

SSC JE Syllabus

Important Points:

Number of papers: Two
 Total marks of exam:
 Paper 1: 200 marks
 Paper 2: 300 marks
 Nature of questions:
 Paper 1: Objective type
 Paper 2: Conventional type

SSC JE Exam Pattern

Paper 1 will be divided in three sections namely, General Intelligence and Reasoning, General Awareness and Part A (Civil), Part B (Electrical) and Part C (Mechanical). There is a negative mark of 0.25 marks for each wrong answer in Paper 1

SSC JE Paper 1 exam pattern is given below:

Papers	Mode of Examination	Subject	Maximum Marks	Duration & Timings
Paper-I Objective type	Computer Based Test	General Intelligence & Reasoning	50	2 Hours Morning shift [10.00 AM to 12.00 Noon] Afternoon Shift [2.00 PM to 4.00 PM]
		General Awareness	50	
		Part – A General Engineering (Civil & Structural) Or Part-B General Engineering (Electrical) Or Part-C General Engineering (Mechanical)	100	

SSC JE Paper 2 Exam Pattern 2020

The paper 2 is a conventional type paper which is to be held in offline mode. It comprises of Part-A General Engineering (Civil & Structural) or Part- B General Engineering (Electrical) or Part-C General Engineering (Mechanical).

The SSC JE exam pattern of Paper 2 is given below:

Paper	Mode of exam	Subjects	Total Marks	Time Duration
Paper-II Conventional	Written	Part-A General Engineering (Civil & Structural) Or Part- B General Engineering (Electrical) Or	300	3 hours

Type		Part-C General Engineering (Mechanical)		
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SSC JE Syllabus 2020:

Subject	Syllabus
General Intelligence & Reasoning	<p>Questions on analogies, similarities, differences, space visualization, problem solving, analysis, judgment,</p> <p>decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning,</p> <p>Verbal and figure classification, arithmetical number series etc.</p> <p>Questions designed to test the candidate's abilities to deal with abstract ideas and symbols and their relationships,</p> <p>Arithmetical computations and other analytical functions.</p>
General Awareness	<p>Questions relating to India and its neighboring countries especially pertaining to History, Culture, Geography, Economic Scene, General Polity and Scientific Research, etc.</p>
General Engineering (Civil)	<p>Part-A: Civil Engineering</p> <p>Building Materials, Estimating, Costing and Valuation, Surveying, Soil Mechanics, Hydraulics, Irrigation Engineering, Transportation Engineering, Environmental Engineering.</p> <p>Structural Engineering: Theory of Structures, Concrete Technology, RCC Design, Steel Design.</p>
General Engineering (Electrical)	<p>Part-B: Electrical Engineering</p> <p>Basic concepts,</p> <p>Circuit law,</p> <p>Magnetic Circuit,</p> <p>AC Fundamentals,</p> <p>Measurement and Measuring instruments,</p>

	<p>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.</p>
<p>General Engineering (Mechanical)</p>	<p>Part C: Mechanical Engineering Theory of Machines and Machine Design, Engineering Mechanics and Strength of Materials, Properties of Pure Substances, 1st Law of Thermodynamics, 2nd Law of Thermodynamics, Air standard Cycles for IC Engines, IC Engine Performance, IC Engines Combustion, IC Engine Cooling & Lubrication, Rankine cycle of System, Boilers, Classification, Specification, Fitting & Accessories, Air Compressors & their cycles, Refrigeration cycles, Principle of Refrigeration Plant, Nozzles & Steam Turbines. Properties & Classification of Fluids, Fluid Statics, Measurement of Fluid Pressure, Fluid kinematics, Dynamics of Ideal fluids,</p>

	<p>Measurement of Flow rate, basic principles, Hydraulic Turbines, Centrifugal Pumps, Classification of steels.</p>
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SSC JE Syllabus 2020 Paper 2

Part B – Civil & Structural Engineering

Subject	Syllabus
Building Materials	<p>Physical and Chemical properties, classification, standard tests, uses and manufacture/quarrying of materials e.g. building stones, silicate based materials, cement (Portland), asbestos products, timber and wood based products, laminates, bituminous materials, paints, varnishes</p>
Estimating, Costing and Valuation	<p>estimate, glossary of technical terms, analysis of rates, methods and unit of measurement, Items of work – earthwork, Brick work (Modular & Traditional bricks), RCC work, Shuttering, Timber work, Painting, Flooring, Plastering. Boundary wall, Brick building, Water Tank, Septic tank, Bar bending schedule, Centre line method, Mid-section formula, Trapezoidal formula, Simpson's rule. Cost estimate of Septic tank, flexible pavements, Tube well, isolates and combined footings, Steel Truss, Piles and pile-caps. Valuation – Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolescence, methods of valuation.</p>
Surveying	<p>Principles of surveying, measurement of distance, chain surveying, working of prismatic compass, compass traversing, bearings, local attraction, plane table surveying, theodolite traversing, adjustment of theodolite, Levelling, Definition of terms used in levelling, contouring, curvature and</p>

