

एसएससी जेई एग्जाम पैटर्न और सिलेबस

एसएससी जेई एग्जाम पैटर्न

पेपर	परीक्षा का प्रकार	परीक्षा का माध्यम	कुल प्रश्न	कुल समय
पेपर - I	MCQ (Multiple Choice Question)	ऑनलाइन (कंप्यूटर में)	200	120 मिनट
पेपर- II	Written Exam	ऑफलाइन (कॉपी कलम में)	300	120 मिनट

एसएससी जेई पेपर- I एग्जाम पैटर्न

विषय	प्रश्नों की संख्या	अधिकतम अंक
General Intelligence & Reasoning	50	50
General Awareness	50	50
Part-A Civil & Structural Engineering Or Part- B Electrical Engineering Or Part-C Mechanical Engineering	100	100
कुल	200	200

एसएससी जेई पेपर- I सिलेबस

एसएससी जेई जनरल इंटेलिजेंस एंड रीजनिंग सिलेबस

- Analogies उपमाएँ
- Similarities समानताएँ
- Differences मतभेद

- Space Visualization अंतरिक्ष विजुअलाइज़ेशन
- Problem Solving समस्या को सुलझाना
- Analysis विश्लेषण
- Judgement प्रलय
- Decision Making निर्णय लेना
- Visual Memory दृश्य स्मृति
- Discrimination भेदभाव
- Observation अवलोकन
- Relationship Concepts संबंध अवधारणाएं
- Arithmetical Reasoning अंकगणित तर्क
- Verbal and Figure Classification मौखिक और चित्र वर्गीकरण
- Arithmetical Number Series अंकगणित संख्या श्रृंखला
- Abstract Ideas & Symbols and Relationships सार विचार और प्रतीक और रिश्ते
- Arithmetical Computations अंकगणितीय संगणना
- Other Analytical Functions अन्य विश्लेषणात्मक कार्य, आदि

एसएससी जेई सामान्य जागरूकता सिलेबस

- Environment and Its Application to Society पर्यावरण और समाज के लिए इसका अनुप्रयोग
- Current Events वर्तमान घटनाएं
- India and Its Neighboring Countries भारत और उसके पड़ोसी देश
- History इतिहास
- Culture संस्कृति
- Geography भूगोल
- Economic Scene आर्थिक दृश्य
- General Polity सामान्य राजनीति
- Scientific Research वैज्ञानिक अनुसंधान, आदि

एसएससी जेई सिविल इंजीनियरिंग सिलेबस

Civil Engineering

- Building Materials निर्माण सामग्री
- Estimating आकलन
- Costing and Valuation लागत और मूल्यांकन

- Surveying भूमि की नाप
- Soil Mechanics सोइल मकैनिक्स
- Hydraulics जलगति विज्ञान
- Irrigation Engineering सिंचाई इंजीनियरिंग
- Transportation Engineering परिवहन इंजीनियरिंग
- Environmental Engineering पर्यावरणीय इंजीनियरिंग, आदि

Structural Engineering

- Theory of Structures संरचनाओं का सिद्धांत
- Concrete Technology कंक्रीट प्रौद्योगिकी
- RCC Design आरसीसी डिजाइन
- Steel Design स्टील डिजाइन, आदि

एसएससी जेई इलेक्ट्रिकल इंजीनियरिंग सिलेबस

- Basic concepts बुनियादी अवधारणाओं
- Circuit law सर्किट कानून
- Magnetic Circuit चुंबकीय सर्किट
- AC Fundamentals एसी फंडामेंटल
- Measurement and Measuring instruments मापन और मापने के उपकरण
- Electrical Machines विद्युत मशीनें
- Fractional Kilowatt Motors भिन्नात्मक किलोवाट मोटर्स
- Single Phase Induction Motors सिंगल फेज इंडक्शन मोटर्स
- Synchronous Machines तुल्यकालिक मशीनें
- Generation जनरेटर
- Transmission and Distribution संचरण और वितरण
- Estimation and Costing अनुमान और लागत
- Utilization and Electrical Energy उपयोग और विद्युत ऊर्जा
- Basic Electronics बेसिक इलेक्ट्रॉनिक्स, आदि

