

**Uttar Pradesh University of Medical  
Sciences, Saifai, Etawah**

**SYLLABUS**

**CRT 2023-24**

**(Group B & C Post)**

**Computer Based Examination**

(Advt. No. 34/UPUMS/Recruitment Cell/2023-24 (Revised))

**NOTE:**

1. **Syllabus is only Indicative**
2. **The questions can assess any aspect of knowledge, aptitude, attitude, sub and practical skills, which is expected from a trained person to work efficiently at the advertised post.**

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# Syllabus

## General Instructions

1. The Computer Based Test (CBT)-2023-24 will be of 02 hours duration & will be of 300 marks.

2. It will contain 100 multiple choice questions (MCQs)

**3. Examination Scheme:**

- a. **For the post of:** Senior Administrative Assistant, Receptionist, Receptionist, Medical Social Service Officer Gr. – 2, Stenographer, Librarian Grade – 2, Junior Engineer - Electrical Engineering, Junior Engineer - AC Engineering, Junior Engineer - Telecommunication / CCTV Engineering, Junior Engineer - Mechanical Engineering, Junior Engineer - Civil Engineering, Draftsman, Assistant Security Officer, Sanitation Inspector, Jr. Medical Record Officer and Technical Officer (Biomed)

<b>Part A</b>	<b>General Aptitude</b> (Common for all the Posts)	General English	10 Questions
		General Knowledge	10 Questions
		Reasoning	10 Questions
		Mathematical Aptitude	10 Questions
<b>Part B</b>	<b>Core Subject</b>	Subject related to the post and level of the qualifications required	60 Questions

- b. **For the post of:** Dietician, Medical Lab Technologist, Technician (OT), Technician (Radiology) , Technician (Radiotherapy), Technician (CSSD) OT Assistant Technical Assistant (Cardiology) Technical Assistant (Neuro Physiology) Technician (Dialysis)

<b>Part A</b>	<b>General Aptitude</b> (Common for all the Posts)	General English	05 Questions
		General Knowledge	05 Questions
		Reasoning	05 Questions
		Mathematical Aptitude	05 Questions
<b>Part B</b>	<b>Core Subject</b>	Subject related to the post and level of the qualifications required	80 Questions

4. 1/3 (one-third) mark will be deducted for the wrong answer (i.e. there will be negative marking).

## Part- A

### Indicative Syllabus: General Aptitude

(Common for all the Posts)

- 1. General English:** Candidates ability to understand correct English, his basic comprehension and writing ability would be tested, Questions in this section will be designed to test the candidates understanding and knowledge of English language and will be based on spot the error, fill in the blanks, synonyms, antonyms, spelling/detecting mis-spelt words, idioms and 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, comprehension passage and any other English Language questions at the Level of Matriculation /Higher Secondary.
- 2. General Knowledge:** 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 everyday observations and experience in the scientific aspect as may be expected of any educated person. The test will also include questions relating to india and its neighboring countries especially pertaining history, culture geography, economic scene general policy & scientific research.
- 3. Reasoning:** It would include questions of both verbal and nonverbal type. This component may include questions on analogies, similarities and differences, spatial orientation, problem solving, Analysis, judgement, decision making, discrimination, observation, relationship concepts, arithmetical reasoning and figural classification, arithmetic number series, non verbal series, coding and decoding, statement conclusion, etc the topics are, 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 thing, Emotional Intelligence, Social Intelligence, Other sub topics, if any.
- 4. Mathematics Aptitude:** 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 relationship between numbers percentage, Ration & Proportion, Square roots, Averages, Interest, Profit & Loss, Discount, Partnership, Elementary Surds, Graphs of Linear Equation, 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 ration, Degree and radian Measures, Standard Identities, Complementary Angles, Heights and Distances, Histogram, Frequency, polygon, Bar diagram & pie chart.

## Senior Administrative Assistant

**Part- A:** General Aptitude (Page No 4) - 40 Questions (120 Marks)

**Part-B:** Core Subject - 60 Questions (180 Marks)

1. Fundamental Rules (FRs) and Supplementary Rules (SRs)
2. TA Rules; LTC Rules; Leave Rules; Medical Attendance Rule
3. CCS (Conduct) Rules, 1964; CCS (CCA) Rules 1965
4. General Financial Rules (GFRs)- 2017
5. Office Procedure.
6. Institutional Administration
7. RTI Act 2005; CCS (Pension) Rules; New Pension Scheme
8. Leadership, Teamwork and Conflict Resolution/Management
9. Any other matter of National Importance/Constitutional Laws/Case Laws etc.
10. Computer literacy: Characteristics of computers, computer organization including RAM, ROM, File system, Input devices, Software understanding, Relationship between hardware and software, Operating system, MS office, Information technology and society Indian IT act, Digital signatures, Application of information technology in Government , E-office management etc.

## Receptionist

**Part- A:** General Aptitude (Page No 4) - 40 Questions (120 Marks)

**Part-B:** Core Subject - 60 Questions (180 Marks)

1. **Basic Computer Knowledge:** Introduction to MS Windows, MS Office, And Basics of Internet etc. (f): Subject Knowledge Principles of Communication and Public Relations.
2. **Communication:** Definitions – Elements of Communication, Nature, Role and Scope of Communication, Communications, Public opinion and Democracy, Communication mass media and Socio-economic development.
3. **Methods Of Communication:** Face to face Communication, Group Communication, Mass Communication- Spoken, Written, Un-Spoken and Unwritten, Present state of Communication in India.
4. **Mass Communications And Mass Media:** Marshal McLuhan's theory-the Medium is the message, One-step, two- step, multi-step flow of Communication, Mass Media and its characteristics what is Communication research, the nature and task of Communication research.
5. **Principles Of Public Relations:** Meaning and Definitions, Basic elements of PR, Nature, role and scope, PR as a tool of modern management – PR role in the Indian Setting- Developing economy. PR as distinct from other forms of Communication, PR and Publicity, Lobbying, Propaganda, Sales Promotion, and Advertising, PR and Corporate Marketing Services. Historical Perspective- Industrial revolution-the beginnings of PR – Pioneers-Ivy Lee in America – Technological and media revolution in the Society- PR during First and Second World Wars – The Development of Indian PR, Early Phase, Professionalism, Genesis and Growth of PRSI – Present status and Future of PR in India. Public Opinion – Meaning and Definition- Opinion Leaders-Individuals Institution, Roots of public attitudes – Culture, the family, religion, Economic and Social Classes – Role of PR in opinion formation-persuasion. The Ethics of PR – Social Responsibility Code of Professional Standards for the practice of PR – IRSI – Code of Ethics. Public Relations Media
6. **Media Classification:** Introduction to Mass Media, Functions of Mass Media, Characteristics, Limitations, advantage and relative appeal of different media.
7. **News-Papers And Magazines:** Principal categories of newspapers and periodicals, News Agencies, Government and Press – Mass Media as Social Instruments.
8. **Radio Broadcasting:** Ratio in India, Relative coverage and appeal of Radio and Press. Impact of Radio on rural India and rural development.
9. **TV In India:** A brief history of Television – Coverage, present status and impact on masses, Role of Satellite Communication, TV for Socio- Economic change, The future of Television in India.
10. **Film In India:** Film as a tool of PR, Impact of films, Documentaries, PR Films, Feature Films, Script writing of newsreel and documentaries.
11. **Photographs:** The Camera as a tool of PR, Uses of Photos in PR, News-photos, Photo features-photo Editing, Caption writing.

