

About us

Skylight Career Academy is a viable Institute for **Technical and Non-Technical** Coaching.

We impart excellent coaching for Junior Engineer/Assistant Engineer in all govt. sectors and PSU [DMRC, Railways, SSC, RRB, ISRO, DRDO, ONGC, SAIL, GAIL] for technical & non-technical in Delhi (Laxmi Nagar). It is established in **2009** with the exemplary ideas of fathom study, good-supervision and viewing the consent of the students. It has been burgeoning as the best serving institute in Delhi. The target of becoming Junior Engineer is feasible at **Skylight Career Academy** for those students who aspire to become a successful engineer in Govt. Services. We are good at contemplating the problems of students and quelling them. More than 300 students have hold aloft the name of our Institute in various exams at State and Central Level. Brilliancy emanates from **Skylight Career Academy**. We support students to the hilt. Students must work at it hook, line & sinker.

Skylight Career Academy, a platform for aspirants to learn basics, understand subject in real world, boost confidence and to become leader, has started its services in Delhi.

Note:- We work on the principle of “**Discipline with right approach, clarity of goals, zeal to have knowledge**”. Our academy has earned a good fame for its incomparable study approach.

We believe in Specialization.

Website : <http://skylightcareeracademy.com>

E-mail : sky.engg.academy@gmail.com

<https://www.facebook.com/skylightcareeracademy>

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, isolated 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, Leveling, Definition of terms used in leveling, 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 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, III effects of irrigation, types and methods of irrigation. Hydrology – Measurement of rainfall, run off coefficient, rain gauge, losses from precipitation – evaporation, infiltration, etc. 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 measures. 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 – causes, 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 doubly reinforced beams, cantilever beams. T-beams, lintels. One way and two way slabs, isolated footings. Reinforced brick works, columns, staircases, retaining walls, 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.

Mechanical Engineering

- **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, Governors—Principles and classification, Riveted joint, Cams, Bearings, Friction in collars and pivots, 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. Clutches—Place and Conical clutch, Gears—Type of gears, gear profile and gear ratio calculation,
- **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).
- **1st 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 of Steady State Steady Flow; Steady State Steady Flow Energy Equation,

- **2nd Law of Thermodynamics:** Definition of Sink, Source Reservoir of heat, Heat Engine, Heat Pump & Refrigerators; 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 Stand 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
- **Power Plant Engineering:** Simple Rankin cycle plot on P-V, T-S, H-S planes Rankin 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 Refrigeration 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.



Electrical Engineering ELECTRICAL ENGINEERING

1. BASIC ELECTRICAL ENGINEERING AND NETWORKS

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.

Electrostatics- charges, basic properties of charges, capacitor, electric fields and potential due to various charge configuration.

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

2. ELECTRICAL MACHINES

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.

(d) Synchronous Machines – Generation of 3-phase e.m.f. armature reaction, voltage regulation, parallel operation of two alternators, synchronizing, power. Starting and applications of synchronous motors.

3. MEASUREMENT

Measuring devices and their orders, zero order instruments, 1st order and second order instruments, potentiometers etc.

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.

Measurement of non electrical quantities, transducers and sensors, LVDT etc.

4. BASIC ANALOG 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.

1. P-N Junctions: Diode theory, forward and reverse-biased junctions, reverse-bias breakdown, load line analysis, diode applications - Limiters, clippers, clampers, voltage multipliers, half wave & full wave rectification, Special purpose diodes - Zener diode, Varactor, light emitting diodes, Laser diodes.

2. Bipolar Junction Transistors (BJT): Transistor fundamentals, transistor configurations, DC operating point, BJT characteristics & parameters, fixed bias, emitter bias with and without emitter resistance, analysis of above circuits and their design, variation of operating point and its stability.

