

SSC JE

Electrical Engineering

Syllabus



UGC NET | CTET | TRB | TNEB | GATE | ESE | UPSC | CSIR NET | TET | SET | SSC | State Exams

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ELECTRICAL ENGINEERING

PAPER – I

General Intelligence & Reasoning: The Syllabus for General Intelligence would include questions of both verbal and non-verbal type. The test may include questions on analogies, similarities, differences, space visualization, problem solving, analysis, judgment, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning, verbal and figure classification, arithmetical number series, etc. The test will also include questions designed to test the candidate's abilities to deal with abstract ideas and symbols and their relationships, arithmetical computations and other analytical functions.

General Awareness: Questions will be aimed at testing the candidate's general awareness of the environment around him/ her and its application to society. Questions will also be designed to test knowledge of current events and of such matters of everyday observations and experience in their scientific aspect as may be expected of any educated person. The test will also include questions relating to India and its neighbouring countries especially pertaining to History, Culture, Geography, Economic Scene, General Polity and Scientific Research, etc. These questions will be such that they do not require a special study of any discipline.

PART – B (ELECTRICAL ENGINEERING)

Basic concepts: Concepts of resistance, inductance, capacitance, and various factors affecting them
Concepts of current, voltage, power, energy and their units.

Circuit law: Kirchoff's law, Simple Circuit solution using network theorems.

Magnetic Circuit: Concepts of flux, MMF, reluctance, Different kinds of magnetic materials,
Magnetic calculations for conductors of different configuration e.g. straight, circular, solenoidal, etc...
Electromagnetic induction, self and mutual induction.

AC Fundamentals: Instantaneous, peak, RMS and average values of alternating waves,
Representation of sinusoidal wave form, simple series and parallel AC Circuits consisting of RL and
C, Resonance, Tank Circuit Poly Phase system – star and delta connection, 3 phase power, DC and
sinusoidal response of R-L and R-C circuit.

Measurement and measuring instruments: Measurement of power (1 phase and 3 phase, both active
and re-active) and energy, 2 wattmeter method of 3 phase power measurement, Measurement of
frequency and phase angle Ammeter and voltmeter (both moving coil and moving iron type),
extension of range wattmeter, Multimeters, Megger, Energy meter AC Bridges Use of CRO, Signal
Generator, CT, PT and their uses Earth Fault detection.

Electrical Machines:

(a) DC Machine – Construction, Basic Principles of DC motors and generators, their characteristics,
speed control and starting of DC Motors Method of braking motor, Losses and efficiency of DC
Machines.

(b) 1 phase and 3 phase transformers – Construction, Principles of operation, equivalent circuit,
voltage regulation, OC and SC Tests, Losses and efficiency Effect of voltage, frequency and wave
form on losses Parallel operation of 1 phase /3 phase transformers Auto transformers.

(c) 3 phase induction motors, rotating magnetic field, principle of operation, equivalent circuit, torque-speed characteristics, starting and speed control of 3 phase induction motors Methods of braking, effect of voltage and frequency variation on torque speed characteristics Fractional Kilowatt Motors and Single-Phase Induction Motors: Characteristics and applications.

Synchronous Machines: Generation of 3-phase emf armature reaction, voltage regulation, parallel operation of two alternators, synchronizing, control of active and reactive power Starting and applications of synchronous motors.

Generation, Transmission and Distribution: Different types of power stations, Load factor, diversity factor, demand factor, cost of generation, inter-connection of power stations Power factor improvement, various types of tariffs, types of faults, short circuit current for symmetrical faults Switchgears – rating of circuit breakers, Principles of arc extinction by oil and air, HRC Fuses, Protection against earth leakage / over current, etc. Buchholtz relay, Merz-Price system of protection of generators & transformers, protection of feeders and bus bars Lightning arresters, various transmission and distribution system, comparison of conductor materials, efficiency of different system Cable – Different type of cables, cable rating and derating factor.

Estimation and costing: Estimation of lighting scheme, electric installation of machines and relevant IE rules Earthing practices and IE Rules.

Utilization of Electrical Energy: Illumination, Electric heating, Electric welding, Electroplating, Electric drives and motors.

Basic Electronics: Working of various electronic devices e.g. P N Junction diodes, Transistors (NPN and PNP type), BJT and JFET Simple circuits using these devices.