

GENERAL INFORMATION REGARDING BE/BTECH-DECEMBER 2012 ADMISSIONS INCLUDING ENTRANCE TEST SYLLABUS

Information for:

Structure of the Entrance Test: It will be of 3 hours duration and shall contain 150 Objective/Multiple choice questions of 1 mark each. 1/4 mark shall be deducted for every wrong answer.:

Compulsory subjects		Number of Questions
1	English	20
2	Mathematics	20
3	Physics	20
4	Chemistry	20
Any two from following (S.No 5-7)		
5	Solid Mechanics	20
6	Computer Programming	20
7	Electrical and Electronic Science	20
Any two from following (S.No 8-10)		
8	Engineering Graphics	15
9	Thermodynamics	15
10	Manufacturing Process	15
TOTAL		150

ENGLISH

Communicative grammar-Spotting errors related to nouns, pronouns, adjective and adverbs. Changing voice from active to passive and Passive to Active. Idioms and phrases; Words often confused; One word substitutes; Formation of words (suffixes, prefixes and derivatives)

Written English- Types of writing (narrative, expository, analytical, descriptive); Structure of a paragraph; Fundamentals of letter writing.

Reading Skills –Process of reading; Various types of reading skills; Strategies to become an effective reader.

Speaking and Listening Skills-Elements of an effective talk; Oral presentations and designing & using audio visual aids; Process of listening; Recognition of barriers to listening; Developing good listening skills; Role of non verbal cues in speaking and listening.

Physics

Electromagnetic Waves: Introduction, Maxwell's equations in differential and integral forms, Concept of displacement current, Electromagnetic wave equations for free space, Conducting and dielectric medium, Poynting theorem, Concept of wave guides.

Light Waves: Interference: thin films, wedge-shaped films, non-reflecting films, Newton rings, Michelson interferometer, Diffraction: single, double and multiple slits, Dispersive and resolving powers. Polarization, its production, and detection.

Quantum Mechanics: Origin of quantum hypothesis, de-Broglie hypothesis of matter waves, Uncertainty principle, Wave function and wave mechanics, Schrodinger equation: steady state form, Quantum mechanical operators, Expectation value, One dimensional solutions: zero potential, step potential, potential barrier and potential well.

Laser and Fiber Optics: Basic concepts, Laser properties, Laser systems: ruby, Nd:YAG, He-Ne and semiconductor lasers, Optical fiber, Basic theory, Acceptance angle, Numerical Aperture, Normalised Frequency, Mode of propagating ; materials dispersion and pulse dispersion in optical fiber; fiber connectors, splicers and couplers; application of optical fiber.

Magnetic Materials and superconductivity: Classification of magnetic materials, Types of magnetism, Magnetic anisotropy and magnetostriction, Magnetic domain, Hard and soft magnetic materials, Ferrites and their applications, Basic ideas of superconductivity, Type I and Type-II superconductors and their applications.

Chemistry

Water and its treatment: Specifications of water for different uses, Water for domestic uses, Different methods of water softening, Boiler feed water, Desalination of water

Electrochemistry: Migration of ions, Transference number, Diffusion and ionic mobility, Debye Huckel theory; Types of electrodes, Concentration cells with and without transference, Potentiometric titrations and conductometric titrations.

Phase Rule: Definitions of terms, Derivation of phase rule, One component and two component systems.

Polymers: Basic concepts, Classification and industrial application.

Spectroscopic Techniques: Law of absorption of light, Limitations and applications of Beer's law, Grotthus-Draper Law, Stark Einstein Law; Jablonski diagram, Types of molecular spectra, Introduction to atomic spectroscopy, Principle and applications of atomic absorption spectroscopy, UV/VIS, IR and NMR spectroscopy

Corrosion and its prevention: Corrosion, Different types of corrosion, Prevention of corrosion

MATHEMATICS

Applications of derivatives: Mean value theorems and their geometrical interpretation, Cartesian graphing using first and second order derivatives, polar curves, Polar equations for conic sections. Differential calculus of functions of several variables with applications, directional derivative, homogeneous functions and Euler's theorem, Jacobians, maxima and minima of functions of two variables .

Integral Calculus: Fundamental theorem of integral calculus applications of definite integral to area and arc length. Double and triple integration , and their applications to areas and volumes.

Vector Calculus: Differentiation and integration of vector valued functions, velocity, acceleration, tangent, principle normal and binormal vectors, Curvature and Torsion., Gradient, Divergence and Curl. Line integrals, Work, Circulation and Flux. Green's theorem in Plane

Infinite Series: Introduction to sequences and Infinite series, Tests for convergence/divergence. Alternating series, Absolute convergence , conditional convergence, power series and its convergence.

