

**SYLLABUS OF SLIET ENTRANCE TEST SET-V
FOR ADMISSION TO DEGREE PROGRAMME, 2010 (Vertical Promotion)**

- Note :**
1. In both the papers all the questions will be objective type with multiple choice. Answers of the objective type questions are to be filled in the OMR answer sheet given separately.
 2. There will not be any negative marking.

PAPER - I

M.Marks :100

Time : 2 Hours

ENGLISH, GENERAL KNOWLEDGE, MENTAL APTITUDE

Marks: 25 (25 Questions)

The paper will include questions covering the following topics :-

1. General Science
2. Current events of National and International importance
3. History of India
4. Indian National Movement and also General Mental ability
5. Indian Politics and Economy
6. Basics of Tenses /Voice/Narration

MATHEMATICS

Marks :75 (75 Questions)

Algebra: Solution of quadratic equations, relationship between their roots and coefficients. Equations reducible to quadratic equation. Symmetric functions of roots. Formation of a quadratic equation with given roots. Arithmetic progression, Geometric progression and Arithmetico-Geometric series. Series of natural numbers ($\sum n$, $\sum n^2$, $\sum n^3$). Mathematical induction. Permutations and Combinations. Binomial theorem for any index.

Trigonometry : Trigonometric ratios and their relations. Trigonometric identities. T-ratios of allied angles. Addition and Subtraction formulae. Transformation of product into sum or difference and vice-versa. T-ratios of multiple and sub-multiple angles. Heights and distances.

Coordinate Geometry: Rectangular Cartesian coordinates. Distance between two points. Section formulae. Locus of a point. Equation of a straight line in various forms. Angle between two given lines. Condition for two lines to be parallel or perpendicular. Distance of a point from a line. Line through point of intersection of two given lines. Concurrency of lines. Equation of a circle in various forms. Intersection of a circle with a straight line. Equations of tangent and normal to a circle. Intersection of two circles. Equations of the parabola, ellipse and hyperbola in the standard forms.

Calculus: Function, its domain and range. Limit, continuity and differentiability of a function. Derivative of sum, difference, product and quotient of two functions. Derivative of algebraic, trigonometric, exponential, logarithmic, hyperbolic and Inverse trigonometric functions. Chain rule. Derivative of functions expressed in implicit and parametric forms. Logarithmic differentiation. Maxima & minima, Rate measure error Tangents & normals. Integration as the inverse process of differentiation. Integration by parts, by substitution and by partial fractions. Integration of rational and irrational functions. Definite integral and its application for the determination of area (simple cases). Trapezoidal & Simpson's rule for numerical integration.

MODEL QUESTIONS

Fill the choice of the alternative you think to be correct answer in the OMR answer sheet.

- Q.1 He is being accused _____ theft.
(a) with (b) of (c) for (d) about
- Q.2 The first term of a G.P. whose second term is 2 and sum to infinity is 8 will be
(a) 6 (b) 3 (c) 4 (d) 1

PAPER - II

Max. Marks : 100 (100 Questions)

Time : 2 Hours

CHEMICAL TECHNOLOGY

Basic Physical & Chemical Processes: Fertilizer Industries; Chloro, Alkali and Allied Industries; Inorganic Acid Industries : HNO_3 , H_2SO_4 , HCl . Hydrogenation; Sulphonation; Sterilization, fermentation; Polymer: concept of polymerisation, techniques, thermoplastic & thermoset materials, Nylon, Phenol formaldehyde & polyurethane. Pulp & Paper: Manufacturing technique, recovery of various chemicals from waste liquors, Oils & Fats. Sugar, Rubber, Soap & detergents.

Engineering Materials: Various properties of common fabrication & construction materials & applications; Packaging materials & their classification, Alloys, Hook's Law, Steel, Fe-C diagram.

Thermodynamics : Open, Closed & isolated system; reversible & irreversible process; intensive & extensive properties; entropy; enthalpy, internal energy; Equilibrium; Phase rule; Thermo chemistry; Heat of reaction; heat of formation; heat of combustion, Hess's Law. Thermodynamic laws & their applications; general thermodynamic equations; Maxwell relations; Vapour liquid equilibria; Refrigeration, Vapour compression cycle & absorption cycle; Joule Thompson effect; liquefaction processes.

Mechanical Operations: Size reduction & analysis; Screening; material handling & equipments, belt conveyor, bucket elevator and pneumatic conveyor; Mixing & agitation; Filtration theory, filter media, filter aid, plate & frame filter press, vacuum filtration. Settling: free and hindered settling.