12. **Exhibitions:** Exhibition as a PR tool, Types of Exhibitions, Planning an Exhibition- Theme and Display.
13. **Media Relations:** Strategy for good media relations, Inter-Media Publicity, Press Conference. -Traditional Media as a PR tool – Types – Advantages - Role of traditional Media in rural India. -Outdoor media as a PR tool – Hoardings – Posters – Transit media – Bus panels – Neon signs – Direct Mail – advantages. - The Art of News writing – What is News, Difference between newspapers writing and broadcast writing, Language, content and style. -Writing for Newspapers and House Journals - Reporting – How to write a press release, Press release – Its parts, headline, subhead lines, the lead, paragraphs, essentials of writing a press release. -Feature writing, Corporate features- Development-stories. - Editorial Writings: House Journal’s Editorials, Writing for Radio & TV. Public Relations Practice
14. **Public Relations Practice:** Scope of the Practice; Profile of the practitioner; Planning for Public Relations; Measuring Public Relations Objectives; Organizing Public Relations department;- Organizing Public Relations Agency.
15. **Public Relations Specialisation:** Public Relations in Employee Relations ; Public Relations in Industrial Relations ; Public Relations and the Community ; Public Relations and the Govt. ; Public Relations in Promotion of causes and Ideas.

## Medical Social Service Officer Gr-2

**Part- A:** General Aptitude (Page No 4) - 40 Questions (120 Marks)

**Part-B:** Core Subject - 60 Questions (180 Marks)

1. Nature and development of social work
2. Sociological concepts and contemporary concerns
3. Human behavior and social environment
4. Social action and social movements
5. Research in social work
6. Administration of welfare and development services
7. Social justice and empowerment
8. Social work and disaster management
9. Counselling
10. HIV/AIDS



# Dietician

**Part- A:** General Aptitude (Page No 4) - 20 Questions (60 Marks)

**Part-B:** Core Subject - 80 Questions (240 Marks)

## 1. Human Physiology:

- a. General principles of Physiology.
- b. The Skeleton
- c. Blood and Circulatory System
- d. Lymphatic System
- e. Respiratory System
- f. Digestive
- g. Excretory System
- h. Nervous System
- i. Reproductive System
- j. Sense Organs
- k. Glands and Endocrine System

## 2. Biochemistry:

- a. Introduction to Biochemistry
- b. Carbohydrates
- c. Proteins
- d. Lipids
- e. Enzymes
- f. Nucleic Acids
- g. Biological Oxidation, Electron Transport Chain, Oxidative Phosphorylation
- h. Hormones

## 3. Food Microbiology, Sanitation And Hygiene:

- a. Introduction to Microbiology
- b. Growth curve of a typical bacterial cell
- c. Primary sources of micro-organisms in foods
- d. Sterilization, Pasteurization and disinfection
- e. Micro-organisms in foods
- f. Food spoilage and contamination

- g. Public health hazards due to contaminated foods
- h. Microbes used in biotechnology
- i. Hygiene and its importance and application
- j. Safe handling of food
- k. Rodents and Insects as carriers of food-borne diseases
- l. Human Nutrition And Meal Management
- m. Disinfectants, sanitizers, antiseptic and germicide. Common disinfectants used on working surfaces, kitchen equipment, dish washing, hand washing etc. Care of premises and equipment, cleaning of equipment and personal tools immediately after use, use of hot water in the washing process.
- n. Waste disposal, collection, storage and proper disposal from the premises.
- o. Legal administration and quality control, laws relating to food hygiene

#### 4. **Human Nutrition And Meal Management**

- a. Concept and Definition of terms – Nutrition, Malnutrition, Health, Brief history of Nutritional Science. Scope of Nutrition.
- b. Minimum Nutritional Requirements and RDA. Formulation of RDA and Dietary Guidelines
- c. Energy in Human Nutrition
- d. Proteins, Lipids, Carbohydrates, Dietary Fibre
- e. Minerals and Trace Elements
- f. Water – Functions, Requirements
- g. Nutritional requirements
- h. Effect of cooking and home processing
- i. Improving nutritional value through different methods – germination, fermentation, combination of foods.
- j. Basic principles of meal planning.
- k. Nutritional considerations for planning meals for Adults – male and female
- l. Feeding of young children 0 -3 years and Old age
- m. Athletes
- n. Nutritional considerations in brief for the following: Military, naval personnel, Astronauts and food for space travel
- o. Emergencies such as drought, famine, floods etc.

#### 5. **Community Nutrition**

- a. Concept and Scope of Community Nutrition

- b. Food availability and factors affecting food availability and intake
- c. Assessment of Nutritional status
- d. Nutritional problems of communities and implications for public health (PEM, Micronutrient Deficiencies, Fluorosis)
- e. Schemes and Programs in India to combat Nutritional Problems in India
- f. Hazards to Community Health and Nutritional status
- g. Nutrition Policy of India and Plan of Action.
- h. Health and Nutrition Education

## 6. **Diet Therapy**

- a. Diet Therapy and Nutritional Care in Disease
- b. Nutritional
- c. Interactions between Drugs, Food Nutrients and Nutritional Status
- d. Disease of the G. I. System – Nutritional Assessment and Treatment and Dietary Care
- e. Intestinal Diseases and Treatment and Dietary Care
- f. Diet in Diseases of the Liver, Pancreas and Biliary System
- g. Dietary care and management in diseases of Gall Bladder and Pancreas
- h. Diet in Disease of the Endocrine Pancreas Diabetes Mellitus and Hypoglycemia
- i. Dietary care in diseases of the Adrenal Cortex, Thyroid gland and Parathyroid gland
- j. Nutritional care for Weight Management Regulation of energy intake
- k. Diseases of the Circulatory System
- l. Anemia, Thalassemia and dietary management
- m. Renal Disease and Dietary Treatment and
- n. Nephrolithiasis
- o. Food Allergy
- p. Diseases of Nervous System and dietary treatment and prognosis
- q. Arthritis and dietary management
- r. Nutrition in Cancer and nutritional implications
- s. Nutrition in Physiological
- t. Dietary guidelines and Surgery and Management of Surgical Conditions
- u. Dietary guidelines in Burns
- v. Metabolic implications – nutritional requirement Management and nutritional care

- w. Nutritional Management of Patients with HIV,
- x. Pediatric patients with cancer and the terminal cancer patient
- y. Misconceptions in nutritional care

**7. Nutrition Education And Dietetic Counseling**

- a. Dietician as part of the Medical Team and Outreach Services.
- b. Clinical Information
- c. The Care Process
- d. Working with – 1. Hospitalized patients (adults, pediatric, elderly, and handicapped), adjusting and adopting to individual needs. 2. Outpatients (adults, pediatric, elderly, handicapped), patients' education, techniques and modes.
- e. Follow up, Monitoring and Evaluation of outcome, Home visits
- f. Maintaining records, Reporting findings, Applying findings, Resources and Aids for education and counseling.