3. Field-Effect Transistors (FET): JFET- current-voltage characteristics, effects in real devices, high-frequency and high-speed issues. 4. Transistors Amplifier: Small Signal BJT amplifiers: AC equivalent circuit, hybrid, re model and their use in amplifier design. Multistage amplifiers, frequency response of basic & compound configuration, Power amplifiers: Class A, B, AB, C and D stages, IC output stages.

5. Feedback & Oscillator Circuits : Effect of positive and negative feedbacks, basic feedback topologies & their properties, Analysis of practical feedback amplifiers, Sinusoidal Oscillators (RC, LC and Crystal), Multi-vibrators, The 555 timer.

6. Operational Amplifiers: Op-Amp Basics, practical Op-Amp circuits, differential and Common mode operation, Inverting & Non Inverting Amplifier, differential and cascade amplifier, Op-Amp applications.

5. POWER ELECTRONICS

Power semiconductor devices PNPN diodes, DIACS Thyristors, TRIACS, G.T.O. devices. Power Transistors, Power MOSFET, Rating, Losses and Cooling. Triggering circuits for SCR's, UJT, Blocking Oscillators, Schmitt trigger circuits - Power MOS gate drive circuits. Uncontrolled and controlled Rectifiers : Single phase and poly phase Bridge rectifiers. Transformer ratings. Inductive load, free diodes. Converter operation: Overlap, power factor, inversion, regulation, P-pulse converters, power factor control via PWM converters. D.C. line commutation : Series and parallel capacitor

turn off, resonant turn off, impulse commutation. D.C. Choppers : Principles, classification, use. Frequency conversion : Cyclo-converter single and three phase circuits, blocked group operation, circulating current mode. Single phase and three phase inverters, constant voltage source and constant current source inverters, HF inverters for heating. Application : D.C. and A.C. drives, S.M.P.S., Resonant converters, A.C. Line Filters, ratio, interference suppression. HDVC transmission.

6. POWER SYSTEM

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.

7. CONTROL SYSTEM

Concept of feedback and Automatic Control, Electrical analogy of physical system. Transfer Function, Block diagram representation of Control Systems, Block Diagram Algebra, Signal Flow Graph, Mason' s gain formula. Control system components : Error sensing devices, potentiometer, synchros, D.C. and A.C. tachometers, servomotors, modulators and demodulators. Transient analysis of closed loop systems. Transient errors and their minimization, steady state error and their minimization, error coefficients, P, PI and P-I-D type controllers. Stability of Control Systems : R-H criteria, Nyquist criteria, Bode Plots. Polar Plots, Nichols chart, measures of relative stability. Construction of Root Loci for simple system, effects of the movement of poles and zeros. Improvement of system performance through compensation. Case studies on control voltage, current, frequency, position and speed. Control of liquid level, density, flow, temperature etc.

8. DIGITAL ELECTRONICS

Number Systems: Decimal, binary, octal, hexadecimal number system and conversion, binary weighted codes, signed numbers, 1s and 2s complement codes, Binary arithmetic

Boolean Algebra: Combinational Logic:, canonical logic forms, sum of product & product of sums, Karnaugh maps, two, three and four variable

Karnaugh maps, simplification of expressions, Analysis & design of Combinational Logic: Introduction to combinational circuits, code conversions, decoder, encoder, priority encoder, multiplexers as function generators, binary adder, subtractor, BCadder, Binary comparator, arithmetic logic units. Sequential Logic: Sequential circuits, flip-flops, clocked and edge triggered flipflops, timing counters, counter design with state equations, Registers , serial in serial out shift registers, tristate register, timing considerations. Digital integrated circuits: Logic levels, propagation delay time, power dissipation fan-out and fan-in, noise margin, logic families and their characteristics TTL, LSTTL CMOS and ECL integrated circuits and their performance comparison, open collector and tristate gates and buffers.

9. MICROPROCESSORS

Introduction to 8085A CPU architecture-register organization, addressing modes and their features. Software instruction set and Assembly Language Programming. Pin description and features. Instruction cycle, machine cycle, Timing diagram.