Heat Transfer: Conduction: Steady state conduction through plane and composite walls, cylindrical & spherical surfaces, thermal insulations; Convection: natural & forced convection; LMTD, dimensional analysis, basic calculations. Radiations: Black body & Grey body concepts, Stephen-Boltzmann law. Evaporation: types of evaporators, single & multiple effect evaporator.

Mass Transfer: Diffusion: Molecular & Eddy diffusion, diffusion through solids; Absorption-concept, Humidification & dehumidification; packed & tray towers; membrane separation & Crystallization; Drying & drying equipments. Concept of ideal & non-ideal solution, Raoult's law, Relative volatility, Azeotropes. Distillation: Batch & continuous, fractional, flash, differential distillation; McCabe Thiele method for maximum, minimum & optimum reflux.

Fluid Flow Operations: Concept of continuity; Newtonian & Non-Newtonian fluids; laminar & turbulent fluids; pressure & its manometric measurements; Bernoulli's theorem; Fanning friction factor, Boundary layer concept, Flowmeters: orificemeter, venturimeter, pitot tube, Rotameter. Pumps & their classification, NPSH and cavitation, valves & their classifications.

Chemical Reaction Engineering: Kinetics of homogeneous reactions; rate of reaction, Elementary & Non-Elementary reactions; Molecularity & order of reaction; Effect of temperature & pressure on equilibrium constant; Zero, first & second order reactions, half life period; irreversible reactions in series & parallel; Basic concept of batch, CSTR, PFR reactors.

Environmental & Industrial Pollution & Safety Hazards: Air pollution, Water pollution, Noise Pollution & its measurement. Types of pollutants in chemical industries & their effects. Methods of measuring & sampling of gaseous and particulate pollutants. Solid waste disposal, various processing techniques such as incineration, composting, land fills & biological process. Safety hazards in chemical industries, hazards due to fire, explosion, toxicity, radiation, fire triangle.

MODEL QUESTIONS

Fill the choice of the alternative you think to be correct answer in the OMR answer sheet.

- Q.1 Stoke's law is valid when the particle's Reynold number is
(a) < 1 (b) < 5 (c) > 1 (d) none of these
- Q.2 Fugacity has the units of
(a) Temperature (b) Concentration (c) Pressure (d) Energy

FOOD TECHNOLOGY

Max. Marks : 100 (100 Questions)

Time : 2 Hours

Elements of Food Engineering: Different modes of heat transfer; Steady state heat transfer through slab, cylinder and spheres; Natural and forced convection; Heat exchangers; Radiation heat transfer; Basic concepts of diffusion and convective mass transfer; Drying basics; Constant and falling rate phase calculations; Concept of psychrometry and its use; Refrigeration cycles; Cooling load calculations; Physical properties of fluid; Classification of fluid and fluid flow; Continuity equation; Bernoulli's theorem and its application, Navier Stokes equation, Study of centrifugal, reciprocating and rotary pumps.

Unit Operations in Food Processing: Size reduction theory and equipments; Rittinger's and Bond's law; Mixing index; Rate of mixing; Constant rate & constant pressure filtration; Filter cake compressibility; Ultrafiltration and reverse osmosis; Basic separation equation; Liquid-liquid separation, Centrifugal equipments, Crystallization; Separation based on size; Effectiveness of screens; Fineness modulus; Azeotropic and extractive distillation; Differential distillation; Rectification.

Food Chemistry: Structure and properties of water, classification and properties of carbohydrates, proteins and lipids; enzymes, pigments; Food additives.

Technology of Food Grains: Structure and composition of cereals and pulses; Processing of wheat: Cleaning, conditioning and milling; Flour treatments; Flour storage; Parboiling and milling of rice; Wet and dry milling of corn; Pulse and oilseed milling; Manufacturing of biscuits, bread, cake and confectionery items; Technology of breakfast cereals.

Fruits and Vegetable Technology: Physiology of fruits and vegetables; Climateric and non-climateric fruits; Cleaning, sorting, grading and blanching of fruits and vegetables; Thermal processing and process time calculation; Dehydration and freezing techniques; FPO specifications;

Food Beverages: Bottled water, processing of tea and coffee, production of beer and wine.

Dairy Technology: Factors effecting composition of milk; Physico-chemical properties; Plateforms test; Pasteurization and Pasteurizers (LTLT, HTST, Flash); Sterilization of Milk; Manufacturing of butter, cheese, condensed and evaporated milk; Cleaning and sanitization of equipments and plant.

