# DETAILED SYLLABUS FOR THE POST OF CSR TECHNICIAN GR.II/ STERILISATION TECHNICIAN GR. II ( MEDICAL EDUCATION DEPARTMENT)

**(Cat.No. : 499/2023)**

**(Total Marks - 100)**

## PART I : INSTRUMENT MECHANIC / MECHANIC MEDICAL ELECTRONICS (40 Marks)

### Basics of Human Anatomy and Physiology & Bioelectric Signal - 7 Marks

Introduction to Anatomy and Human Physiology, Bio-electric potentials, Sources of Bioelectric potentials, Resting & Action potentials, Recording electrodes, Cells and their Structure, Biomedical recorders - ECG, EMG, EEG. The Heart and Cardiovascular System, Blood Pressure, Characteristics of Blood Flow, Heart Sounds, The physiology of respiratory system.

### Medical Equipments - 7 Marks

Pacemaker, Defibrillator, Inhalators, Ventilators, Respirators. Clinical Lab Equipment: Microscope, Colorimeter, Spectrophotometer, Flame photometer, PH meter, Semi Auto Analyzers, Blood Cell Counter, Blood Gas analyzer, Sphygmomanometer, Different types of Physiotherapy Equipment technique, Diathermy- Shortwave Diathermy, Microwave diathermy, Ultrasonic diathermy, Muscle Stimulator. Hospital Electrical appliances: Hot plate and Magnetic Stirrer, Centrifuges, Hot air oven, Incubator, Water bath, Nebulizer, Baby Incubator, Clinical Incubator, Phototherapy, Radiant warmer, Autoclave.

### Different Imaging Equipments - 6 Marks

Ultrasound scanners: Basic physics, Block diagram, Transducer type Different modes - A, B, M mode etc. X-Ray: Basic physics. Different components of X-ray machine, Block diagram of X Ray machine, H.T. Generator, X-ray tubes, Scattered radiation & secondary radiation controls, Digital X ray concepts, X-ray films, Screens, Darkroom system & Procedure, Collimator, Bucky Grids, Dental X-ray machine. CT Scanner, MRI, Mammography, Bronchoscope.

**Various departments in Hospital - 5 Marks**

Various departments in Hospital, Classification of Hospitals, Role of Biomedical Department, SOP of Biomedical department, CSSD, Different types of License required for hospitals - NABH,AERB,ARRT,Drug License,RMDC,PC PNDT

**Passive Electronic Components, Basic Electrical terms, Measuring Instruments,Cells and Batteries - 7 Marks**

Resistors: Types of resistors, construction & specific use, color-coding, power rating. Equivalent Resistance of series parallel circuits. Inductors: Principles of induction, inductive reactance. Types of inductors, Self and Mutual induction. Behavior of the inductor at low and high frequencies. Series and parallel combination. Working principle of a Transformer, Step-up, Step down and isolation transformers with applications. Capacitor:Capacitance and Capacitive Reactance, Impedance. Types of capacitors, construction, specifications and applications. Electric charges, Potential difference, Voltage, Current, Resistance. Basics of AC & DC. Terms such as +ve cycle, -ve cycle, Frequency, Time period, RMS, Peak, P-P, instantaneous value. Insulators, conductors and semiconductor properties. Working principle of PMMC,MI meters. Voltmeter, Ammeter and Multimeter. Primary and secondary cells, materials used specification of cells and batteries. Use of a Hydrometer.

**Semiconductor materials - 8 Marks**

PN Junction, Forward and Reverse biasing of diodes. Interpretation of diode specifications. Forward current and Reverse voltage. Rectifier configurations: half wave ,full wave, Bridge their efficiencies, Filter components, Working principles of Zener diode, varactor diode, their specifications and applications. Regulated Power supply using 78XX series, 79XX series Integrated circuits. Transistor: Construction, working of a PNP and NPN Transistors, purpose of E, B & C Terminals. Significance of α, β and relationship of a Transistor. Biasing of Transistors. Transistor applications as switch and amplifier. Transistor input and output characteristics. Classification of amplifiers, RC coupled amplifier, voltage gain, Feedback and its types. Astable, monostable, bistable multivibrator circuits using transistors. IC 555, functional description w.r.t. different configurations of IC 555 such as monostable, astable, IC741Op-Amp basics, Op-Amp circuits Inverting, Non-inverting Amplifiers.

## PART II : CSR TECHNOLOGY (60 Marks)

### Module 1 (25 Marks)

### Sterilisation

#### Processing of equipments and devices

Reprocessing of common medical and dental devices
Reprocessing of endoscopes
Cleaning- methods of cleaning –manual, ultrasonic cleaner, washer disinfectors
Decontamination

#### Sterilisation

Different methods of sterilization

a) High temperature method-Autoclave- Principle, working, loading and unloading of article, Maintenance work
   - Hot air Oven
b) Low temperature methods-Ethylene oxide sterilization
   -hydrogen peroxide gas plasma (Sterrad)

Principle, working, loading and unloading of article, Maintenance work

c) Chemical sterilants- Different types

### Module 2 (10 Marks)

#### Quality assurance in CSSD

Quality assurance for CSSD equipment and quality control within CSSD
Indicators for monitoring efficacy of different methods of sterilization- chemical & biological indicators
Documentation related to safety & security

### Module 3 (15 Marks)

#### Packaging, storage & supply

**Various reusable packaging materials**

Principles of packaging
Types uses and properties of various packaging materials
Packaging techniques, steps for wrapping instruments, sealing, labelling
Package assembly guidelines
Handling and Stocking of sterile devices, shelf life, stock rotation
Requirement of sterile storage area
Transport protocols for contaminated equipment and sterile supplies

## Inventory management

Types of inventory, inventory replenishment and distribution system
Case cart system
Inventory management of reusable surgical supplies and presterilized items
Inventory control guidelines

## Module 4 (10 Marks)

## Biomedical Engineering

Environmental parameters for each zone of CSSD, CSSD-location, lay out and workflow
Safety devices of steam sterilizer
Automated cleaning machines used in CSSD
Performance qualification testing of steam sterilizer

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