

**DETAILED SYLLABUS FOR THE POST OF  
ELECTRICIAN- CUM- MECHANIC IN MEDICAL EDUCATION  
SERVICE**

**(Cat.No.: 503/2019)**

**(Total Marks – 100)**

**PART I : ELECTRICIAN (50 Marks)**

**Module -1 10 Marks**

**Safety Precaution & Environment guidelines**

Occupational safety and health, Electric shock, chemical hazard and mechanical hazard, ecosystem & factors causing imbalance, conservation of energy, Reuse and Recycle, personal protective equipment, safety signs, classification of fire, Different type of fire extinguishers ,causes and effect of Global warming

**Module 2 10 Marks**

**Basic electricity**

Fundamentals of electricity, conductor ,insulators ,semiconductors ohms law,kirchoffs law, Flemings left hand rule & right hand rule, , Series and Parallel circuit, Flux and soldering technique, magnetic terms, , Primary and secondary cells,AC fundamentals ,

**Module-3 10 Marks**

**Control panel wiring, Electrical Drives and Power generation**

Lay out marking, Din rail, Race ways, mounting and wiring accessories in control panel, Routing, Bunching and tying, control elements for control panel ,D C and A C Drives ,merits & demerits of non-conventional over conventional source of energy, , micro hydal power generation, tidal power generation,

Magneto hydro dynamic power generation, power generation by solar and wind energy, types of pollution

#### **Module 4 10 Marks**

#### **DC Machines & AC Machines**

DC Generators and Types , Various types of DC Motor and their application, different type of DC Motor starters, 3 Phase induction motor, Single phase motors, Various type of AC Motor starters , Alternator & Synchronous motor,

#### **Module -5 10 Marks**

#### **Transformer, Basic electronics & Basics of computer**

Transformer Principle, construction of transformer ,instrument Transformers computer evolution, input device & output device, use of modem and its types,LAN & WAN, Semiconductors, Diodes, Different type of Passive and Active components and their usage,Rectifiers,Transistors

### **PART II : MACHINIST (50 Marks)**

#### **Safety ( 2 Marks)**

PPE, First aid, Disposal of waste material, Occupational safety and health, Safety signs, Types of fire, Types of fire extinguishers, Lifting and handling loads, Moving heavy equipment.

#### **Basic tools ( 5 Marks)**

Steel rule, Dividers, Calipers, Jenny calipers, Punches, Bench vice, Hammers, Marking off table,Files, Facksaw frame and blade, Surface gauge, Ordinary depth gauge, Combination set, Marking media, Surface plate, V- block, Angle plate, Parallel block, Cold chisel, Drill, Taps, Tap wrenches, Dies, Die stocks, Reamers.

#### **Precision tools ( 5 Marks)**

Vernier caliper, Out side micro meter, Vernier height gauge, Vernier micro meter, Dial test indicator, Vernier bevel protractor, Depth micro meter, Different types of micro meter, Bore dial gauge, Telescopic gauge, Angle gauge, Centre gauge, Limit gauge, Comparator gauge, Radius gauge.

#### **Screw thread( 3 Marks)**

Elements of screw thread, Types of V-thread, Square thread, Trapezoidal threads, Specification of thread, Single and multi - start thread, Screw pitch gauge

### **Drilling( 3 Marks)**

Drilling machine, Types and application, Cutting speed, rpm, feed

### **Turning( 7 Marks)**

Lathe, Parts, Types, Specification, Safety while working on lathe, Lathe cutting tools, Lathe tools- angles and their functions, Type of chip, Type of chip breakers, Tool life, Lathe driving mechanism, Back gear, Tumbler gear, Feed mechanism of lathe, Cutting speed, Feed, Depth of cut, Recommended speed, Calculation of cutting speed and feed, Lathe operations, Work holding devices- chucks, centres, mandrels, carriers, driving plate, face plate, steady rest, Taper, Types of taper, Taper turning methods, Calculation of compound slide swivel angle, Calculation of amount of offset, Sine bar, Slip gauge, Determining taper using sine bar and slip gauge.

### **Milling( 7 Marks)**

Milling machine, Principle, Classification, Specification, Parts and functions, Driving and feed mechanism, Different types of milling cutters and their uses, Cutter nomenclature, Different milling operations, Milling attachments, Jigs and fixtures, Indexing, Different types of indexing, Calculation of indexing, Gears- types and uses, Rack- types and uses, Spur gear calculation, Helix, Spiral.

### **Heat treatment( 2 Marks)**

Physical and mechanical properties of metal, Different heat treatment process and purposes.

### **Grinding ( 6 Marks)**

Off hand grinding, Bench grinder, Pedestal grinder, Loading, Glazing, Dressing, Truing, Grinding wheel dressers, Grinding wheel – types and application, Marking system and selection of grinding wheel, Surface grinder, Cylindrical grinder, Cutting speed, Feed, Depth of cut, Wet and dry grinding, Tool and cutter grinder, Cutter grinding attachments.

### **CNC Turning/Milling( 6 Marks)**

NC machine, CNC machine, Advantages and disadvantages of CNC, Types of CNC, Difference between CNC and conventional machines, Safety on CNC, Parts of CNC, Machine axes of CNC turning/milling machine, Classification of CNC, Address codes, G-codes, M-codes, Interpolation, Canned cycle, Operational modes, Cutter radius compensation, CNC tooling, Types of offset, Programming.

### **Interchangeability( 2 Marks)**

IS System of limit and fit- terminology, Different standard system of fits and limits, Geometrical tolerance, Surface quality, Roughness values and symbols.

### **Coolant and lubricant( 2 Marks)**

Coolant-purpose, properties and types

Lubricant- purpose, properties and types, method of applying lubricant

***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.***