	<p>refraction corrections, temporary and permanent adjustments of dumpy level, methods of contouring, uses of contour map, tachometric survey, curve setting, earth work calculation, advanced surveying equipment</p>
Soil Mechanics	<p>Origin of soil, phase diagram, Definitions-void ratio, porosity, degree of saturation, water content, specific gravity of soil grains, unit weights, density index and interrelationship of different parameters, Grain size distribution curves and their uses. Index properties of soils, Atterberg's limits, ISI soil classification and plasticity chart. Permeability of soil, coefficient of permeability, determination of coefficient of 12 permeability, Unconfined and confined aquifers, effective stress, quick sand, consolidation of soils, Principles of consolidation, degree of consolidation, pre-consolidation pressure, normally consolidated soil, E-log p curve, computation of ultimate settlement. Shear strength of soils, direct shear test, Vane shear test, Triaxial test. Soil compaction, Laboratory compaction test, Maximum dry density and optimum moisture content, earth pressure theories, active and passive earth pressures, Bearing capacity of soils, plate load test, and standard penetration test.</p>
Hydraulics	<p>Fluid properties, hydrostatics, measurements of flow, Bernoulli's theorem and its application, flow through pipes, flow in open channels, weirs, flumes, spillways, pumps and turbines</p>
Irrigation	<p>Definition, necessity, benefits, effects of irrigation, types and methods</p>

Engineering	<p>of irrigation,</p> <p>Hydrology – Measurement of rainfall, run off coefficient, rain gauge, losses from precipitation – evaporation, infiltration, etc.</p> <p>Water requirement of crops, duty, delta and base period, Kharif and Rabi Crops, Command area, Time factor, Crop ratio, Overlap allowance, Irrigation efficiencies.</p> <p>Different type of canals, types of canal irrigation, loss of water in canals.</p> <p>Canal lining – types and advantages.</p> <p>Shallow and deep to wells, yield from a well.</p> <p>Weir and barrage, Failure of weirs and permeable foundation, Slit and Scour, Kennedy’s theory of critical velocity.</p> <p>Lacey’s theory of uniform flow. Definition of flood, causes and effects, methods of flood control, water logging, preventive measure.</p> <p>Land reclamation, Characteristics of affecting fertility of soils, purposes, methods, description of land and reclamation processes.</p> <p>Major irrigation projects in India</p>
Transportation Engineering	<p>Highway Engineering – cross sectional elements, geometric design, types of pavements, pavement materials – aggregates and bitumen, different tests,</p> <p>Design of flexible and rigid pavements – Water Bound Macadam (WBM) and Wet Mix Macadam (WMM), Gravel Road, Bituminous construction,</p> <p>Rigid pavement joint, pavement maintenance, Highway drainage, Railway Engineering- Components of permanent way – sleepers, ballast,</p> <p>Fixtures and fastening, track geometry, points and crossings, track junction, stations and yards.</p> <p>Traffic Engineering – Different traffic survey, speed-flow-density and their interrelationships, intersections and interchanges, traffic signals, traffic operation, traffic signs and markings, road safety</p>
Environmental Engineering	<p>Quality of water,</p> <p>source of water supply, purification of water,</p> <p>distribution of water, need of sanitation, sewerage systems, circular sewer, oval sewer, sewer appurtenances,</p> <p>sewage treatments. Surface water drainage.</p> <p>Solid waste management – types, effects, engineered management</p>

	<p>system.</p> <p>Air pollution – pollutants, causes, effects, control. Noise pollution – cause, health effects, control.</p>
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SSC JE Syllabus- Structural Engineering

Subject	Syllabus
Theory of Structures	<p>Elasticity constants,</p> <p>types of beams – determinate and indeterminate,</p> <p>bending moment and shear force diagrams of simply supported, cantilever and over hanging beams.</p> <p>Moment of area and moment of inertia for rectangular & circular sections,</p> <p>bending moment and shear stress for tee, channel and compound sections,</p> <p>chimneys, dams and retaining walls</p>
Concrete Technology	<p>Properties, Advantages and uses of concrete,</p> <p>cement aggregates, importance of water quality,</p> <p>water cement ratio, workability, mix design,</p> <p>storage, batching, mixing, placement,</p> <p>compaction, finishing and curing of concrete,</p> <p>quality control of concrete, hot weather and cold weather concreting,</p> <p>repair and maintenance of concrete structures</p>
RCC Design	<p>RCC beams-flexural strength,</p> <p>shear strength, bond strength,</p> <p>design of singly reinforced and double reinforced beams,</p> <p>Cantilever beams. T-beams, lintels.</p> <p>One way and two way 12 slabs, isolated footings.</p> <p>Reinforced brick works, columns, staircases, retaining wall,</p> <p>water tanks (RCC design questions may be based on both Limit State and Working Stress methods)</p>
Steel Design	<p>Steel design and construction of steel columns,</p> <p>beams roof trusses plate girders</p>

