THE POST OF OFFICE ATTENDANT GRADE-II

1/5/2023

**A. General Intelligence and Reasoning (50 Marks):**

It would include questions of both verbal and non-verbal type. The test will include questions on Semantic Analogy, Symbolic operations, Symbolic/Number Analogy, Trends, Figural Analogy, Space Orientation, Semantic Classification, Venn Diagrams, Symbolic/Number Classification, Drawing inferences, Figural Classification, Punched hole/pattern-folding & unfolding, Semantic Series, Figural Pattern-folding and completion, Number Series, Embedded figures, Figural Series, Critical Thinking, Problem Solving, Emotional Intelligence, Word Building, Social Intelligence, Coding and de-coding, Other sub-topics, if any Numerical operations.

**B. General Awareness (50 Marks):**

Questions are designed to test the candidate's general awareness of the environment around him and its application to society. Questions are also designed to test knowledge of current events and of such matters of everyday observation and experience in their scientific aspect as may be expected of an educated person. The test will also include questions relating to India and its neighbouring countries especially 10 pertaining to History, Culture, Geography, Economic Scene, General policy and scientific research.

**C. Quantitative Aptitude (50 Marks):**

Number Systems: Computation of Whole Number, Decimal & Fractions, Relationship between numbers

Fundamental arithmetical operations: Percentages, Ratio and Proportion, Square roots, Averages, Interest (Simple and Compound), Profit and Loss, Discount, Partnership Business, Mixture and Allegation, Time and distance, Time and work.

Algebra: Basic algebraic identities of School Algebra and Elementary surds (simple problems) and Graphs of Linear Equations.

Geometry: Familiarity with elementary geometric figures and facts: Triangle and its various kinds of centres, Congruence and similarity of triangles, Circle and its chords, tangents, angles subtended by chords of a circle, common tangents to two or more circles.

Mensuration: Triangle, Quadrilaterals, Regular Polygons, Circle, Right Prism, Right Circular Cone, Right Circular Cylinder, Sphere, Hemispheres, Rectangular Parallelepiped, Regular Right Pyramid with triangular or square Base

Trigonometry: Trigonometry, Trigonometric ratios, Complementary angles, Height and distances (simple problems only) Standard Identities like  $\sin^2\theta + \cos^2\theta = 1$  etc.

Statistical Charts: Use of Tables and Graphs: Histogram, Frequency polygon, Bar-diagram, Pie-chart

**D. English Language (50 Marks):**

Spot the Error, Fill in the Blanks, Synonyms/Homonyms, Antonyms, Spellings/ Detecting Misspelt words, Idioms & Phrases, One word substitution, Improvement of Sentences, Active/Passive Voice of Verbs, Conversion into Direct/Indirect narration, Shuffling of Sentence parts, Shuffling of Sentences in a passage, Cloze Passage, Comprehension Passage.

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## SYLLABUS FOR THE POST OF PUMP MECHANIC

1/5/2023

**A. General Intelligence & Reasoning (10 Marks):**

It would include questions of both verbal and non-verbal type. This component may include questions on analogies, similarities and differences, space visualization, spatial orientation, problem solving, analysis, judgement, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning and figural classification, arithmetic number series, non-verbal series, coding and decoding, statement conclusion, syllogistic reasoning etc. The topics are, Semantic Analogy, Symbolic/Number Analogy, Figural Analogy, Semantic Classification, Symbolic/Number Classification, Figural Classification, Semantic Series, Number Series, Figural Series, Problem Solving, Word Building, Coding & decoding, Numerical Operations, symbolic Operations, Trends, Space Orientation, Space Visualization, Venn Diagrams, Drawing inferences, Punched hole/pattern –folding & unfolding, Figural Pattern – folding and completion, Indexing, Address matching, Date & city matching, Classification of centre codes/roll numbers, Small & Capital letters/numbers coding, decoding and classification, Embedded Figures, Critical thinking, Emotional Intelligence, Social Intelligence, Other sub-topics, if any.

**B. General Awareness (10 Marks):**

Questions in this component will be aimed at testing the candidate's general awareness of the environment around him and its application to society. Questions will also be designed to test knowledge of current events and of such matters of every day observations and experience in their scientific aspect as may be expected of any educated person. The test will also include questions relating to India and its neighbouring countries especially pertaining History, Culture, Geography, Economic Scene, General Policy & Scientific Research.