Technology of Meat, Fish and Poultry: Structure of muscle, Changes during conversion of muscle into meat, sausages production, composition and structure of egg, egg powder production. Poultry processing; Fish preservation by dehydration, Smoking, Freezing and Salting.

Packaging, Handling and Storage: Packaging requirements and materials for various food products; Packaging environment (CAP/MAP Aseptic, Inert Gas); Handling equipments like conveyors, elevators, pumps and fans; Handling losses and their control; Storage requirements for perishable and non-perishable foods.

Food Quality and Waste Management: Sampling techniques; Food adulteration and its detection; Sensory and statistical quality control; Characterization of waste; Primary, secondary and tertiary treatments of waste; Treatment and disposal of solid waste.

Food Microbiology: Morphology and reproduction of bacteria, yeast and mould; Microbiology of milk and milk products, meat, fish and poultry, fruits and vegetables; Food infection and intoxication.

MODEL QUESTIONS:

Fill the choice of the alternative you think to be correct answer in the OMR answer sheet.

- Q.1 Brewer's Malt is used for the product of :
(a) Beer (b) Ale (c) Malt Syrup (d) All of these
- Q.2 In milk, the emulsion stabilizer is :
(a) Water (b) texture and nutritive value (c) Fat (d) None of these.

ELECTRONICS AND COMMUNICATION ENGINEERING

Max. Marks : 100 (100 Questions)

Time : 2 Hours

Electrical Engineering: KCL, KVL, Ohm's Law, Circuit elements & Circuit theorems, A.C. Fundamentals- RMS, Average values of different waveforms, Power, Power factor, Star delta connection, Principles of D.C. Machines, Three phase and Single phase Induction Motors, Principle and Construction of Transformers.

Electronic Devices & Circuits: Semi-conductors, PN junction diode, halfwave and fullwave rectifiers, ripple factor, characteristics and applications of UJT, FET, MOSFET & SCR. Half & fullwave controlled rectification Inverters & Choppers, Zenor Diode, NPN & PNP transistors and their different configuration and characteristics, biasing, transistor as an amplifier, Oscillator, Operational amplifier characteristics, Inverting and Non-inverting amplifier and its applications, timer IC, regulated power supply, IC Regulators.

Measurement & Instrumentation: Functional elements of generalized instrument system, Analog voltmeter, DVM, VTVM-construction and working, Measurement of resistance, capacitance and inductance using bridges, CRO & Signal generators.

Digital Electronics & Microprocessors: Number system, Boolean Algebra, Logic gates and flip flops, A/D converters, D/A converters, Counters, Registers. 8085 Microprocessor Architecture, assembly Language of 8085, 8085 interrupts, instruction Set of 8085, Semiconductor memories.

Networks: RC, RL and RLC circuits, differentiator, and integrator, constant K-Low pass and high pass filters, attenuators, resonance and Q factor, equalizers.

Communication Techniques: Modulation, Amplitude modulation, Percentage of modulation, Frequency spectrum of AM wave, Methods of amplitude modulation, Power distribution in carrier and AM signal, Frequency modulation, Modulation index and percentage of modulation, Preamphasis and Deemphasis, methods of FM modulation, Pulse modulation-Analog (PAM, PWM, PPM), Digital (PCM, Delta).

Communication Systems: Block diagram explanation of AM transmitter, different types of AM transmitter, Broadcast AM communication receiver and its different constituents parts, FM transmitter, Different types of FM transmitters, FM detectors-Foster seeley, Dual slope & ratio detectors, basics of fibre optic communication and satellite communication.

Television Engineering: Television fundamentals, scanning, synchronization, persistence of vision, blanking, raster, aspect ratio, picture elements, resolution, frame, transmitter, Principles of colour television, colour signals, compatibility, composite video signal, audio signal, colour TV camera tubes, CTV picture tubes, block diagrams of colour TV receiver and transmitter.

MODEL QUESTIONS

Fill the choice of the alternative you think to be correct answer in the OMR answer sheet.

- Q.1 Which of the following is measured by a wheatstone bridge?
(a) current (b) voltage (c) resistance (d) power
- Q.2 The full load copper loss in a transformer is 400 watts. At half load, the copper loss will be
(a) 400 watt (b) 200 watt (c) 100 watt (d) 50 watt

INSTRUMENTATION ENGINEERING

Max. Marks : 100 (100 Questions)

Time : 2 Hours

Electrical Engineering : Ohm's Law, Kirchhoff's Laws, Circuit elements and circuit theorems, AC Fundamentals-RMS, average values of different waveforms, power, power factor, star-delta connection, transformers, principle, working and construction of AC and DC machines.