Hardware Interfacing: Interfacing memory, peripheral chips (IO mapped IO & Memory mapped IO). Interrupts and DMA. Peripherals: 8279, 8255, 8251, 8253, 8237, 8259, A/D and D/A converters and interfacing of the same. Typical

applications of a microprocessor. 16 bit processors: 8086 and architecture, segmented memory has cycles, read/write cycle in min/max mode. Reset operation, wait state, Halt state, Hold state, Lock operation, interrupt processing. Addressing modes and their features. Software instruction set (including specific instructions like string instructions, repeat, segment override, lock prefixes and their use) and Assembly Language programming with the same. Brief overview of some other microprocessors (eg. Intel 8086)

SSC JE Exam Pattern

SSC JE Paper	Sections	Total marks
Paper – 1 Objective Type	1. GI & Reasoning	50
	2. GA (General Awareness & Current Affairs)	50
	3. General Engineering (GE)- (Civil & structural or Electrical or Mechanical)	100
Paper II- Descriptive Conventional Type	Electrical Engineering <ul style="list-style-type: none"> • 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 of Electrical Energy • Basic Electronics 	300

Electronics Engineering

1. BASIC ELECTRICAL ENGINEERING AND NETWORKS

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.

Electrostatics- charges, basic properties of charges, capacitor, electric fields and potential due to various charge configuration.

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

2. Communications:

Random signals and noise: probability, random variables, probability density function, autocorrelation, power spectral density. Analog communication systems: amplitude and angle modulation and demodulation systems, spectral analysis of these operations, superheterodyne receivers; elements of hardware, realizations of analog communication systems; signal-to-noise ratio (SNR) calculations for amplitude modulation (AM) and frequency modulation (FM) for low noise conditions. Fundamentals of information theory and channel capacity theorem. Digital communication systems: pulse code modulation (PCM), differential pulse code modulation (DPCM), digital modulation schemes: amplitude, phase and frequency shift keying schemes (ASK, PSK, FSK), matched filter receivers, bandwidth consideration and probability of error calculations for these schemes. Basics of TDMA, FDMA and CDMA and GSM.

3. MEASUREMENT

Measuring devices and their orders, zero order instruments, 1st order and second order instruments, potentiometers etc.

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.

Measurement of non electrical quantities, transducers and sensors, LVDT etc.

4. BASIC ANALOG 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.

1. P-N Junctions: Diode theory, forward and reverse-biased junctions, reverse-bias breakdown, load line analysis, diode applications - Limiters, clippers, clampers, voltage multipliers, half wave & full wave rectification, Special purpose diodes - Zener diode, Varactor, light emitting diodes, Laser diodes.
2. Bipolar Junction Transistors (BJT): Transistor fundamentals, transistor configurations, DC operating point, BJT characteristics & parameters, fixed bias, emitter bias with and without emitter resistance, analysis of above circuits and their design, variation of operating point and its stability.
3. Field-Effect Transistors (FET): JFET- current-voltage characteristics, effects in real devices, high-frequency and high-speed issues.
4. Transistors Amplifier: Small Signal BJT amplifiers: AC equivalent circuit, hybrid, re model and their use in amplifier design. Multistage amplifiers, frequency response of basic & compound configuration, Power amplifiers: Class A, B, AB, C and D stages, IC output stages.
5. Feedback & Oscillator Circuits : Effect of positive and negative feedbacks, basic feedback topologies & their properties, Analysis of practical feedback amplifiers, Sinusoidal Oscillators (RC, LC and Crystal), Multivibrators, The 555 timer.
6. Operational Amplifiers: Op-Amp Basics, practical Op-Amp circuits, differential and Common mode operation, Inverting & Non Inverting Amplifier, differential and cascade amplifier, Op-Amp applications.

5. Signals and Systems:

Definitions and properties of Laplace transform, continuous-time and discrete-time Fourier series, continuous-time and discrete-time Fourier Transform, DFT and FFT, z-transform. Sampling theorem. Linear Time-Invariant (LTI)

Systems: definitions and properties; causality, stability, impulse response, convolution, poles and zeros, parallel and cascade structure, frequency response, group delay, phase delay. Signal transmission through LTI systems.