**8. Food Services Management**

- a. Introduction to food services and catering industry
- b. Hospital food service as a specialty
- c. Organizations – Types of organizations and characteristics. Organizational charts.
- d. Catering Management
- e. Approaches to Management Traditional, Systems Approach, Total Quality Management.
- f. Management of Resources
- g. Purchase and store room
- h. Human Resource Management
- i. Financial Management
- j. Food Production and Service Operations

# Stenographer

**Part- A:** General Aptitude (Page No 4) - 40 Questions (120 Marks)

**Part-B:** Core Subject - 60 Questions (180 Marks)

1. Professional Communication
2. Modern office Practices & Procedures
3. Computer literacy: Characteristics of computers, computer organization including RAM, ROM, File system, Input devices, Software understanding, E-office management etc.
4. Computer Typing Theory
5. Elementary Book Keeping and Accountancy
6. Short Hand (English & Hindi)
7. Computer Communication Concept
8. Secretarial Practices and Office automation
9. Office and Business correspondence
10. Computer Accountancy
11. Elements of company law and banking services
12. Personality development and behavior
13. Environmental education ad disaster management
14. Vocational Hindi and correspondence

## Librarian Grade -2

**Part- A:** General Aptitude (Page No 4) - 40 Questions (120 Marks)

**Part-B:** Core Subject - 60 Questions (180 Marks)

1. Library Methods and Techniques Library and Society: Laws of Library Science; Types of Libraries; Library Associations, Systems and Programmers; Library Movement and Library Legislation in India; Organizations and Institutions involved in the development of Library and Information Services- UNESCO, IFLA, FID, INIS, NISSAT, etc.
2. Library Management: Collection development - Types of Documents and Selection Principles, Acquisition Procedure, Acquisition of Journals and Periodicals, Preparation of Documents for use.
3. Library Personnel and Library Committee, Library Rules and Regulations
4. Library Finance and Budget
5. Principles of Library Management, Library Organization and Structure
6. Use and Maintenance of the Library - Circulation, Maintenance, Shelving, Stock Verification, Binding and Preservation, Weeding out, etc.; Library Classification Theory and Practice: Canons and Principles, Library Classification Schemes - DDC, CC, UDC.
7. Library Cataloguing Theory and Practice: Canons and Principles; Library Cataloguing Codes - CCC and AACR.
8. Reference and Information Sources: Bibliography and Reference Sources - Types of Bibliography; Reference Sources- Dictionaries, Encyclopedias, Ready Reference Sources, etc.
9. Sources of Information - Primary, Secondary, Tertiary, Documentary, Non-Documentary; E-Documents, E-Books, E-Journals, etc
10. Information Services: Concept and need for Information
11. Types of Documents; Nature and organization of Information Services, Abstracting and Indexing Services; Computer based Information Services - CAS, SDI.
12. Information Technology: Basics Introduction to Computers; Use of computers in Library housekeeping, Library Automation; Software and software packages; Networks - DELNET, NICNET, etc.; National and International Information Systems - NISSAT, NASSDOC, INSDOC, DESIDOC, etc.

## Junior Engineer (Electrical Engineering)

**Part- A:** General Aptitude (Page No 4) - 40 Questions (120 Marks)

**Part-B:** Core Subject - 60 Questions (180 Marks)

1. Basic concepts: Concepts of resistance, inductance, capacitance, and various factors affecting them. Concepts of current, voltage, power, energy and their units.
2. Circuit law: Kirchhoff's law, Simple Circuit solution using network theorems. Magnetic Circuit: Concepts of flux, mmf, reluctance, Different kinds of magnetic materials, Magnetic calculations for conductors of different configuration e.g. straight, circular, solenoidal, etc. Electromagnetic induction, self and mutual induction.
3. AC Fundamentals: Instantaneous, peak, R.M.S. and average values of alternating waves, Representation of sinusoidal wave form, simple series and parallel AC Circuits consisting of R.L. and C, Resonance, Tank Circuit. Poly Phase system – star and delta connection, 3 phase power, DC and sinusoidal response of R-L and R-C circuit.
4. Measurement and measuring instruments: Measurement of power (1 phase and 3 phase, both active and re- active) and energy, 2 wattmeter method of 3 phase power measurement. Measurement of frequency and phase angle. Ammeter and voltmeter (both moving coil and moving iron type), extension of range wattmeter, Multimeters, Megger, Energy meter AC Bridges. Use of CRO, Signal Generator, CT, PT and their uses. Earth Fault detection.
5. Electrical Machines : (a) D.C. Machine – Construction, Basic Principles of D.C. motors and generators, their characteristics, speed control and starting of D.C. Motors. Method of braking motor, Losses and efficiency of D.C. Machines. (b) 1 phase and 3 phase transformers – Construction, Principles of operation, equivalent circuit, voltage regulation, O.C. and S.C. Tests, Losses and efficiency. Effect of voltage, frequency and wave form on losses. Parallel operation of 1 phase /3 phase transformers. Auto transformers. (c) 3 phase induction motors, rotating magnetic field, principle of operation, equivalent circuit, torque-speed characteristics, starting and speed control of 3 phase induction motors. Methods of braking, effect of voltage and frequency

variation on torque speed characteristics.

6. Fractional Kilowatt Motors and Single Phase Induction Motors: Characteristics and applications.
7. Synchronous Machines - Generation of 3-phase e.m.f. armature reaction, voltage regulation, parallel operation of two alternators, synchronizing, control of active and reactive power. Starting and applications of synchronous motors.
8. Generation, Transmission and Distribution – Different types of power stations, Load factor, diversity factor, demand factor, cost of generation, inter-connection of power stations. Power factor improvement, various types of tariffs, types of faults, short circuit current for symmetrical faults. Switchgears – rating of circuit breakers, Principles of arc extinction by oil and air, H.R.C. Fuses, Protection against earth leakage / over current, etc. Buchholtz relay, Merz-Price system of protection of generators & transformers, protection of feeders and bus bars. Lightning arresters, various transmission and distribution system, comparison of conductor materials, efficiency of different system. Cable – Different type of cables, cable rating and derating factor.
9. Estimation and costing : Estimation of lighting scheme, electric installation of machines and relevant IE rules. Earthing practices and IE Rules.
10. Utilization of Electrical Energy : Illumination, Electric heating, Electric welding, Electroplating, Electric drives and motors.
11. Basic Electronics: Working of various electronic devices e.g. P N Junction diodes, Transistors (NPN and PNP type), BJT and JFET. Simple circuits using these devices



## Junior Engineer (A C Engineering)

**Part- A:** General Aptitude (Page No 4) - 40 Questions (120 Marks)

**Part-B:** Core Subject - 60 Questions (180 Marks)

1. Subject Knowledge (Air conditioning & Refrigeration): General - Knowledge of Indian Electricity Act, Indian Elect. Rules as amended up-to- date. General conditions of supply and charges to be paid to licencees for obtaining connection. CPWD General Specifications for Electrical Works, Principles of analysis of rates. General Principles in preparation of estimates, project reports, award of works and execution of works and measurement. ISI/BIS Standards and Codes of practices.
2. Internal Electrical Installations - Systems of wiring and their design, distribution system. Apparatus for control, protection and Testing.
3. Earthing, Lighting Protection, Safety & Maintenance - Necessity of earthing, earthing resistance, type of earthing. Lighting protection design, layout, material and installation. Safety procedures and practices, principles of equipment installation, preventive maintenance and testing of equipment.
4. Sub-Station up to 33 KV and Distribution - Layout and Design for indoor and outdoor application. Specifications for equipment, Sub- Station earthlings, stand-by generating sets, commissioning procedures and tests. Distribution: Design of overhead line and underground distribution systems. Specification for cables, conductors, Supports etc. Cable joining and termination methods, power factor improvement, service connection to buildings.
5. Air-Conditioning Ventilation - General principles of Refrigeration, Air-Conditioning, evaporative cooling and ventilation, Heating and cooling load estimation. Classification of systems, their design and application, structural requirements, specifications for installations.
6. Water Supply - Types of pumps and their characteristics. Prime movers, pumping Page | 82 systems and application. Specification for equipment and installation.
7. Electrical Apparatus –
  - a. Single and poly phase A.C. Circuit. Effects of resistance inductance and capacitance.