Part B – Electrical Engineering

Subject	Syllabus
Basic Concepts	<p>Concepts of resistance, inductance, Capacitance and various factors affecting them.</p> <p>Concepts of current, voltage, power, energy and their units</p>
Circuit Law	<p>Kirchhoff's law,</p> <p>Simple Circuit solution using network theorems</p>
Magnetic Circuit	<p>Concepts of flux, mmf, reluctance,</p> <p>Different kinds of magnetic materials,</p> <p>Magnetic calculations for conductors of different configuration e.g. straight, circular, solenoid, etc.</p> <p>Electromagnetic induction, self and mutual induction</p>
AC Fundamentals	<p>Instantaneous, peak, R.M.S. and average values of alternating waves,</p> <p>Representation of sinusoidal wave form, simple series and parallel AC Circuits consisting of R.L. and C, Resonance, Tank Circuit.</p> <p>Poly Phase system – star and delta connection,</p> <p>3 phase power,</p> <p>DC and sinusoidal response of R-L and R-C circuit</p>
Measurement & Measuring Instruments	<p>Measurement of power (1 phase and 3 phase, both active and reactive) and energy,</p> <p>2 wattmeter method of 3 phase power measurement.</p> <p>Measurement of frequency and phase angle.</p> <p>Ammeter and voltmeter (both moving coil and moving iron type), extension of range wattmeter, Multimeters, Megger, Energy meter AC Bridges.</p> <p>Use of CRO, Signal Generator, CT, PT and their uses. Earth Fault detection</p>

SSC JE Syllabus- Electrical Machines:

Subject	Syllabus
D.C. Machine	<p>Construction,</p> <p>Basic Principles of D.C. motors and generators, their</p>

	<p>characteristics, speed control and starting of D.C. Motors. Method of braking motor, Losses and efficiency of D.C. Machines</p>
1 phase and 3 phase transformers	<p>Construction and Principles of operation, equivalent circuit, voltage regulation, O.C. and S.C. Tests, Losses and efficiency. Effect of voltage, Frequency and wave form on losses. Parallel operation of 1 phase /3 phase transformers. Auto transformers 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</p>
Synchronous Machines	<p>Generation of 3-phase e.m.f. armature reaction, voltage regulation, parallel operation of two alternators, synchronizing, control of active and reactive power. Starting and applications of synchronous motors</p>
Generation, Transmission and Distribution	<p>Different types of power stations, Load factor, diversity factor, demand factor,</p>

	<p>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, H.R.C. Fuses, Protection against earth leakage / over current, etc</p>
Estimation and Costing	<p>Estimation of lighting scheme, Electric installation of machines and relevant IE rules. Earthing practices and IE Rules.</p>
Utilization of Electrical Energy	<p>Illumination, Electric heating, Electric welding, Electroplating, Electric drives and motors</p>
Basic Electronics	<p>Working of various electronic devices e.g. P N Junction diodes, Transistors (NPN and PNP type), BJT and JFET</p>

SSC JE Syllabus- Part C – Mechanical Engineering

Subject	Syllabus
Theory of Machines and Machine Design	<p>Concept of simple machine, Four bar linkage and link motion, Flywheels and fluctuation of energy, Power transmission by belts – V-belts and Flat belts, Clutches – Plate and Conical clutch, Gears – Type of gears, gear profile and gear ratio calculation,</p>

	<p>Governors – Principles and classification, Riveted joint, Cams, Bearings, Friction in collars and pivots</p>
Engineering Mechanics & Strength of Materials	<p>Equilibrium of Forces, Law of motion, Friction, Concepts of stress and strain, Elastic limit and elastic constants, Bending moments and shear force diagram, Stress in composite bars, Torsion of circular shafts, Buckling of columns – Euler’s and Rankin’s theories, Thin walled pressure vessels</p>
Thermal Engineering	<p>Properties of Pure Substances P-V & P-T diagrams of pure substance like H₂O, Introduction of steam table with respect to steam generation process; Definition of saturation wet & superheated status. Definition of dryness fraction of steam, degree of superheat of steam. H-S chart of steam (Mollier Chart)</p>
Properties & Classification of Fluid	<p>Ideal & real fluids, Newton’s law of viscosity, Newtonian and Non-Newtonian fluids, compressible and incompressible fluids</p>
Fluid Statics	<p>Pressure at a point. Measurement of Fluid</p>
Pressure	<p>Manometers, U-tube,</p>

	Inclined tube
Fluid Kinematics	Stream line, laminar & turbulent flow, external & internal flow, continuity equation
Dynamics of Ideal Fluids	Bernoulli's equation, Total head; Velocity head; Pressure head; Application of Bernoulli's equation
Centrifugal Pumps	Classifications, Principles, Performance
Production Engineering Classification of Steels	Mild steel & alloy steel, Heat treatment of steel, Welding – Arc Welding, Gas Welding, Resistance Welding, Special Welding Techniques i.e. TIG, MIG, etc. (Brazing & Soldering), Welding Defects & Testing; NDT, Foundry & Casting – methods, defects, different casting processes