6. POWER ELECTRONICS

Power semiconductor devices PNP diodes, DIACS Thyristors, TRIACS, G.T.O. devices. Power Transistors, Power MOSFET, Rating, Losses and Cooling. Triggering circuits for SCR's, UJT, Blocking Oscillators, Schmitt trigger circuits – Power MOS gate drive circuits. Uncontrolled and controlled Rectifiers : Single phase and poly phase Bridge rectifiers. Transformer ratings. Inductive load, free diodes. Converter operation: Overlap, power factor, inversion, regulation, P-pulse converters, power factor control via PWM converters. D.C. line commutation : Series and parallel capacitor turn off, resonant turn off, impulse commutation. D.C. Choppers : Principles, classification, use. Frequency conversion : Cycloconverter single and three phase circuits, blocked group operation, circulating current mode. Single phase and three phase inverters, constant voltage source and constant current source inverters, HF inverters for heating. Application : D.C. and A.C. drives, S.M.P.S., Resonant converters, A.C. Line Filters, ratio, interference suppression. HDVC transmission.

7. CONTROL SYSTEM

Concept of feedback and Automatic Control, Electrical analogy of physical system. Transfer Function, Block diagram representation of Control Systems, Block Diagram Algebra, Signal Flow Graph, Mason's gain formula. Control system components : Error sensing devices, potentiometer, synchros, D.C. and A.C. tachometers, servomotors, modulators and demodulators. Transient analysis of closed loop systems. Transient errors and their minimization, steady state error and their minimization, error coefficients, P, PI and P-I-D type controllers. Stability of Control Systems : R-H criteria, Nyquist criteria, Bode Plots. Polar Plots, Nichols chart, measures of relative stability. Construction of Root Loci for simple system, effects of the movement of poles and zeros. Improvement of system performance through compensation. Case studies on control voltage, current, frequency, position and speed. Control of liquid level, density, flow, temperature etc.

8. DIGITAL ELECTRONICS

Number Systems: Decimal, binary, octal, hexadecimal number system and conversion , binary weighted codes, signed numbers, 1s and 2s complement codes, Binary arithmetic
Boolean Algebra: Combinational Logic:, canonical logic forms, sum of product & product of sums, Karnaugh maps, two, three and four variable
Karnaugh maps, simplification of expressions, Analysis & design of Combinational Logic: Introduction to combinational circuits, code conversions, decoder, encoder, priority encoder, multiplexers as function generators, binary adder, subtractor, BCD adder, Binary comparator, arithmetic logic units. Sequential Logic: Sequential circuits, flip-flops, clocked and edge triggered flipflops, timing counters, counter design with state equations, Registers , serial in serial out shift registers, tristate register, timing considerations. Digital integrated circuits: Logic levels, propagation delay time, power dissipation fan-out and fan-in, noise margin, logic families and their characteristics TTL, LSTTL CMOS and ECL integrated circuits and their performance comparison, open collector and tristate gates and buffers.

9. MICROPROCESSORS

Introduction to 8085A CPU architecture-register organization, addressing modes and their features. Software instruction set and Assembly Language Programming. Pin description and features. Instruction cycle, machine cycle, Timing diagram.

Hardware Interfacing: Interfacing memory, peripheral chips (IO mapped IO & Memory mapped IO). Interrupts and DMA. Peripherals: 8279, 8255, 8251, 8253, 8237, 8259, A/D and D/A converters and interfacing of the same. Typical applications of a microprocessor. 16 bit processors: 8086 and architecture, segmented memory has cycles, read/write cycle in min/max mode. Reset operation, wait state, Halt state, Hold state, Lock operation, interrupt processing. Addressing modes and their features. Software instruction set (including specific instructions like string instructions, repeat, segment override, lock prefixes and their use) and Assembly Language programming with the same . Brief overview of some other microprocessors (eg. Intel 8086)

Reasoning

Alphabet, Coding-Decoding, Ranking, Series, Arrangement, Syllogism, Clock, Direction, Blood Relation, Cube, Dice, Syllogism, Mirror Image, Water Image, Paper Cutting, Paper, Folding, Embedded, Counting Of Figure, Calendar.

