

## **ANNEXURE-I**

### **SYLLABUS FOR THE COMPETITIVE TEST FOR THE RECRUITMENT OF ASSISTANT ENGINEERS**

1. **ELECTRICAL CIRCUITS AND NETWORKS:** Kirchhoff's laws, mesh and node analysis, network, theorems, sinusoidal steady state analysis of single phase and three phase circuits, resonance, transient response of RL, RC, RLC circuits for different inputs, two-port networks, elements of two element network synthesis.
2. **CONTROL SYSTEMS:** Modelling of physical systems, Block diagrams and signal flow graphs, Time and frequency domain analysis, Steady state errors, Routh's criterion, Nyquist and Bode plots, compensation, root loci, elementary ideas of state variable analysis, control system components.
3. **MEASUREMENTS AND INSTRUMENTATION:** SI units, measurement of current, voltage, power-factor and energy. Measurement of resistance inductance capacitance and frequency-bridge methods, transducers and their applications to the measurement of non-electrical quantities like temperature, pressure, strain, displacement etc., cathode ray oscilloscope.
4. **ANALOG AND DIGITAL ELECTRONICS:** Characteristics of diodes, BJT, FET, SCR, Amplifier biasing, equivalent circuits, frequency response, feedback amplifiers power amplifiers, oscillators, operational amplifiers and applications, wave shaping circuits, multivibrators flip-flops, universal gates, combinational circuits, A/D and D/A converters.
5. **ELECTRICAL MACHINES AND POWER ELECTRONIC DRIVES:** Single Phase Transformer, equivalent circuit, tests, regulation and efficiency, three phase transformer connections parallel operation, auto transformer, principle of energy conversion, windings of rotating machines, DC generators and motors, characteristics, starting and speed control, three phase induction motors performance characteristics, starting and speed control, single phase induction motors, synchronous generators, performance, regulation parallel operation, synchronous motors, starting characteristics and applications, synchronous condensers, fractional horse power motors, permanent magnet and stepper motors Characteristics of Power electronic devices, phase control, bridge converters, choppers and inverters, basic concepts of adjustable speed drives.
6. **POWER SYSTEMS:** Electrical power generation, thermal, hydro, nuclear: transmission line parameters; steady state performance of overhead transmission lines and cables, surge propagation, distribution systems, insulators, bundle conductors, corona, and radio interference effects; per-unit quantities; bus admittance and impedance matrices: load flow: voltage control and power factor correction; economic operation, symmetrical components, analysis of symmetrical and unsymmetrical faults; principles of over current, differential and distance protections, circuit breakers, concept of system stability – swing curves and equal area criterion.