Electronic Devices & Circuits: Semi-conductors, PN Junction Diode, Half-wave and Full-wave rectifiers, Ripple Factor, NPN and PNP transistors and their different configuration and characteristics, transistor biasing as amplifier, characteristics of UJT, FET, MOSFET, SCR and their applications, operational amplifier and its applications, 555 timer and its applications, regulated power supply.

Measurement & Instrumentation: Functional elements of generalised instrumentation system, Static & dynamic characteristics of instruments, standards & calibration, errors, principles of analog instruments, PMMC, Moving iron, Electrodynamic instruments, DVM, VTVM, display & recording methods, CRO.

Digital Electronics: Number system, Boolean algebra, logic gates and flip flops, combinational and sequential circuits, A/D converters, D/A converters, Counters, 8085 Microprocessor Architecture, instruction set and Programming, 8051 microcontroller.

Transducers: Resistive, inductive, capacitive, piezo electric, thermo electric, Hall Effect, photo electric and elastic transducers, optical sensor, ultrasonic transducers, biosensors.

Measurement of non-electrical Quantities: Temperature, pressure, level, flow, humidity & moisture measurement.

Control Systems: Introduction to open and closed loop, automatic control, block diagram and transfer functions, time domain response, signal flow graph, steady state errors and stability criterion. ON-OFF, feedback, feed forward, cascade, PID controller, pneumatic controllers and actuators, PLC's (Programmable logic controllers).

Analytical & Bio-Medical Instruments: Different transducers used in Bio-medical & clinical instruments, Spectrophotometer, blood gas analyser, spirometer, column chromatography, gas and liquid chromatography, ECG, EMG, EEG, Blood Pressure Measurement, Pacemakers and Defibrillators.

MODEL QUESTIONS

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COMPUTER SCIENCE & ENGINEERING

Max. Marks : 100 (100 Questions)

Time : 2 Hours

Number System: Basics of a number system; Binary, Octal and hexadecimal, conversion of number, binary arithmetic, floating point numbers.

Digital Electronics: Logic gates, Boolean Algebra, simplification of Boolean expressions, Universal gates, formation and implementation of logical expressions, logic families, Combinational circuit- half adder & subtractor, full adder & subtractor, Comparator circuits, Principles of D/A conversion and A/D conversion, working principles of seven segments alpha numeric displays, decoding and driving circuits of displays, Sequential Circuit- Flip Flops-Types & Designing, Counters-Types & Designing and Shift registers, Semiconductor Memory- Working principles of ROM, PROM, EPROM, EEPROM, static and dynamic RAM's. De Morgan's theorems, simplification of Logic Circuits SOP, POS, K-map.

C-Programming: Data Types, Enumerated data types, Storage classes, arithmetic, logical, bit wise operators, statements expressions, Control structures, pointers, structures, parameter passing, user defined functions and Library functions, String operations, Header files, file handling.

C++ and Concepts of Object Oriented Programming: Objects & classes, constructors & destructors, operator & function overloading, inheritance, multilevel & multiple inheritance, containership, friend function and virtual function.

DBMS: Introduction to Data & Database management, Levels of data representation, Relations, operations on relations, Database models, Design of data base models, ER model, and relational data models. SQL, Normalization, Database keys.

System Software: Assembler, macro, Loader & linker. Direct loading scheme, Compiler, phases of compiler.

Data Structures: Arrays, records, linked lists, stacks, queues, trees, recursion, sorting, and searching algorithms, graphs, complexity.

Operating System: Definition & Basic concepts of single and multi-user operating system, batch processing, time sharing, real time and multiprocessing operating system, MS-DOS structure, boot sequence, MS-DOS commands, Memory Management, Virtual Memory, Deadlocks.

Computer Architecture and Organizations: Basics of Computers, Processor organizations, General structures of CPU registers, stacks, ALU, Control units etc., Basic mathematical operations and ALU design, principles of arrays and pipeline processors, memory and input/output organization.

Microprocessor: Introduction to architecture of 8085, instruction set, Addressing modes, concept of Stack, Subroutines & Interrupts, Assembly Language Programming.