- b. Single and poly phase transformers – constructional features, equivalent circuits performance, parallel operation, phase conversion. Separation of losses and determination of efficiency by various methods. Auto transformers.
  - c. Alternators, Constructional features, regulation, parallel operation and Protection. Automatic Voltage regulators, Emergency generating sets, automatic change over.
  - d. Induction machines, polyphase motor and its principle of operation and equivalent circuit. Torque, slip characteristics. Crawling, methods of starting, single phase motor, its theory, characteristics and application.
8. Instrument Transformers, Protective Relaying, Measurements - Current, Voltage transformers. Constructional features of IDMT relays, instantaneous relays including knowledge of overload earth fault, undervoltage, Bucholz relays. Connection diagrams, settings. Electrical instruments and Measurements, principles of construction and theory of measuring instruments for direct and alternating currents. Commercial types. Measurement of resistance, Voltage, current, power, power factor and energy. Watt meters, energy meters. Thermos couples, Resistance Thermometers, Pyro-meters. Fault locating bridges for cables. Measurements of resistance, inductance and capacitance, Wheatstone
9. Internal Combustion Engines Fuels and Combustion. Fuels and their properties, combustion calculations. Analysis of products of combustion. Power cycles. Vapor power cycles- Carnot and Rankine. Gas Power-Otto and Diesel cycles. Deviation of actual cycles from theoretical cycles. Internal combustion engines – Two and four stroke compression ignition and spark ignition engines. Combustion phenomena. Detonation, Knocking, scavenging of two stroke engines. Fuel injection and carburation. Lubrication and cooling system performance and testing of IC engines. Pollution control requirements/standards.
10. Heating, Air Conditioning And Refrigeration – Refrigeration and heat pump cycles. Vapour compression, absorption Cycles. Refrigerants and their characteristics. Air Conditioning – Psychrometric chart, comfort airconditioning, comfort indices, ventilation requirements. Cooling and dehumidification methods. Industrial air-conditioning processes. Different

methods of electric heating. Construction and performance of Electric heating equipment.

11. Workshop Technology Estimation of power and energy requirements of electric welding, different types of equipments used and their characteristics. Manufacturing and Fabricating methods and practices for various electrical and mechanical equipment such as pumps, switch boards, light fittings, AHUs etc.
12. Energy Conservation, Power Factor Improvement Comparison of different types of lamps from the point of energy conservation, calculation of payback period. Power factor improvement, Reduction of load current and transformer losses due to power factor improvements. KVA requirement for power factor improvement.
13. Solar Energy Utilisation Solar Hot Water system, principles, constructional features, constituent parts, installation, operation & maintenance, solar photo voltaic system, advantages/disadvantages of solar heating & solar photo voltaic system.

## Junior Engineer (Telecommunication/CCTV Camera)

**Part- A:** General Aptitude (Page No 4) - 40 Questions (120 Marks)

**Part-B:** Core Subject - 60 Questions (180 Marks)

1. Computer Architecture: Computer architecture, basic computer organization and design programming, CPO, I/Q organization, memory organization. Control unit design. Familiarization with DOS and Window-concept of file, directly, folder, Number system, Programming-Elements of high-level programming Language, PASCAL, C: Use of basic data structure.
2. Web Page Design: Scripting Language – Perl/CGI/Java Script; Fundamentals of JAVA Programming; Advanced Features of JAVA Programming.
3. Data Communication and Computer Network: Data Network and Networking Basics; MAC& Data Link Layer Network, Transport (TCP/IP). Introduction to Computer Network, LAN,MAN,WAN, Network essentials, Internet addresses, ARP, RARP, Internet protocols, user data, gram protocol, transmission control protocol, internet multi testing, socket interface, domain name system, applications.
4. Data Structure and Algorithms: Basis concept of data representation, introduction to algorithms design and data structure, Arrays stacks and queues, linked lists, storage allocation and garbage collection, symbol tables, Searching, Sorting and Merging Techniques.
5. Database Management System: Database, Data models, rational algebra and normalization, statistical quality level, distributed and object data basis. Introduction to the Relational Model; Normalisation and Query Processing; Recovery, Concurrency Management and Database Security.
6. Electronic/Electrical Measurement & Measuring Instrument: Electrical Measuring instrument, Watt meters and energy meters, measurement of resistance , measurement of inductance and capacitance, electronic voltmeters, audio and radio frequency measurements, A F &R F Power measurement, digital measurement.
7. Electrical Installation & Maintenance: Single Phase supply vs. 3 phase, Star Delta connection, relation between phase & line voltage power factor. All types of motor and generators-AC & DC Transformers, starters, rectifiers, inverters,

batteries. Installation commissioning, earthing insulation. Testing and maintenance, preventive maintenance, electrical accidents and safety measures, switchgear, sub-station maintenance of relays and circuit breakers. A.C. Circuits, Circuit theorems, four terminal passive Networks, Coupled circuits and their analysis, Passive filters, lightning protection, power electronics application in control of drivers, Refrigeration & air-conditioning.

8. Fundamentals of Digital Circuits: Fundamentals of digital electronics, Transistor as a switching elements; Boolean algebra, simplification of Boolean functions, Karnaugh Maps AND APPLICATIONS; Number system, IC Logic Gates, Logic-Circuits, Encoders and Decoders, binary code converters , Arithmetic logic units (ALU), DTL, TTL, NMOS, PMOS and CMOS gates and their comparison; combination logic circuits; Half adder, full adder; Digital comparator, multiplexer Demultiplexer; ROM and applications. Flip-flops, R-S, J-K,D and T flip-flops; different type of counters and registers; A/D and D/A converters; Communication Systems: Amplitude, frequency and phase modulation, generation and demodulation, Noise. PCM, basic principles of SPC Exchanges. Quantization & Coding; time division and frequency division multiplexing; Equalization; optical communication in free space & fibre optic; propagation of signals at HF, VHF, UHF and microwave frequency; Satellite Communication.
9. Foundation in Information Technology: Information system—Hardware; Software; Software Engineering; Operating systems Computing: An Object-Oriented Approach: Introduction to object-oriented concepts; object-oriented programming language; object-oriented analysis and design.
10. Discrete Electronic Devices & Circuits: The P-N Junction, Junction Diode, Zener Diode, BJT configurations and biasing, low frequency low signal Hybrid models of BJT; JFET, MOSFET, CMOS, photo-electric devices, feedback amplifiers, Oscillators, R.F. Voltage amplifiers using BJT, special semiconductor devices.
11. Microprocessors: Architecture & programming of 8086/8088, microprocessor-based data acquisition, memory address & DMA controllers, arithmetic co-processor, other microprocessor applications. Study of Peripheral Chips: 8255, 8279, 8155, 8259. Study of ADC 0808, DAC 0800.
12. Radio Communication Systems: Principles of Radio Communication, A.M.,

F.M., Radio, Phase Modulation. Signal conditioning and Transmission study of special chips, output interfacing, output instruments-indicators, recorders, data acquisition systems, data loggers, servo mechanism, electronic process control instrumentation. Wave propagation, Microwave devices & components, microwave measurements, antenna fundamental & their characteristic. Audio engineering, sound transducers, sound recording & reproduction, sound transmission, radio transmission, radio reception.

