RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SYLLABUS FOR SCREENING TEST FOR THE POST OF
JUNIOR ENGINEER ELECTRICAL/MECHANICAL
(DIPLOMA HOLDERS),
PUBLIC HEALTH ENGINEERING DEPARTMENT

Part – A

1 प्राचीन सभ्यताएं – कालीबंगा, आहड़–बैराठ

2 मुगल शासन और राजपूत राज्य (1526–1707)

3 राजस्थान में स्वतंत्रता संग्राम एवं राजस्थान का एकीकरण (1857 से 1956)

- **वास्तुशिल्प एवं स्थापत्य –** मन्दिर, दुर्ग व हवेलियां
- **राजस्थान के भक्त एवं संत**
- **राजस्थान की संस्कृति –** रीति–रिवाज, मेले, त्यौहार, उत्सव, व्रत एवं उपवास
- **राजस्थान की लोक परम्पराएं –** नृत्य, गीत, संगीत व कलाएं
- **राजस्थान के सन्दर्भ में समसामयिक घटनाएं**
- **राज्य प्रशासन –** कार्यपालिका, व्यवस्थापिका एवं न्यायपालिका
- **जिला प्रशासन –** जिलाधीश, उपखण्ड अधिकारी एवं तहसीलदार – कार्य एवं भूमिका
- **स्थानीय प्रशासन –** ग्रामीण एवं नगरीय
- **राजस्थान का सामान्य भूगोल –** स्थिति, आकार, विस्तार, प्रशासनिक विभाजन, स्थलाकृतिक स्वरूप, जलवायु, वनस्पति, अपवाह व कृषि
- **सर्वेक्षण –** तलेक्षण (लैवलिंग) सर्वेक्षण की विशेषताएं व समस्याएं

राजस्थान के हस्तशिल्प, लघु उद्योग, वृहद् उद्योग, राज्य में संचालित योजनाएं ।

Part – B

B-1. ELECTRICAL ENGINEERING

1 **Basic Electrical Engineering :**
Resistance, Inductance, Capacitance and their application, Ohm's law, Kirchoff's law and its application, R-L-C series and parallel circuits and its application, Storage battery and its application.

2 **Electrical Installation & Design :**
Design & estimate for L.T. overhead line, Design & estimate for 11 KV overhead line and underground cables, Classification of substations, Site selection & estimation for distribution Substation (11/0.4 KV), Types of ACSR Conductor, Panel wiring diagram.

3 **Electrical Estimating & costing :**
Specifications of wiring materials, Earthing, Types of wiring, Testing of Installation, Indian Electricity Rules, Illumination, Types of wires and cables, Electrical Symbols.

4 **Electrical Machines :**
Single phase and Three phase induction motor, Alternator, Synchronous motor, D.C. generator, D.C. motor, Single phase and Three phase Transformer, Single phase and Three phase Auto transformer, Starters for induction motor, Starters for D.C. motor

5 **Electrical Measuring Instruments :**
Analog and Digital Ammeter, Analog and Digital voltmeter, Analog and Digital wattmeter, Analog and Digital Single and three phase energy meter, Analog and Digital multimeter, Megger, Current transformer, Potential transformer, Tong Tester

6 **Switchgear & Protection :**
Faults in power system, Fuses, Relays, Transformer protection, Line protection

7 **Electrical Maintenance & Repair :**
Electrical Hand and Power Tools, 3 phase Transformer, D.C. Motor, Single phase and Three phase motor, Circuit Breakers, Overhead lines and underground cables, Safety measure

8 **Generation :**
Hydro electric power plant, Nuclear power station, Diesel power plant, Thermal power plant,
Load and Load curves, Tariff and power factor improvement, Non-conventional Energy Sources.

9 **Special Devices :**
Miniature Circuit breaker, Earth leakage circuit breaker, Capacitors and capacitor bank, Power capacitors, Voltage regulating devices, Distribution boards, Change over switches, Re-wireable switches,Moulded case circuit breackers

10 **Computer :**
Hardware, Software, E-mail, Internet

B-2. MECHANICAL ENGINEERING

1 Strength of Materials

Simple stress and strain, compound stress, Strain energy, Bending moment and shear force, Moment of inertia, Bending stresses in beams, Shear stress in beams, Deflection, Columns and struts, Torsion of shafts, Springs, Thin cylindrical shells, Combined direct and bending stress, Frames.

2 Fluid Mechanics and Machines

Introduction, Fluid pressure and its measurement, Hydrostatics, Hydro-kinematics, Hydrodynamics and measurement of Flow, Orifices and Notches, Flow through pipes, Impact of free jet, Hydraulic turbines, Centrifugal pump, Reciprocating pump, Miscellaneous hydraulic machines.

3 Manufacturing Process

Welding process, Gas welding, Electric welding process, Modern welding methods, Pattern making, Types of pattern, Moulding sand ingredients, Core and core making, Testing of moulding sands, Mould making, Special casting techniques, Melting furnaces, Castings, Metal forming process, Conventional metal cutting processes, Newer machining processes, Metallic coating processes, Jigs and fixtures.

4 Thermal Engineering

Basic concepts and gas laws, Laws of thermodynamics, Availability, Formation of steam and its properties, Steam generators, Boiler performance, Vapour power cycles, Steam nozzles, Steam turbines, Steam condenser, Air pumps and cooling tower, Heat transfer.

5 Fluid Power and Tribilogy

Introduction, Hydraulic pumps, Hydraulic valves, Actuators, Accumulators and heat exchangers, Hydraulic circuit and devices, Packing and seals, Pipes and pipe fittings, Pneumatics, Lubrication principles, Properties of fluids, Lubricants and applications, Lubrication of equipments, Lubricant application system.

6 Internal Combustion Engine

Gas power cycles, Principles of internal combustion engines, Petrol engines, Diesel engines, Cooling, lubrication and governing, I.C. Engines performance, Air compressors, Gas Turbines.

7 Workshop Technology

Cutting tools and materials, Lathe machine, Drilling machines, Shaping, planning and slotting machines, Cutting fluids and cooling process, Metal cutting saws, Boring, Milling machine, Grinding and grinding machines, Capstan and Turret lathes, Automatic machines, Metal finishing processes, Maintenance of machine tools, Installation and testing of machine tools.

8 Theory of Machines

Simple mechanism, Velocity and acceleration in mechanism, Dynamics of reciprocating parts, Friction, Transmission of power, Balancing, Vibration.

9 Industrial Engineering

Production, planning and control, Inventory control, Inspection and quality control, Work study, Plant location and layout, Material handling.

10 Power Plant Engineering

Introduction, Thermal power plant, Hydro-electric power plant, Nuclear power plant, Diesel power plant, Gas turbine plant, Power plant economics.

11 Refrigeration and Air-conditioning

Principles of refrigeration, Refrigeration systems, Refrigerants, Refrigeration system components and controls, Refrigeration applications, Production of low temperature, Psychrometry, Air-conditioning.

12 Automobile Engineering

Introduction, Engine unit, Power transmission system, Electrical system, Brakes, Wheels and tyres, Steering system, Suspension system, Air pollution.

13 Machine Design

Introduction, Design of welding joints, Design of screw and bolts, Design of joints, Design of keys and couplings, Design of shaft, Design of components, Bearings.

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Pattern of Question Papers :

1 Objective Type Paper.
2 Maximum Marks : 100
3 Number of Questions : 100
4 Duration of Paper : Two Hours.
5 All Questions carry equal marks.
6 There will be **Negative Marking**.
7 20% question will be from Part-A and 80% questions from Part-B-1 & 2 each.

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