Computer Communication and Networking:

Concept of Networking, Evolution of networking, Description of LAN, MAN, WAN & wireless networks, Topologies, Media, and LAN & WAN devices- Hub, Switch & Router, OSI reference model, TCP/IP, Issues & protocols of Data link layer and Network layer, Subnetting, Introduction to data communication, transmission media, transmission errors, error detection and correction algorithms.

MODEL QUESTIONS :

Fill the choice of the alternative you think to be correct answer in the OMR answer sheet.

Q1. Closest representation of -7.656 in 2's complement form is

- a) 10111.101 b) 11000.011 c) 11001.101 d) 11001.010

Q2. While developing a program for a microprocessor system, to store the program you will use a

- a) ROM b) PROM c) RAM d) EPROM

MECHANICAL ENGINEERING

Max. Marks : 100 (100 Questions)

Time : 2 Hours

Manufacturing Processes: Patterns & pattern materials; cores and core materials, die casting, continuous casting and centrifugal casting processes. Welding processes; arc welding, gas welding, resistance welding, thermit welding; soldering and brazing; welding defects and precautions. Elements of metal cutting; cutting tools; tool geometry: cutting fluids. Turning, milling, drilling and broaching operations: grinding, grinding wheels. Forming processes; hot and cold working; rolling; punching, blanking, shearing, spinning and Powder metallurgy, electric discharge machining, electro chemical machining.

Thermal Engineering: Basic concepts of Thermodynamics: Thermodynamic systems; types (open and closed), Heat and work, specific heat, Enthalpy. Laws of Thermodynamics (Zeroth, First and Second Laws), reversible and irreversible process, entropy. Description of various types of boiler mounting and accessories. I.C. Engines, their cycles, auto cycle, diesel cycle, classification of engine 2 stroke, 4 stroke and fuels, non-conventional resources of energy, different modes of heat transfer.

Mechanics of Solids: Concept of simple stress & strain, Hook's law. Concepts of bending moment and shear force. Bending moment and shear force diagrams for cantilevers, simply supported, overhanging beams subjected to concentrated and uniformly distributed load. Concept of torsion, derivation of torsion equation for circular shafts.

Materials and Metallurgy: Introduction of Engineering materials, their physical and mechanical properties, Iron-Carbon diagram; ferrous and non-ferrous materials; Pig iron, grey and white cast iron. Alloying elements in steel and their effects. High speed steel, heat resistant steel, heat treatment process, binary phase diagram, TTT diagrams (time temperature transformation diagram).

Industrial Engineering and Management: Measurement & Quality control, its advantages; statistical quality control; Control chart; types of production; material requirement planning. Plant location and layout, types of layouts. PERT/CPM, Inspection and its types, Basics of motion and time study, role of ergonomics in the design of work stations. Cost reduction through standardization, management of men, materials and machines.

Theory of Machines: Simple mechanisms, four bar chain; inversion of four bar chain, single slider crank chain and double slider crank chain. Flywheel, friction; motion of the body along horizontal and inclined planes. Various power transmission systems with their merits and demerits; flat and V-belt drives etc..

Mechanics: Moment of force, couple, moment of couple, equivalent force-couple system, free body diagrams. Equation of the equilibrium in case of rigid bodies (2D only). Friction; Law of friction, limiting friction, co-efficient of friction. Simple trusses; method of joints, method sections (2D cases only). Displacement, velocity, acceleration and relative motion, Newton's second Law of motion, linear momentum, rate of change of linear momentum, work of a force, principle of work and energy, kinetic and potential energy, impulse and momentum, centre of gravity.

Machine Drawing & Design: Introduction to design, selection of the materials in machine design. Types of loading; stress concentration; factor of safety, endurance limit. Rivets and riveted joints, welds and welded joints, keys and couplings (muff and flanged), shafts under static and dynamic loading, screwed joints.

CNC Machines: Principle of NC, CNC and DNC. Element of CNC machines; drive mechanism; feed back systems, manual and computer aided part programming. Basic concept of interfacing of Mechanical/Electrical components of PC.

MODEL QUESTIONS:

Fill the choice of the alternative you think to be correct answer in the OMR Answer sheet.

- Q.1 While machining a brass casting on a lathe, the type of chuck used is
(a) Collet chuck (b) Face plate (c) Magnetic chuck (d) None of these
- Q.2 In order to lower the cutting forces and also to reduce the cutting wear, alloying element generally added to steel for free machining is
(a) Manganese (b) Lead (c) Chromium (d) None of these