## Junior Engineer (Mechanical Engineering)

**Part- A:** General Aptitude (Page No 4) - 40 Questions (120 Marks)

**Part-B:** Core Subject - 60 Questions (180 Marks)

1. Mechanical Engineering: Theory of Machines and Machine Design Concept of simple machine, Four bar linkage and link motion, Flywheels and fluctuation of energy, Power transmission by belts – V-belts and Flat belts, Clutches – Plate and Conical clutch, Gears – Type of gears, gear profile and gear ratio calculation, Governors – Principles and classification, Riveted joint, Cams, Bearings, Friction in collars and pivots.
2. Engineering Mechanics and Strength of Materials Equilibrium of Forces, Law of motion, Friction, Concepts of stress and strain, Elastic limit and elastic constants, Bending moments and shear force diagram, Stress in composite bars, Torsion of circular shafts, Buckling of columns – Euler’s and Rankin’s theories, Thin walled pressure vessels.
3. Thermal Engineering: Properties of Pure Substances: p-v & P-T diagrams of pure substance like H<sub>2</sub>O, Introduction of steamtable with respect to steam generation process; definition of saturation, wet & superheated status. Definition of dryness fraction of steam, degree of superheat of steam. H-s chart of steam (Mollier’s Chart).
4. 1st Law of Thermodynamics: Definition of stored energy & internal energy, 1st Law of Thermodynamics of cyclic process, Non Flow Energy Equation, Flow Energy & Definition of Enthalpy, Conditions for Steady State Steady Flow; Steady State Steady Flow Energy Equation.
5. 2nd Law of Thermodynamics: Definition of Sink, Source Reservoir of Heat, Heat Engine, Heat Pump & Refrigerator; Thermal Efficiency of Heat Engines & co-efficient of performance of Refrigerators, Kelvin – Planck & Clausius Statements of 2nd Law of Thermodynamics, Absolute or Thermodynamic Scale of temperature, Clausius Integral, Entropy, Entropy change calculation of ideal gas processes. Carnot Cycle & Carnot Efficiency, PMM-2; definition & its impossibility.
6. Air standard Cycles for IC engines: Otto cycle; plot on P-V, T-S Planes; Thermal Efficiency, Diesel Cycle; Plot on P-V, T-S planes; Thermal efficiency.

IC Engine Performance, IC Engine Combustion, IC Engine Cooling & Lubrication.

7. Rankine cycle of steam: Simple Rankine cycle plot on P-V, T-S, h-s planes, Rankine cycle efficiency with & without pump work. Boilers; Classification; Specification; Fittings & Accessories: Fire Tube & Water Tube Boilers. Air Compressors & their cycles; Refrigeration cycles; Principle of a Refrigeration Plant; Nozzles & Steam Turbines
8. Fluid Mechanics & Machinery: Properties & Classification of Fluid, ideal & real fluids, Newton's law of viscosity, Newtonian and Non-Newtonian fluids, compressible and incompressible fluids.
9. Fluid Statics: Pressure at a point.
10. Measurement of Fluid Pressure: Manometers, U-tube, Inclined tube.
11. Fluid Kinematics: Stream line, laminar & turbulent flow, external & internal flow, continuity equation.
12. Dynamics of ideal fluids: Bernoulli's equation, Total head; Velocity head; Pressure head; Application of Bernoulli's equation.
13. Measurement of Flow rate Basic Principles: Venturimeter, Pilot tube Hydraulic
14. Turbines: Classifications, Principles.
15. Centrifugal Pumps: Classifications, Principles, Performance. Production Engineering
16. Classification of Steels: mild steel & alloy steel, Heat treatment of steel, Welding – Arc Welding, Gas Welding, Resistance Welding, Special Welding Techniques i.e. TIG, MIG, etc. (Brazing & Soldering), Welding Defects & Testing; NDT, Foundry & Casting – methods, defects, different casting processes, Forging, Extrusion, etc, Metal cutting principles, cutting tools, Basic Principles of machining with (i) Lathe (ii) Milling (iii) Drilling (iv) Shaping (v) Grinding, Machines, tools & manufacturing processes.



## Junior Engineer (Civil Engineering)

**Part- A:** General Aptitude (Page No 4) - 40 Questions (120 Marks)

**Part-B:** Core Subject - 60 Questions (180 Marks)

1. Civil Engineering: Building Materials: Physical and Chemical properties, classification, standard tests, uses and manufacture/quarrying of materials e.g. building stones, silicate based materials, cement (Portland), asbestos products, timber and wood based products, laminates, bituminous materials, paints, varnishes.
2. Estimating, Costing and Valuation: estimate, glossary of technical terms, analysis of rates, methods and unit of measurement, Items of work earth work, Brick work (Modular & Traditional bricks), RCC work, Shuttering, Timber work, Painting, Flooring, Plastering. Boundary wall, Brick building, Water Tank, Septic tank, Bar bending schedule, Centre line method, Mid-section formula, Trapezoidal formula, Simpson's rule. Cost estimate of Septic tank, flexible pavements, Tube well, isolates and combined footings, Steel Truss, Piles and pile-caps. Valuation- Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolescence, methods of valuation. Surveying : Principles of surveying, measurement of distance, chain surveying, working of prismatic compass, compass traversing, bearings, local attraction, plane table surveying, theodolite traversing, adjustment of theodolite, Levelling, Definition of terms used in levelling, contouring, curvature and refraction corrections, temporary and permanent adjustments of dumpy level, methods of contouring, uses of contour map, tachometric survey, curve setting, earth work calculation, advanced surveying equipment.
3. Soil Mechanics: Origin of soil, phase diagram, Definitions-void ratio, porosity, degree of saturation, water content, specific gravity of soil grains, unit weights, density index and interrelationship of different parameters, Grain size distribution curves and their uses. Index properties of soils, Atterberg's limits, ISI soil classification and plasticity chart. Permeability of soil, coefficient of permeability, determination of coefficient of permeability, Unconfined and confined aquifers, effective stress, quick sand, consolidation of soils, Principles of consolidation, degree of consolidation, pre-consolidation pressure, normally consolidated soil, e-log p curve, computation of ultimate settlement. Shear

strength of soils, direct shear test, Vane shear test, Triaxial test. Soil compaction, Laboratory compaction test, Maximum dry density and optimum moisture content, earth pressure theories, active and passive earth pressures, Bearing capacity of soils, plate load test, standard penetration test.

4. Hydraulics: Fluid properties, hydrostatics, measurements of flow, Bernoulli's theorem and its application, flow through pipes, flow in open channels, weirs, flumes, spillways, pumps and turbines
5. Irrigation Engineering: Definition, necessity, benefits, 2II effects of irrigation, types and methods of irrigation, Hydrology–Measurement of rainfall, run off coefficient, rain gauge, losses from precipitation–evaporation, infiltration, etc. Water requirement of crops, duty, delta and base period, Kharif and Rabi Crops, Command area, Time factor, Crop ratio, Overlap allowance, Irrigation efficiencies. Different type of canals, types of canal irrigation, loss of water in canals. Canal lining– types and advantages. Shallow and deep to wells, yield from a well. Weir and barrage, Failure of weirs and permeable foundation, Slit and Scour, Kennedy's theory of critical velocity. Lacey's theory of uniform flow. Definition of flood, causes and effects, methods of flood control, water logging, preventive measure. Land reclamation, Characteristics of affecting fertility of soils, purposes, methods, description of land and reclamation processes. Major irrigation projects in India.
6. Transportation Engineering: Highway Engineering–cross sectional elements, geometric design, types of pavements, pavement materials–aggregates and bitumen, different tests, Design of flexible and rigid pavements–Water Bound Macadam (WBM) and Wet Mix Macadam (WMM), Gravel Road, Bituminous construction, Rigid pavement joint, pavement maintenance, Highway drainage, Railway Engineering–Components of permanent way–sleepers, ballast, fixtures and fastening, track geometry, points and crossings, track junction, stations and yards. Traffic Engineering–Different traffic survey, speed-flow-density and their interrelationships, intersections and interchanges, traffic signals, traffic operation, traffic signs and markings, road safety.
7. Environmental Engineering: Quality of water, source of water supply, purification of water, distribution of water, need of sanitation, sewerage systems, circular sewer, oval sewer, sewer appurtenances, sewage treatments. Surface water drainage. Solid waste management–types, effects, engineered management

system. Air pollution–pollutants, causes, effects, control. Noise pollution– cause, health effects, control. Structural Engineering Theory of structures: Elasticity constants, types of beams–determinate and indeterminate, bending moment and shear force diagrams of simply supported, cantilever and over hanging beams. Moment of area and moment of inertia for rectangular & circular sections, bending moment and shear stress for tee, channel and compound sections, chimneys, dams and retaining walls, eccentric loads, slope deflection of simply supported and cantilever beams, critical load and columns, Torsion of circular section.