Quantitative Aptitude

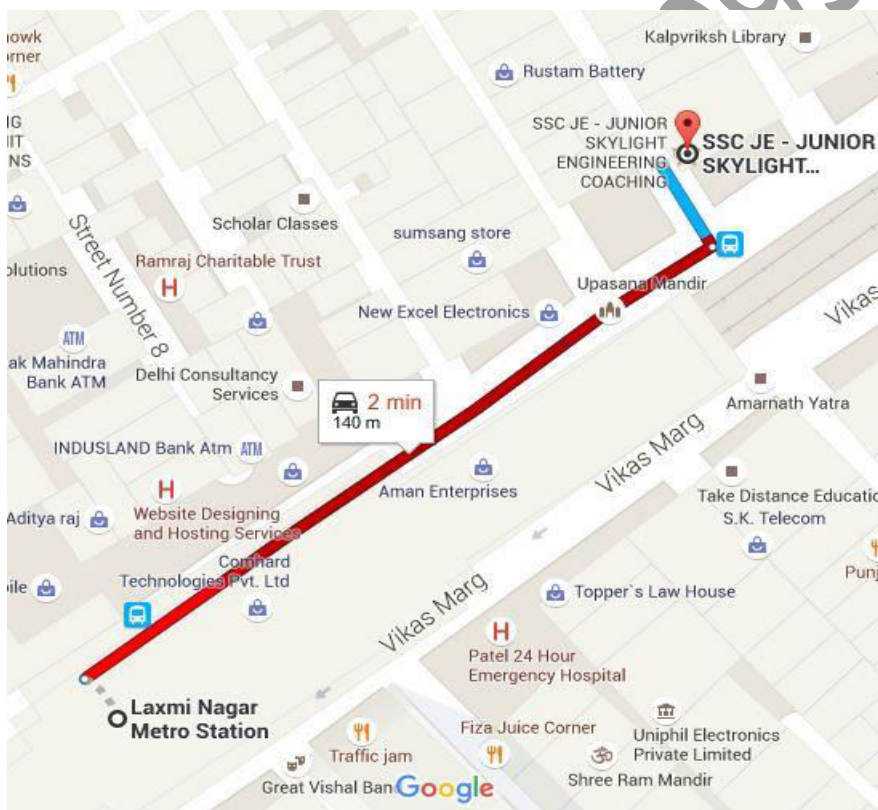
H.C.F & L.C.M, Number System, Average, Mensuration (2d & 3d), Time & Distance, Time & Work, Pipes & Cistern, Percentage (%), Profit/Loss, Boat & Stream, Problems On Trains, Ratio, Mixed Proportion, Partnership, Simple Interest, Compound Interest, Mixture, Age, Permutation, Height & Distance, Trigonometry

General Science

Political - Science, History, Physics, Chemistry, Biology, Geography, Economy, Current Affairs

English

Articles, Nouns & Cases, Nouns & Numbers, Subject-Verb Agreement Time & Tenses, Pronouns, Adjectives, Verb, Adverbs, Conjunctions, Voices, Narrations, Question-Tag, Synonyms-Antonyms, Superfluous Expressions & Slang, Passages, Spell-Check, One Word Substitution, Idioms & Phrases, Sentence-Arrangement, Sentence-Improvement, Para-Jumbling



SKYLIGHT CAREER ACADEMY

**D- 60 STREET NO - 4, LAXMI NAGAR, NEAR METRO GATE NO - 5, OPP METRO
PILLER NO - 31, DELHI -110092**