Matrices: Rank and inverse of a matrix, Solution of linear system of equations.

Complex Numbers: De'Moivre's theorem and its applications.

SOLID MECHANICS

Review of Engineering Mechanics: Concept of force, representation and resolution of forces, free body diagrams, analysis of Pin jointed plane trusses.

Simple Stresses and Strains: Stress-strain curves for elastic materials, axial stress and strain, Hooke's law, Young's modulus of elasticity, Bulk modulus of rigidity and Poisson's ratio, relationship between elastic constants, thermal stresses, principal planes and stresses.

Torsion: Concept of shear strain, Torsion of circular and hollow shafts, power transmitted.

Bending Moment and Shear force Diagrams: Types of beams, supports and loadings, sign conventions, relationship between load, shear force and bending moment, graphical plots of Shear Force and Bending Moments.

Bending and shear Stresses: Theory of simple bending, determination of stresses in simple and built -up sections, flitched beams, variation of shear stress across the depth of various beam sections

COMPUTER PROGRAMMING

Introductory Concepts : Elements of Computer Processing, Basic Concepts of Hardware and Software, Problem solving with Algorithms and Flowchart, Types of Programming Languages, Basic DOS and Linux Commands.

C Programming Concepts and Operators, Hierarchy of operators, Header files, Data input and output, Control statements: loops and Decision statements, Preprocessor directives, Storage classes, Array, Strings, Structures, Union, Enumerations, Functions, Fundamentals of pointers, File Handling in C, Command line arguments.

ELECTRICAL AND ELECTRONIC SCIENCE

Basic electrical quantities, electric circuit elements and their V-I relations, KCL, KVL, Ohm's law, combination of circuit elements, temperature dependency of resistance.

Mesh and Nodal Analysis, Star-Delta Transformation, Superposition theorem, Thevenin's and Norton's theorems, Maximum power transfer theorem, Transient (step) response of RL and RC series circuits.

Concept of Phasor, sinusoidal steady state response of RL, RC & RLC series and

parallel circuits, power and power factors, resonance in series and parallel circuits, bandwidth, loss tangent and quality factor.

Concepts of magnetic circuits, analogy of magnetic circuit with electric circuit, B-H curve, ampere-turn calculation, constructional features and operating principle of single phase transformer and DC machine, characteristics and applications of DC motor.

Diode applications and characteristics, transistor operating modes and characteristics in various configurations, colour coding of low power resistors.

ENGINEERING GRAPHICS

Introduction and use of drafting tools, Lettering, Dimensions and standards, Projection systems, Orthographic projection of points and lines on reference planes, Auxiliary planes and their applications, Projection of surfaces, Projection and sections of solids, Intersection of solids, Development of surfaces, Orthographic projections from pictorial views, Isometric views. Missing lines and views

THERMODYNAMICS

Introduction: Basic Concepts : System, Control Volume, Surrounding, Boundaries, Universe, Types of Systems, Macroscopic and Microscopic viewpoints, Concept of Continuum, Thermodynamic Equilibrium, State, Property, Process: Flow and non flow process, cycle concept of work and heat, Specific heats, Zeroth law, Energy and its form, pure substance, Thermodynamic diagrams, triple point, steam tables and their use.

First Law of Thermodynamics: Concept of internal energy & enthalpy, energy equation as applied to a close and open system, PMM of First kind. Transient flow processes. Charging and discharging of tanks.

Limitations of the First Law – Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements and their Equivalence/Corollaries, PMM of Second kind, Carnot's principle, Carnot cycle and its specialties, Thermodynamic scale of Temperature, Second law analysis of control volume.

Clausius Inequality, Entropy, Principle of Entropy Increase – Energy Equation.

Various cycles and systems: Rankine cycle, vapour compression refrigeration cycle, Air standard cycles: Otto, Diesel, Dual, Brayton cycles.

MANUFACTURING PROCESSES

Introduction: Common engineering materials and their important mechanical and

manufacturing properties. General classification of manufacturing processes

Metal Casting: Principles of metal casting, Patterns, their functions, types, materials and pattern allowances, Characteristics of molding sand, Types of cores, chaplets and chills; their materials and functions.

Metal Forming And Shearing: Forging, rolling, drawing, extrusion, bending, spinning, embossing, shearing, piercing and blanking.

Machining Processes: Principles of metal cutting, cutting tools, their materials and applications, Geometry of single point cutting tool, Basic machine tools and their applications. Introduction to non-traditional machining processes (EDM, USM, CHM, ECM, and LBM).

Joining Processes: Electric arc, Gas, Resistance and Thermit welding, Soldering, Brazing and Braze welding, Adhesive bonding, Mechanical fastening.