SSC Junior Engineer Syllabus for Electrical Engineering

Scheme of Examination:

The Computer Based Examination will be conducted in two papers as indicated below:

- Paper-I
- Paper-II

Papers	Mode of Examination	Subject	Number of Questions /Maximum Marks	Duration
Paper-I	Computer Based Examination	(i) General Intelligence and Reasoning	50/ 50	2 Hours (2 hours and 40 minutes for the candidates who are eligible for scribe as per **Para-9.1, 9.2 and 9.3**)
		(ii) General Awareness	50/ 50	
		(iii) Part-A: General Engineering (Civil & Structural) or Part-B: General Engineering (Electrical) or Part-C: General Engineering (Mechanical)	100/ 100	
Paper-II	Computer Based Examination	Part-A: General Engineering (Civil & Structural) or Part-B: General Engineering (Electrical) or Part-C: General Engineering (Mechanical)	100/ 300	2 Hours (2 hours and 40 minutes for the candidates who are eligible for scribe as per **Para 9.1, 9.2 and 9.3**)

The candidates will be required to attempt the General Engineering part (i.e., Part-A, Part-B or Part-C) in Paper-I and Paper-II, which has been selected by them, on the basis of their Stream/ Subject of Educational Qualification, in the online application form. In other words, the candidates appearing from Civil Stream are required to attempt Part-A (Civil & Structural) of Paper-I and PaperII and the candidates appearing from Electrical are required to attempt Part-B (Electrical) and the candidates appearing from Mechanical Stream are required to attempt Part-C (Mechanical) of Paper-I and Paper-II failing which their candidature will be rejected.

Paper-I & Paper-II will consist of Objective Type, Multiple-choice questions only. The questions will be set both in Hindi & English.

There will be a negative marking of 0.25 marks for each wrong answer in Paper-I and one (01) mark for each wrong answer in Paper-II.

The standard of the questions in Engineering subjects will be approximately of the level of a Diploma in Engineering (Civil/ Mechanical/ Electrical). The details of the syllabus are given below:

Syllabus for Paper I: (Computer-Based Examination)

I. General Intelligence & Reasoning:

The Syllabus for General Intelligence would include questions of both verbal and non-verbal types. 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.

II. General Awareness:

Questions will be aimed at testing the candidate's general awareness of the environment around him and its application to society. Questions will also be designed to test knowledge of current events and 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 neighboring 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.

III. General Engineering:

Part-B (Electrical Engineering):

Basic concepts, Circuit law, Magnetic Circuit, AC Fundamentals, Measurement and Measuring instruments, Electrical Machines, Fractional Kilowatt Motors and single-phase induction Motors, Synchronous Machines, Generation, Transmission and Distribution, Estimation and Costing, Utilization and Electrical Energy, Basic Electronics.

Syllabus for Paper II: (Computer-Based Examination)

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:

Kirchhoff'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 configurations 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-Land R-Circuit

Measurement and measuring instruments:

Measurement of power (1 phase and 3 phase, both active and re-active) and energy, 2 wattmeter methods of 3 phase power measurement, Measurement of frequency and phase angle Ammeter and voltmeter (both moving oil 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, torquespeed 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