RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SYLLABUS FOR SCREENING TEST FOR THE POST OF

ASSISTANT ELECTRICAL INSPECTOR

(ELECTRICAL INSPECTORATE, RAJASTHAN)

1 Electrical Circuit Analysis:

2 Measurements and Instrumentation:
Error analysis, Measurements of current, voltage, power, power factor and energy. Indicating instruments. Measurements of resistance, inductance, capacitance and frequency, Bridge measurements, Electronic measurement instruments, Digital voltmeter and frequency counters. Transducers and their applications to the measurement of non-electrical quantities like – temperature, pressure, flow rate, displacement, acceleration, A/D & D/A converters.

3 Electrical Machines:
DC generators: Construction, Types of DC generators, emf equation, equalizing connections, armature reaction, commutation, methods of improving commutations, demagnetizing and cross magnetizing mmf, interpoles, characteristics.

DC Motors: Principle, back emf, types, production of torque, armature reaction & interpoles, characteristics of shunt, series & compound motor, DC motor starting. Speed Control of DC Motor: Armature voltage and field current control methods, Braking, losses and efficiency, single-phase series motor.


Synchronous Motors: types, construction, principle, phasor diagrams, speed torque characteristics, power factor control, V-curves, starting methods, performance calculations, applications, synchronous condenser, synchronous induction motor.

4 Power System:
Generation of Electrical power and Supply System: Solar, Wind, Biomass, Thermal, Hydro and Nuclear power plants. Transmission and distribution voltage, effect of system voltage on size of conductor and losses. Comparison of DC 2- wire, DC 3- wire, 1- phase AC and 3- phase AC (3- wire and 4- wire) systems. Primary and secondary distribution systems, feeder, distributor and service mains. Radial and ring- main distribution systems.

Parameters of Transmission Lines: Resistance inductance and capacitance of overhead lines, effect of earth, line transposition. Inductance and capacitance of line with symmetrical and unsymmetrical spacing Inductance and capacitance of double circuit lines. Skin and proximity effects. Equivalent circuits and performance of short and medium transmission lines. Generalized ABCD line constants, equivalent circuit


**Distribution Systems:** Distribution of power, power loads. Load survey, load forecasting-regression analysis, correlation theory, analysis of time series, load growth factors.


**Grounding:** Grounding system, earth and safety, earth electrode- earth resistance calculation, effect of rod size and soil resistivity, earth conductor sizes. Introduction to earth electrode design. Brief description of system earthing – system neutral earthing, earthing of substations, lines and consumer premises. Earth fault protection of feeders.

**Electric Heating and Welding:** Different methods of electric heating. Principle of high frequency induction and di-electric heating. Welding process, welding transformer, Classification of Electric welding.


5  **Control System Engineering:**
Open loop and cleared loop systems, Transfer function, Time response and steady state analysis, stability R-H criteria and Root locus methods, frequency response, control system components, a-c and d-c servo motor, synchros and techogenerator.

6  **Power Electronics:**
Principles of operation of Thyristors, Rectifiers, Inverters and Choppers. Methods of speed control of motors using SCR’s.

7  **Micro Processor and C-Programming:**
Micro processor architecture (8085): Functional block diagram, Buses, Introduction to circuits (Block diagram only) used in electrical application. Introduction of ‘C’ language, Elements of ‘C’, Arrays, Functions and Pointers.

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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

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