एसएससी जेई मैकेनिकल इंजीनियरिंग सिलेबस

- Theory of Machines and Machine Design मशीनों और मशीन डिजाइन का सिद्धांत

- Engineering Mechanics and Strength of Materials इंजीनियरिंग यांत्रिकी और सामग्री की ताकत
- Properties of Pure Substances शुद्ध पदार्थों के गुण
- 1st Law of Thermodynamics ऊष्मप्रवैगिकी का पहला नियम
- 2nd Law of Thermodynamics ऊष्मप्रवैगिकी का दूसरा नियम
- Air standard Cycles for IC Engines आईसी इंजन के लिए वायु मानक चक्र
- IC Engine Performance आईसी इंजन प्रदर्शन
- IC Engines Combustion आईसी इंजन दहन
- IC Engine Cooling & Lubrication आईसी इंजन कूलिंग और स्नेहन
- Rankine cycle of System सिस्टम का रैंकिन चक्र
- Boilers- Classification, Specification बॉयलर- वर्गीकरण, विशिष्टता
- Fitting & Accessories फिटिंग और सहायक उपकरण
- Air Compressors & their cycles एयर कंप्रेसर्स और उनके साइकिल
- Refrigeration cycles प्रशीतन चक्र
- Principle of Refrigeration Plant प्रशीतन संयंत्र का सिद्धांत
- Nozzles & Steam Turbines नोजल और स्टीम टर्बाइन
- Properties & Classification of Fluids द्रवों के गुण और वर्गीकरण
- Fluid Statics द्रव स्टेटिक्स
- Measurement of Fluid Pressure द्रव दबाव का मापन
- Fluid kinematics द्रव कीनेमेटिक्स
- Dynamics of Ideal fluids आदर्श तरल पदार्थों की गतिशीलता
- Measurement of Flow rate प्रवाह दर का मापन
- basic principles बुनियादी सिद्धांत
- Hydraulic Turbines हाइड्रोलिक टर्बाइन
- Centrifugal Pumps केन्द्रापसारि पम्प
- Classification of steel स्टील का वर्गीकरण, आदि

एसएससी जेई पेपर- II एग्जाम पैटर्न

विषय	अधिकतम अंक	कुल समय
Part-A Civil & Structural Engineering Or Part- B Electrical Engineering Or Part-C Mechanical Engineering	300	120 मिनट

एसएससी जेई पेपर- II सिलेबस

एसएससी जेई सिविल और स्ट्रक्चरल इंजीनियरिंग सिलेबस

Civil Engineering

Building Materials :

- 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.

Estimating, Costing and Valuation:

- 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.

Surveying :

- 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 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.

Soil Mechanics :

- 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
- IS1 soil classification and plasticity chart
- Permeability of soil
- Coefficient of permeability
- Determination of coefficient of 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
- Standard penetration test.

Hydraulics :

- 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.

Irrigation Engineering:

- Definition

- Necessity
- Benefits
- All effects of irrigation
- Types and methods of irrigation
- Hydrology – Measurement of rainfall
- Run off coefficient
- Rain gauge
- Losses from precipitation – evaporation
- Infiltration
- Water requirement of crops
- Duty
- Delta and base period
- Kharif and Rabi Crops
- Command area
- Time factor
- Crop ratio
- Overlap allowance
- Irrigation efficiencies
- Different type of canals
- Types of canal irrigation
- Loss of water in canals
- Canal lining – types and advantages
- Shallow and deep to wells
- Yield from a well
- Weir and barrage
- Failure of weirs and permeable foundation
- Slit and Scour
- Kennedy's theory of critical velocity
- Lacey's theory of uniform flow
- Definition of flood
- Causes and effects
- Methods of flood control
- Water logging
- Preventive measure
- Land reclamation
- Characteristics of affecting fertility of soils
- Purposes
- Methods
- Description of land and reclamation processes
- Major irrigation projects in India.

Transportation Engineering:

- Highway Engineering – cross sectional elements
- Geometric design
- Types of pavements
- Pavement materials – aggregates and bitumen
- Different tests
- Design of flexible and rigid pavements – Water Bound Macadam (WBM) and Wet Mix Macadam (WMM)
- Gravel Road
- Bituminous construction

- Rigid pavement joint
- Pavement maintenance
- Highway drainage
- Railway Engineering- Components of permanent way – sleepers
- Ballast, fixtures and fastening, track geometry
- Points and crossings
- Track junction
- Stations and yards
- Traffic Engineering – Different traffic survey
- Speed-flow-density and their interrelationships
- Intersections and interchanges
- Traffic signals
- Traffic operation
- Traffic signs and markings
- Road safety

Environmental Engineering:

- Quality of water
- Source of water supply
- Purification of water
- Distribution of water
- Need of sanitation
- Sewerage systems
- Circular sewer
- Oval sewer
- Sewer appurtenances
- Sewage treatments
- Surface water drainage
- Solid waste management – types, effects
- Engineered management system
- Air pollution – pollutants, causes, effects, control
- Noise pollution – cause, health effects, control.