**C. Quantitative Aptitude (10 Marks):**

The questions will be designed to test the ability of appropriate use of numbers and number sense of the candidate. The scope of the test will be computation of whole numbers, decimals, fractions and relationships between numbers, Percentage. Ratio & Proportion, Square roots, Averages, Interest, Profit and Loss, Discount, Partnership Business, Mixture and Allegation, Time and distance, Time & Work, Basic algebraic identities of School Algebra & Elementary surds, Graphs of Linear Equations, Triangle and its various kinds of centres, Congruence and similarity of triangles, Circle and its chords, tangents, angles subtended by chords of a circle, common tangents to two or more circles, Triangle, Quadrilaterals, Regular Polygons, Circle, Right Prism, Right Circular Cone, Right Circular Cylinder, Sphere, Hemispheres, Rectangular Parallelepiped, Regular Right Pyramid with triangular or square base, Trigonometric ratio, Degree and Radian Measures, Standard Identities, Complementary angles, Heights and Distances, Histogram, Frequency polygon, Bar diagram & Pie chart.

**D. English Language (10 Marks):**

Candidates' understanding of the Basics of English Language, its vocabulary, grammar, sentence structure, synonyms, antonyms and its correct usage, etc. his/her writing ability would be tested.

**E. Subject Knowledge (80 Marks):**

- (i) General Science (10+2 level): Questions based on Physics, Chemistry and Biology subjects of 10+2 standard.
- (ii) ITI (Mechanical Engineering/Pump Mechanic): Questions based on the syllabus of NCVT ITI (Mechanical Engineering/ Pump Mechanic) trade certificate.
- (iii) Practical Knowledge of Medical Gas System:
  1. Gas Distribution Systems: Compressed gas cylinders, Colour coding, Cylinder valves; Pin index, Gas piping system, Recommendations for piping system, Alarms & safety devices.

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2. MGPS Design and Techniques: Statutory obligations and safe system operation, MGPS design and installation requirements, Basic fault-finding, Structure and management of the permit-to work system, MGPS equipment performance requirements (plant and pipeline); Technical reporting including system capacities/limitations, upgrading requirements/equipment replacement, system compliance.
3. MGPS Policies and documentation: MGPS documentation; Emergency procedures; MGPS operational policy preparation, implementation and monitoring; MGPS testing and quality control requirements; Manifold systems; Cryogenic liquid cylinders; Bulk cryogenic (VIE) systems Alarm requirements.
4. Piping materials and specification of W.I. & steel pipes, Pipe threads, Pipe fittings, Specifications of fittings, Brief description of different types of pipe joints, Pipe fittings, Flanges, Unions, Valves etc., Different types of pipes lay out systems, Different types of pipe joints.
5. Working principals of valves and their description.
6. Mechanical faults on terminal outlets, Line regulators, Zone valve boxes and faults on electrically controlled line, Pressure alarms.
7. Oxygen acetylene welding procedure of medical gas pipeline using inert gas shielding
8. Installation, maintenance and repair of liquid oxygen plant and high-pressure cylinder manifolds
9. Types of many gas manifolds.
10. Manifolds selection criteria.
11. Manifolds assemblies.
12. Semi- automatic manifolds.
13. Manifolds accessories.
14. Manifolds valves etc.

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## SYLLABUS FOR THE POST OF SENIOR ADMINISTRATIVE ASSISTANT

**PART-I****A. General Intelligence and Reasoning (50 Marks):**

It would include questions of both verbal and non-verbal type. The test will include questions on Semantic Analogy, Symbolic operations, Symbolic/Number Analogy, Trends, Figural Analogy, Space Orientation, Semantic Classification, Venn Diagrams, Symbolic/Number Classification, Drawing inferences, Figural Classification, Punched hole/pattern-folding & unfolding, Semantic Series, Figural Pattern-folding and completion, Number Series, Embedded figures, Figural Series, Critical Thinking, Problem Solving, Emotional Intelligence, Word Building, Social Intelligence, Coding and de-coding, Other sub-topics, if any Numerical operations.

**B. General Awareness (50 Marks):**

Questions are designed to test the candidate's general awareness of the environment around him and its application to society. Questions are also designed to test knowledge of current events and of such matters of everyday observation and experience in their scientific aspect as may be expected of an educated person. The test will also include questions relating to India and its neighbouring countries especially 10 pertaining to History, Culture, Geography, Economic Scene, General policy and scientific research.

**C. Quantitative Aptitude (50 Marks):**

Number Systems: Computation of Whole Number, Decimal & Fractions, Relationship between numbers

Fundamental arithmetical operations: Percentages, Ratio and Proportion, Square roots, Averages, Interest (Simple and Compound), Profit and Loss, Discount, Partnership Business, Mixture and Allegation, Time and distance, Time and work.