# Draftsman

**Part- A:** General Aptitude (Page No 4) - 40 Questions (120 Marks)

**Part-B:** Core Subject - 60 Questions (180 Marks)

1. Occupational Forest Health and Safety: Importance of safety and general precautions observed in the industry, introduction to First aid, Introduction to PPEs, response to emergencies e.g., power failure, fire alarm, etc.
2. Engineering Drawing: Symbols & conventional representation for materials in sections as per IS 962- 1989, SP 46:2003 for building drawings, lines, lettering and dimensioning in construction of plain geometrical figures. Knowledge of different types of scale, principle of R.F, Basic principles of Orthographic Projections of line, plane, solid objects & section of solids. Isometric Projection of geometrical solids, Oblique and Perspective views.
3. Building Materials.
4. Building Planning: Objectives & importance, orientation, local building ByeLaws as per IS code, lay out plan & key plan, provisions for lighting and ventilation.
5. Building Services: Introduction, terms used in Public Health Engineering (PHE), systems of sanitation, water supply with plumbing, sanitary fittings, etc., type of sewer, manholes & septic tank, water treatment plant, sewage treatment plant.
6. Surveying
7. Reinforced cement concrete structure: Introduction to RCC, different types of concrete grades and their uses, bar bending details as per IS Code, reinforced brick work, structural elements – columns, beams, slabs -one-way slab & twoway slab, retaining wall, R.C.C. Framed structure.
8. Steel structures: Common forms of steel sections, structural fastener, joints, tension & compression member, classification, fabrication, construction details.
9. Roads: Introduction, history of highway development, general principles of alignment, classification and construction of different types of roads, component parts, road curves, gradient, road drainage system.
10. Bridges & Culverts: Introduction to bridges, Component parts of a bridge, classification of culverts, abutments, wing walls, classification of bridges.
11. Railways: Permanent way, types of rails, rail gauges, functions, requirements, sections, length of rail, types of joints, fish plate, fish bolt-spikes, chairs and keys-bearing plate and base plate.
12. Estimating and Costing: Introduction, purpose and common techniques, measurement techniques, importance and its types, rate analysis of typical items and their specifications, labour and materials, schedule of rates, Units of measurement and standard mode of measurements.
13. Computer Aided drafting: Operating system, hardware & software, Introduction to CAD, its Graphical User Interface, basic commands of CAD, knowledge of Tool icons and set of Toolbars, knowledge of shortcut keyboard command.

## **Assistant Security Officer**

**Part- A:** General Aptitude (Page No 4) - 40 Questions (120 Marks)

**Part-B:** Core Subject - 60 Questions (180 Marks)

1. Role & Aim of Security Department
2. Organization of Security Setup
3. Designation & Batches of Rank
4. Security cadre Scheme
5. Uniform/Dress Regulation applicable for security department
6. Hospital Security
7. Theft/Pilferage- Preventive steps thereof
8. Security Arrangements
9. Duties & Responsibilities of Assistant Security officer
10. Surface fire fighting arrangement
11. Utilization of Techno Gadgets
12. Security Reports & Returns
13. Importance of Physical Fitness in Uniformed Forces
14. Lodging of FIR with Local Police in given situation
15. Induction of Contractual Security

## Sanitation Inspector

**Part- A:** General Aptitude (Page No 4) - 40 Questions (120 Marks)

**Part-B:** Core Subject - 60 Questions (180 Marks)

1. Water Sanitation: WHO's definition of environmental Sanitation. Safe and whole some water, Sources of water, Various uses of water and its need. Water borne diseases, conservation source of water, quality of water, public health aspect of very hard water, Steps of disinfection of well. Physical, chemical and biological standard for portable water sources and nature of pollution of water in large scale and small scale. Process of disinfections of water in large and small scale provisions for sanitary wells and tube wells, plumbing system and its maintenance.
2. Air Sanitation: Concepts and importance of adequate ventilation. Types of ventilation. Natural ventilation. Mechanical ventilation. Indicators of air pollution. Process air purification and disinfection. Green house effect, types of ventilation, thermal comfort, air temperature humidity, radiation, evaporation and their measurements
3. Solid Waste Disposal: Source of generation, storage and collection. Sanitary method of disposal of solid waste. Classification of solid waste in the community. Polluting affect of different types of solid waste, system of collection of solid waste from the houses and street, sanitary transportation of solid waste, sanitary process of disposal of solid waste such as composting, sanitary land filling, incineration.
4. Sewage Disposal: What is sewage? Why sewage purification is required? Sewer appurtenances, house drain. Street sewers or municipal sewers. Sewage forming land treatment. Sewage disposal by Biogas plant or gobar gas plant. Methods of disinfection of sewage. Sanitary practices of sewage farming treatment plant. Collection of sewage sample for chemical and bacteriological analysis and interpretation or reports. Inspection and maintenance of sewage treatment plants and disinfections of stabilized sewage.
5. Liquid Waste Disposal/ Night Soil Disposal: Hygienic method of disposal of liquid waste. Health hazard related to accumulation of liquid waste or in sanitary drainage system. Construction and maintenance of sanitary sewerage system .Use of different types of traps, pollution of water sources from sewerage and its disinfection.
  - a. Soil Sanitation: Identification and use of insecticides, pesticides and disinfection, Application of Techniques of sterilization and disinfection of various articles. Identification of different parts of spraying equipments. Operation and maintenance of spraying equipment. Use of Larvicide's. Use of rodenticides

## Medical Record Officer

**Part- A:** General Aptitude (Page No 4) - 40 Questions (120 Marks)

**Part-B:** Core Subject - 60 Questions (180 Marks)

1. Hospital and Patient-care Appraisal: History and Evolution of Hospitals, New trends in Hospitals. Definition of Hospital- 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
2. 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 (vi) Accident and emergency services Department (vii) Medical Social Service Department (viii) General and Medical stores (ix) Blood Bank (x) Medical Library services. 1. Service units in a hospital Laundry, Housekeeping, CSSD. Miscellaneous Services: Engineering, Mortuary and Transport services.
3. Basic Anatomy:
  - a) General Introduction– Definition of Anatomy & Physiology. – Types of Anatomy (including systemic) – Definition of topographic term/term used to describe the body. – Description of Various regions of the body.
  - b) Cells and tissues of body and general histology.
  - c) Anatomical description of the following: - Skin and breast – Ontology – Joints – Ligaments – Fasciae and Bursae – Musculoskeletal system – Cardiovascular system – Respiratory system – Lymphatic system – Blood and blood forming organs – congenital system – Endocrine system – Organs of special senses (ear, eye, etc.) – Digestive system – Embryology
4. Basic Physiology:
  - a) 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 Nervous system Special senses Muscles

5. 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; diseases of RBCs.,WBCs., Plate less. – Coagulation factors and disorders – Blood groups and cross – matching, - Blood transfusion, - Urine composition: variation in common diseases, - CSF and body fluids, - Gastris & Duodenal contents, - Fasces – parasites, Introduction and historical background, Classification special, Characteristics of organisms bacterias, - Asepsis, - Disinfection Antiseptics- Sanitation, Infection, Immunity, Allergy study of pathogenic organisms, Non-pathology organisms, Virus and fungus, Parasitic diseases- their stance in India with lab Diagnosis.

