

RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SYLLABUS FOR COMPETITIVE EXAMINATION FOR THE POST OF LECTURER IN ELECTRICAL ENGINEERING FOR TECHNICAL EDUCATION DEPARTMENT

PAPER: II

- 1. Electrical Measurement and Instrumentation:** Units and standards. Error analysis. Measurement of current, voltage, power, phase, time, energy and power factor, indicating instruments. Measurement of resistance, inductance, capacitance and frequency by bridge methods, electronic measuring instruments, digital voltmeter and frequency counter. Instrument transformers, digital multimeter, CRO, potentiometers, earth fault detection and measurement of earth resistance.
Transducers and their applications for the measurement for non-electrical quantities like temperature, pressure, flow rate, displacement, velocity, acceleration. Telemetry and data transmission. Data acquisition systems.
- 2. Electronics and Communication:** Semiconductor device physics. P-N junction and transistors, circuit models and parameters. FET, ZENER, TUNNEL, SCHOTKY, photodiodes and their applications, simple diode circuits: clipping, clamping, rectifier circuits, voltage regulation, switching behaviour of diodes and transistors, small signal amplifiers biasing circuits, frequency response, multistage amplifier and feedback amplifiers. D.C. amplifiers, oscillators.
Large signal amplifiers: coupling methods, push-pull amplifiers, operational amplifier, wave shaping circuits, Multivibrators, flip-flop and their applications. Digital logic gate families, universal gates, combinational circuit for arithmetic and logic operation, sequential logic circuits. Multiplexers, demultiplexer, Schmitt Trigger, Sample and Hold Circuit, AD and DA converters, Counters, registers, RAM and ROMs.
Communication: Generation and detection of AM and FM, noise behaviour of AM and FM systems.
- 3. Power Electronics:** Power switching devices namely diode, MOSFET, IGBT; thyristor rectifiers- single phase and three phase with resistance load and inductive load, AC to DC, DC to DC converters, cyclo- converter, single phase and three phase voltage source inverter, single phase and three phase PWM, SMPS, Chopper types, chopper fed multi-quadrant and closed-loop control of DC drive, constant V/f control of induction motor, control of slip ring induction motor.

- 4. Microprocessor Systems and Computers:** 8085 Microprocessor architecture, assemblers and compilers, memory and I/O interfacing of general purpose peripheral devices and their applications, Applications of microprocessors. Basic layout of digital computers, input-output devices, memory organizations. Algorithms. Flow charts.
- 5. Control System:** Open and closed loop systems. Block diagrams and signal flow graphs, transfer function. Response analysis, time domain, frequency domain, steady-state error analysis. Root locus technique, Bode plot, Routh-Hurwitz and Nyquist Criteria of stability. State space analysis of linear systems. State Transition Matrix, Eigen Values and Stability Analysis, Concepts of controllability and observability, Compensating Networks, P, PI and PID Controllers.

Note :- Pattern of Question Paper

- 1. Objective type paper**
- 2. Maximum Marks: 75**
- 3. Number of Questions: 150**
- 4. Duration of Paper: Three Hours**
- 5. All questions carry equal marks.**
- 6. Medium of Competitive Exam: English**
- 7. There will be Negative Marking.**