RAJASTHAN PUBLIC SERVICE COMMISSON, AJMER

Syllabus for Screening Test for the post of Assistant Engineer (Mechanical) for Ground Water Department.

1. **FLUID MECHANICS AND FLUID MACHINERY:**
Continuity equation, Bernoull's theorem. Flow through pipes, Laminar and turbulent flow. Concept of boundarylayer. Flow through convergent divergent nozzle. Normal shock. Measurement of flow by venturimeter, orifice meter, V-notch and pitot tube. Hydraulic turbines, Pelton, Francis and Kaplan turbines, centrifugal and reciprocating pumps, performance characteristics. Cavitation, Axial flow Compressors and pumps.

2. **THERMAL ENGINEERING:**
One dimensional steady state, conduction through walls and cylinders. Fins, concept of thermal boundary layer, Convection, Heat transfer coefficient, combined heat transfer coefficient, Heat exchangers. Introduction to Non-conventional sources of energy like solar, wind, geo-thermal, ocean etc. Construction and working of IC Engines: 2 stroke and 4 stroke, SI and CI engines, performance characteristics of IC Engines.

3. **MACHINE DESIGN:**
Design of machine elements subjected to direct stresses like fastenings. Design of members in bending like beams, laminated springs. Design of members subjected to eccentric load. Design of members in torsion like shafts, couplings. Design of thin cylinders. Theories of failure, Elastic deformations, Material selection, Heat treatment process, fatigue, fracture.
Kinematic mechanisms-Slider Crank, 4 bar and their inversions, lower pair mechanisms, friction, belt and rope drive; gears and gear trains.

4. **INDUSTRIAL ENGINEERING:**
Principles of Scientific management. Human behaviours in organisation. Concept of motivation, Recruitment, training, placement and performance appraisal of industrial personnel. Incentive Schemes. Manufacturing accounts, Balance Sheet, Analysis of financial statements. Method and time study.

5. **PRODUCTION AND OPERATIONS RESEARCH:**
Product design and cost selection of manufacturing processes and systems. Break even analysis, Operation and flow process charts, Plant Location and Plant layout, materials handling, scheduling, despatching and routing. Operations research methods for inventory control, replacement theory, concept of network analysis. PERT and CPM.

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Pattern of Question Paper

1. Objective type paper
2. Maximum marks- 100
3. Number of questions 100
4. Duration of paper - 2 hours
5. All question carry equal marks
6. There will be negative marking

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