Algebra: Basic algebraic identities of School Algebra and Elementary surds (simple problems) and Graphs of Linear Equations.

Geometry: Familiarity with elementary geometric figures and facts: Triangle and its various kinds of centres, Congruence and similarity of triangles, Circle and its chords, tangents, angles subtended by chords of a circle, common tangents to two or more circles.

Mensuration: Triangle, Quadrilaterals, Regular Polygons, Circle, Right Prism, Right Circular Cone, Right Circular Cylinder, Sphere, Hemispheres, Rectangular Parallelepiped, Regular Right Pyramid with triangular or square Base

Trigonometry: Trigonometry, Trigonometric ratios, Complementary angles, Height and distances (simple problems only) Standard Identities like  $\sin^2\theta + \cos^2\theta = 1$  etc.

Statistical Charts: Use of Tables and Graphs: Histogram, Frequency polygon, Bar-diagram, Pie-chart

**D. English Language (50 Marks):**

Spot the Error, Fill in the Blanks, Synonyms/Homonyms, Antonyms, Spellings/ Detecting Mis-spelt words, Idioms & Phrases, One word substitution, Improvement of Sentences, Active/Passive Voice of Verbs, Conversion into Direct/Indirect narration, Shuffling of Sentence parts, Shuffling of Sentences in a passage, Cloze Passage, Comprehension Passage.

**PART-II****Skill Test:**

The Skill Test will be of qualifying nature. Candidates will have to qualify the test for English or Hindi at the prescribed speed on Computer as per the advertisement.

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## 1/5/2023 SYLLABUS FOR THE POST OF STORES ATTENDANT GRADE-II

**A. General Intelligence and Reasoning (50 Marks):**

It would include questions of both verbal and non-verbal type. The test will include questions on Semantic Analogy, Symbolic operations, Symbolic/Number Analogy, Trends, Figural Analogy, Space Orientation, Semantic Classification, Venn Diagrams, Symbolic/Number Classification, Drawing inferences, Figural Classification, Punched hole/pattern-folding & unfolding, Semantic Series, Figural Pattern-folding and completion, Number Series, Embedded figures, Figural Series, Critical Thinking, Problem Solving, Emotional Intelligence, Word Building, Social Intelligence, Coding and de-coding, Other sub-topics, if any Numerical operations.

**B. General Awareness (50 Marks):**

Questions are designed to test the candidate's general awareness of the environment around him and its application to society. Questions are also designed to test knowledge of current events and of such matters of everyday observation and experience in their scientific aspect as may be expected of an educated person. The test will also include questions relating to India and its neighbouring countries especially 10 pertaining to History, Culture, Geography, Economic Scene, General policy and scientific research.

**C. Quantitative Aptitude (50 Marks):**

Number Systems: Computation of Whole Number, Decimal & Fractions, Relationship between numbers

Fundamental arithmetical operations: Percentages, Ratio and Proportion, Square roots, Averages, Interest (Simple and Compound), Profit and Loss, Discount, Partnership Business, Mixture and Allegation, Time and distance, Time and work.

Algebra: Basic algebraic identities of School Algebra and Elementary surds (simple problems) and Graphs of Linear Equations.

Geometry: Familiarity with elementary geometric figures and facts: Triangle and its various kinds of centres, Congruence and similarity of triangles, Circle and its chords, tangents, angles subtended by chords of a circle, common tangents to two or more circles.

Mensuration: Triangle, Quadrilaterals, Regular Polygons, Circle, Right Prism, Right Circular Cone, Right Circular Cylinder, Sphere, Hemispheres, Rectangular Parallelepiped, Regular Right Pyramid with triangular or square Base

Trigonometry: Trigonometry, Trigonometric ratios, Complementary angles, Height and distances (simple problems only) Standard Identities like  $\sin^2\theta + \cos^2\theta = 1$  etc.

Statistical Charts: Use of Tables and Graphs: Histogram, Frequency polygon, Bar-diagram, Pie-chart

**D. English Language (50 Marks):**

Spot the Error, Fill in the Blanks, Synonyms/Homonyms, Antonyms, Spellings/ Detecting Misspelt words, Idioms & Phrases, One word substitution, Improvement of Sentences, Active/Passive Voice of Verbs, Conversion into Direct/Indirect narration, Shuffling of Sentence parts, Shuffling of Sentences in a passage, Cloze Passage, Comprehension Passage.

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