## 6. Medical Terminology

- a. Objective ii. Basic iii.. Elements of Medical Terms (a) Roots (b) Prefixes (c) Suffixes (d) Colours (e) Numerals (f) Symbols(g) Abbreviationn (iv) Terms pertaining to Body as a whole.
- b) Terms relate to Investigations, and operation, treatment of conditions, disorders of: - 1.Skin and Breast (integumentary system) 2. Musculoskeletal 3. Neurological and psychiatric 4. Cardio- vascular 5. Blood and blood forming organs 6. Respiratory 7. Digestive 8. Uro – genital 9. Gynecological 10. Maternal, Antenatal and Neonatal conditions 11. Endocrine and Metabolic 12. Sense organs of: (i) Vision (ii) Hearing13. Systemic: (i) Infectious diseases. (ii) Immunological diseases. (iii) Diseases of the Connective Tissues. Geriatrics and Psycho geriatrics.
- c) Supplementary terms: Selected terms relating: 1. Oncology 2. Anesthesiology 3. Physical Medicine and Rehabilitation 4. Nuclear



Medicine 5. Plastic Surgery of Burns and Maxillofacial 6. Radio-Diagnosis 7. Radiotherapy

6. Biostatistics: Introduction to Statistics. (ii) Methods of collection of data. (iii) Measures of central tendency (simple average, G.M., H.M. Mode and Median). (iv) Measures of dispersion (Standard deviation, range, variance, average deviation) (v) Sampling; Definition, Methods of sampling (random systematic, stratified, cluster). (iv) Correlation and regression: Significance, linear correlation, correlation coefficient, linear regression. (vii) Time series analysis – concept and its utility, component of time series. (viii) Test of significance. (ix) Graphical presentation of data. (x) Probability- concept and definition. (xi) Uses of statistics. -1. Sources of hospital statistics (In- Patient census, Out – Patient deptt, and Special Clinics). 2. Definitions (live, birth, foctal death, immaturity, cause of death, underlying cause of death inpatient bed etc) 3. Analysis of hospital services and discharges. 4. Indices (Bed occupancy, average length of stay, bed turn – over interval, death rate, birth rate etc.) 5. Vital statistics. 6. Uses and Limitations of hospital data. 7. Method of compilation of various Health Returns/ Statistical Returns.

#### 7. Healthcare organization

1. 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.
2. Public Health Structure in India. – Directive Principles of -With relation to Public Health & medical Care. – Constitutional lists. – Various five years plans and priorities.3. Role of Voluntary Health Organisation.4.Basic facts of Health in India. 5. Current Objectives and strategies. –Population Dynamics. – Community Health Worker schemes.
- ii. National Health Programmes of Medicine and Homeopathy.8. Other programmes of relevance to
  - b) Health Sector. – Family Welfare. –Medical Termination of Pregnancy. – National Population Policy. – Maternity and Child Health.

#### 8. Medical Record Science

- a. Introduction to Medical Record Science. II. - 1.Development, Analysis and

### Uses of Medical Record.

- i. (i) Development of Medical Record Forms, basic and special. (ii) Order of Arrangements: (a) Ward
- ii. Medical Record Department. (c) Source oriented medical record. (d) Problem oriented medical record. (e) Integrated Medical Record. 3. Analysis of Medical record: (i) Quantitative. (ii) Qualitative.
- iii. Uses of Medical Records: (a) as a personal document. (b) as impersonal document.
- iv. Values of the Medical Record International classification of Diseases  
Classification of diseases as per I.C.D.

## Technical Officer (Biomed)

**Part- A:** General Aptitude (Page No 4) - 40 Questions (120 Marks)

**Part-B:** Core Subject - 60 Questions (180 Marks)

1. Computer Programming, Electronic Devices And Circuits, Circuit Theory, Transforms And Partial Differential Equations, Signals And Systems, Sensors And Measurements, Object Oriented Programming And Data Structures, Probability And Random Processes.
2. Basics of Electrical Engineering, Analog And Digital Ics, Analog And Digital Communication, Circuits And Ics Laboratory, Bio Control Systems.
3. Pathology and Microbiology Laboratory, Bio Control Systems, Diagnostic And Therapeutic Equipment, Bio Materials And Artificial Organs, Biomedical Instrumentation, Microprocessor And Microcontroller.
4. Hospital Management, Radiological Equipment, Biomechanics, Principles of Digital Signal Processing, Environmental Science and Engineering, Digital Signal Processing Laboratory.
5. Diagnostic and Therapeutic Equipment (ECG, EEG, USG, CT Scan, MRI, Infusion Pumps, Cardiac Monitors Etc.),
6. Pattern Recognition And Neural Networks, Medical Informatics, Medical Optics, Digital Image Processing, Hospital Training, Rehabilitation Engineering Etc

## Medical Lab Technologist

**Part- A:** General Aptitude (Page No 4) - 20 Questions (60 Marks)

**Part-B:** Core Subject - 80 Questions (240 Marks)

1. Anatomy
2. Physiology
3. General and Clinical Biochemistry
4. General Microbiology and Immunology
5. Parasitology
6. Systemic Bacteriology, Virology and Mycology
7. Hematology, Blood Banking and Coagulation Studies
8. Histopathology and Cytology

## Technician (OT)

**Part- A:** General Aptitude (Page No 4) - 20 Questions (60 Marks)

**Part-B:** Core Subject - 80 Questions (240 Marks)

1. Biology and human welfare (infectious diseases: types, sources, cause and control),
2. Anatomy and physiology of human body,
3. Anaesthesia – principle & techniques, Pre-anesthetic check-up, Physiology & Pharmacology of Anaesthesia drugs, CPR, Metabolic response to stress and Trauma,
4. Practice and Principles of surgery, pre & post-operative procedures – Basic of CSSD and sterilization, Used Drugs in O.T. disinfection, and waste disposal, Maintenance and Know-How's of O.T. equipment – O.T. table, Anaesthesia Machines, Suction machine, Ventilators, Defibrillators, Scrubbing Systems, Surgical positions, Needles, suture materials and knots.
5. Preparation of Instrumental Tray, Surgical Procedures & Monitoring, Care of Surgical Instruments and their uses, Protection of the Patient in Surgery's, Safety for operation room personnel, care of unconscious patients, Various types of incision use in surgery.
6. Nursing procedure (like pulse, B.P, Temp., IM, IV, Intra-Cardial, IV Infusion, Blood transfusion, Oxygen therapy, Nebulization, etc.)
7. Principles of Electro Cautery, Laparoscopic equipment, and medical ethics applied to Anaesthesia and Surgery, Critical care concepts and life supports.
8. Using of medical gases (Cylinder and central line), Gowning, gloving and personal protective equipments (PPIs).

## Technician (Radiology)

**Part- A:** General Aptitude (Page No 4) - 20 Questions (60 Marks)

**Part-B:** Core Subject - 80 Questions (240 Marks)

1. Basic Anatomy & Physiology
2. Basic Bio-Chemistry, Microbiology and Pathology
3. General Physics
4. Radiation Physics, Radiation safety and protection
5. Darkroom Techniques
6. General Radiography Techniques
7. Special Radiography Techniques
8. Interventional Radiology Techniques
9. CT, MRI, USG Techniques and procedures
10. General Principles of Hospital Practice & Patient care
11. Computer and its applications in Radiology
12. Quality Assurance and Quality control
13. Knowledge of various regulatory bodies (like AERB, ICRP etc.) norms and regulation including PNDT Act.