Structural Engineering

Theory of structures:

- Elasticity constants
- Types of beams – determinate and indeterminate
- Bending moment and shear force diagrams of simply supported
- Cantilever and over hanging beams
- Moment of area and moment of inertia for rectangular & circular sections
- Bending moment and shear stress for tee
- Channel and compound sections
- Chimneys, dams and retaining walls
- Eccentric loads
- Slope deflection of simply supported and cantilever beams
- Critical load and columns
- Torsion of circular section.

Concrete Technology:

- Properties
- Advantages and uses of concrete
- Cement aggregates
- Importance of water quality
- Water cement ratio
- Workability
- Mix design
- Storage
- Batching
- Mixing
- Placement
- Compaction
- Finishing and curing of concrete
- Quality control of concrete
- Hot weather and cold weather concreting
- Repair and maintenance of concrete structures.

RCC Design:

- RCC beams-flexural strength
- Shear strength
- Bond strength
- Design of singly reinforced and double reinforced beams
- Cantilever beams
- T-beams
- Lintels
- One way and two way slabs
- Isolated footings
- Reinforced brick works
- Columns
- Staircases
- Retaining wall
- Water tanks (RCC design questions may be based on both Limit State and Working Stress methods).

Steel Design:

- Steel design and construction of steel columns
- Beams roof trusses plate girders.

एसएससी जेई इलेक्ट्रिकल इंजीनियरिंग सिलेबस

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 configuration e.g. straight, circular, solenoidal, etc.
- Electromagnetic induction, self and mutual induction.

AC Fundamentals:

- Instantaneous
- Peak
- R.M.S. and average values of alternating waves
- Representation of sinusoidal wave form
- Simple series and parallel AC Circuits consisting of R.L. 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) D.C. Machine – Construction, Basic Principles of D.C. motors and generators, their characteristics, speed control and starting of D.C. Motors. Method of braking motor, Losses and efficiency of D.C. Machines.
- (b) 1 phase and 3 phase transformers – Construction, 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.
- (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 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.

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, H.R.C.
- Fuses
- Protection against earth leakage / over current, etc.
- Buchholz 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.

एसएससी जेई मैकेनिकल इंजीनियरिंग सिलेबस

Theory of Machines and Machine Design

- 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
- Governors – Principles and classification, Riveted joint, Cams, Bearings
- Friction in collars and pivots.

Engineering Mechanics and Strength of Materials

- 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.

Thermal Engineering

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's Chart).

1 st Law of Thermodynamics :

- Definition of stored energy & internal energy
- 1st Law of Thermodynamics of cyclic process
- Non Flow Energy Equation
- Flow Energy & Definition of Enthalpy
- Conditions for Steady State Steady Flow
- Steady State Steady Flow Energy Equation

2 nd Law of Thermodynamics :

- Definition of Sink
- Source Reservoir of Heat
- Heat Engine
- Heat Pump & Refrigerator
- Thermal Efficiency of Heat Engines & co-efficient of performance of Refrigerators

- Kelvin – Planck & Clausius Statements of 2nd Law of Thermodynamics
- Absolute or Thermodynamic Scale of temperature
- Clausius Integral
- Entropy
- Entropy change calculation of ideal gas processes
- Carnot Cycle & Carnot Efficiency
- PMM-2; definition & its impossibility.

Air standard Cycles for IC engines :

- Otto cycle; plot on P-V
- T-S Planes; Thermal Efficiency
- Diesel Cycle; Plot on P-V
- T-S planes; Thermal efficiency.

- IC Engine Performance
- IC Engine Combustion
- IC Engine Cooling & Lubrication

Rankine cycle of steam :

- Simple Rankine cycle plot on P-V, T-S, h-s planes
- Rankine cycle efficiency with & without pump work.

Boilers; Classification; Specification; Fittings & Accessories :

- Fire Tube & Water Tube Boilers.
- Air Compressors & their cycles
- Refrigeration cycles
- Principle of a Refrigerator Plant
- Nozzles & Steam Turbines

Fluid Mechanics & Machinery

Properties & Classification of Fluid :

- Ideal & real fluids
- Newton's law of viscosity
- Newtonian and Non-Newtonian fluids
- compressible and incompressible fluids.

Fluid Statics :

- Pressure at a point.

Measurement of Fluid Pressure :

- Manometers
- U-tube
- 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.

Measurement of Flow rate Basic Principles :

- Venturimeter
- Pilot tube
- Orifice meter.

Hydraulic Turbines :

- Classifications, Principles.

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
- Forging
- Extrusion, etc,
- Metal cutting principles
- cutting tools
- Basic Principles of machining with (i) Lathe (ii) Milling (iii) Drilling (iv) Shaping (v) Grinding
- Machines
- tools & manufacturing processes