## Technician (Radiotherapy)

**Part- A:** General Aptitude (Page No 4) - 20 Questions (60 Marks)

**Part-B:** Core Subject - 80 Questions (240 Marks)

1. Basic Anatomy & Physiology
2. Basic Bio-Chemistry, Microbiology and Pathology
3. General Physics
4. Radiation Physics, Radiation safety and protection
5. Darkroom Techniques
6. General & Special Radiography Techniques
7. Interventional Radiology Techniques
8. CT, MRI, USG Techniques and procedures
9. Radiotherapy treatment planning and Techniques
10. Quality assurance and quality control in Radiotherapy
11. General Principles of Hospital Practice & Patient care
12. Computer and its applications in Radiotherapy
13. Knowledge of regulatory bodies (like AERB, ICRP etc.) norms and regulations.

## Technician (CSSD)

**Part- A:** General Aptitude (Page No 4) - 20 Questions (60 Marks)

**Part-B:** Core Subject - 80 Questions (240 Marks)

1. Classification of infectious agents as bacteria, virus etc.
2. Common infections that spread by various hospital procedures and instruments.
3. Blood Borne Diseases, HBS, HIV, HCV etc.
4. Definition of terms-sterilization, disinfectant, antiseptic, sanitizer, germicide, microbicidal agents, micro biostatic agents and antimicrobial agent.
5. Evaluation antimicrobial chime agents-Tube dilution and agar plate techniques-well method and diskplate method.
6. Physical methods of control Principle, construction and application of most heat sterilization Boiling, Pasteurization, Fractional sterilization-Tyndallisation and Moist heat under pressure autoclave. Dry heat sterilization-Incineration and hot air oven. Filtration -Diatomaceous earth filter, seitz filter, membrane filter and laminar air flows Radiation Ionizing radiation y rays and non-ionizing Radiation- UV-rays.
7. Chemical methods: Alcohol, aldehydes, phenols, halogen, metallic salts, Quaternary ammonium compounds and sterilizing gases as antimicrobial agents. Selection of a chemical agent for practical applications. Modes of actions of these chemicals.
8. DISINFECTION: O.T FUMIGATION, ULTRAVIOLET DISINFECTION.
9. STERLISATION OF SHARP INSTRUMENTS,
10. USE OF ANTISEPTICS SPIRIT, CETAVELON, SAVLON, DETTOL, CARBOLIC ACID, BETADINE,
11. AUTOCLAVING:- TYPES OF AUTOCLAVE, WORKING, PRINCIPLES, METHODS AND DETAIL OF USE.
12. Identification of common instruments used in hospital like various OT Instruments for Surgery, Dental Surgery etc.
13. Universal Biosafety Procedures
14. Quality assurance protocols/ methods in CSSD.
15. Management of Safety and Accidents in CSSD



## O T Assistant

**Part- A:** General Aptitude (Page No 4) - 20 Questions (60 Marks)

**Part-B:** Core Subject - 80 Questions (240 Marks)

1. Biology and human welfare (infectious diseases: types, sources, cause and control),
2. Anatomy and physiology of human body,
3. Anaesthesia – principle & techniques, Pre-anesthetic check-up, Physiology & Pharmacology of Anaesthesia drugs, CPR, Metabolic response to stress and Trauma,
4. Practice and Principles of surgery, pre & post-operative procedures – Basic of CSSD and sterilization, Used Drugs in O.T. disinfection, and waste disposal, Maintenance and Know-How's of O.T. equipment – O.T. table, Anaesthesia Machines, Suction machine, Ventilators, Defibrillators, Scrubbing Systems, Surgical positions, Needles, suture materials and knots.
5. Preparation of Instrumental Tray, Surgical Procedures & Monitoring, Care of Surgical Instruments and their uses, Protection of the Patient in Surgery's, Safety for operation room personnel, care of unconscious patients, Various types of incision use in surgery.
6. Nursing procedure (like pulse, B.P, Temp., IM, IV, Intra-Cardial, IV Infusion, Blood transfusion, Oxygen therapy, Nebulization, etc.)
7. Principles of Electro Cautery, Laparoscopic equipment, and medical ethics applied to Anaesthesia and Surgery, Critical care concepts and life supports.
8. Using of medical gases (Cylinder and central line), Gowning, gloving and personal protective equipments (PPIs).

## Technical Assistant (Cardiology)

**Part- A:** General Aptitude (Page No 4) - 20 Questions (60 Marks)

**Part-B:** Core Subject - 80 Questions (240 Marks)

1. Anatomy & Physiology of Cardiovascular system.
2. Basics of computer science and biostatistics.
3. Equipment details and maintenance of ECG, Holter, Stress ECG (TMT), Echocardiography, Bed side Monitor, Defibrillators, pacemakers.
4. Principles of
  - a. Elementary Physics
  - b. Galvanometer
  - c. Einthoven's law
  - d. Hexaxial system
5. Interpretation of
  - a. Normal ECG and artifacts
  - b. ECGs of acute cardiac emergencies - Acute coronary syndrome, Arrhythmias, conduction defects, cardiac tamponade.
6. Stress ECG-Protocols, procedure, Indications and contraindications.
7. Holter recording - Protocols and analysis.
8. Echocardiography- Types, Methods, Positions, Views, Indication and Normal reference value.
9. Cardiac catheterization (Coronary circulation, Angiography, Angioplasty)- Equipments & instruments used, Dyes & drugs used, Indications of procedure, Steps of procedure, Pre and post procedure care of the patients, Part Preparation, before procedure & discharge advices.
10. Defibrillators - Indications and contraindications.
11. Pacemakers - Indications, various modes, ECG interpretation.
12. First Aid Management of cardiac emergencies.

## Technical Assistant (Neurophysiology)

**Part- A:** General Aptitude (Page No 4) - 20 Questions (60 Marks)

**Part-B:** Core Subject - 80 Questions (240 Marks)

1. Basics of Neuro-Anatomy
2. Basics of Neuro- Physiology
3. Basics of Neuro-Pathology
4. Basics of electronic concepts related to neurophysiology
5. Neuro electrophysiology lab and DSA lab
6. Neuro-Biochemistry Basics of EEG
7. Basics of EMG & NCV
8. Neuro electrophysiology lab and DSA lab Instrumentation of EEG
9. Instrumentation of EMG & NCV
10. Pharmacology related to neurophysiology and clinical practice
11. Evoked potential (BERA/VEP/SSEP) EEG and EMG Machines and clinical practice
12. Instrumentation & technique and clinical practice on EEG, EMG & NCV
13. EEG, EMG in different disease states
14. Intra-operative Neuro Monitoring
15. Basics of Sleep Studies
16. Basics of Neuro-Imaging Modalities

## Technician (Dialysis)

**Part- A:** General Aptitude (Page No 4) - 20 Questions (60 Marks)

**Part-B:** Core Subject - 80 Questions (240 Marks)

1. Basic Human Sciences
  - a) Basics of Anatomy
  - b) Basics of Physiology
  - c) Basics of Bio-chemistry
  - d) Basics of Bio-statistics
2. Physical Sciences
  - a) Basics of Pathology
  - b) Basics of Blood Banking
  - c) Basics of Microbiology
  - d) Basics of Central sterilization.
3. Hospital awareness
  - a) Familiarization of different tables/tubes in surgical dept. Surgical Awareness, Preparation of patient for surgery.
  - b) Patient related services.
  - c) Communication & computer skills, Audio and visual aids
4. Infections & communicable diseases, Microbiology, Biochemistry, Pathology.
5. Diseases of GIT, blood, cardiovascular system
6. Diseases of ear, nose, eye & throat
7. Body fluid & Electrolytes
8. Dialysis Techniques, diseases of kidney
9. Haemodialysis
10. Dialysis equipment & Management.
11. Concept of dialysis, Re-dialysis assessment.
12. Instrumentation Study, Instrument Measurement & Critical Care Equipment.