Subject: Mathematics   **Full Marks: 30**

Set and Function
Set and relations, functions and graphs, Algebraic, trigonometric, exponential, logarithmic and hyperbolic functions and their inverses.

Algebra
Determinates, matrices, Inverse of a matrix, uses of complex numbers, Polynomial equations sequence and series permutation and combination, Binomial theorem, exponential, Logarithmic series.

Trigonometry
Trigonometric equations and general values, Inverse trigonometric function, Principal values, Properties of triangles; Centroid, incentre, Orthocenter and circumcentre and their properties.

Cordinate Geometry
Limit and continuity of functions, Derivatives and application of derivative – Tangent and normal, Rate of change, differentials dy and actual change Maxima of a function; Antiderivatives (Integratios): rules of Integration, Standard Integrals, Definite integral as the limit of sum, Application to areas under a curve and area between two curves.

Vectors
Vectors in space, addition of vectors, linear combination of vectors, linearly dependent and independent set of vectors, Scalar and vector product of two vectors, simple applications.

Subject: Physics   **Full Marks: 30**

Mechanics
Dimensions, equations of motion, motion of a projectile. Laws of motion, addition and subtraction of vectors, Relative velocity, Equilibrium of forces, Moment Center of mass, Centre of gravity, Solid friction, Work power and energy, Conservation of energy, Angular speed, Centripetal force, Moment of inertia, Torque on a body, Angular momentum, Rotational kinetic energy, Laws of gravitation, Gravitational intensity, Gravitation potential, Velocity of escape, Simple harmonic motion energy of SHM. Hooke's law, Breaking stress, Modules of elasticity, Energy stored in stretched wire, Surface tension phenomenon.

Heat and Thermodynamics
Heat and temperature, Temperature scale, Measurement of heat energy, Specific heat capacity, Latent heat, Saturated Unsaturated vapour, Relative humidity and point, First law of thermodynamic, Reversible isothermal and adiabatic changes, Gas laws kinetic theory of gases, Second Law of thermodynamic, Carnot;s engine, Transfer dof Heat, Conduction, convection and radiation, Expansion of solid, liquid and gas.

Optics
Formation of images by plane and curved mirrors, Refraction of light through plane surfaces, Total internal reflection, Critical angel, Refraction through prism, Maximum and minimum deviation, Formation of images by lenses, Dispersion, Achromatic combination of lenses visual angel, Angular magnification, Defect of vision, Telescope and microscope, Wave theory of light: introduction to Huygens' principle and application interference diffraction and polarization of light.

Waves
Damped vibration, Forced oscillation, Resonance, Progressive waves, Principle of superposition, Velocity of sound in solid, liquid and gas: Laplace's correction, Characteristics of sound wave, Beat phenomenon, Doppler Effect, Stationary waves, Waves in pipes, Waves in String.

Electricity and Magnetism

Electric Charge, Gold leaf electroscope, Charging by induction Faraday's ice pail experiment, Colomb's law, permittivity, Electric field,Gauss's law its application, electric potential, Capacitors, Ohm's Law, Resistance- combination of resistance emf, Kirchhoffs law and its application, Heating effect of current, Thermoelectricity, Chemical effect of current, Potentiometer,Wheatstone bridge, Galvanometer, Conversion of galvanometer into voltmeter and ammeter, Magetic Field, Earth's magnetism, Magnetic Flux, Force on a current carrying conductior, Ampere's law, Biot-Savart's law and their applications, Solenoid,Electromagentic, AC circuits.

Modern Physics and Electronics

Discharge electricity through gases, Cathode rays, Electronic mass and charge Bothr's theory of atomic structure Energy level, X-rays, Photoelectric effect Radioactivity, Nuclear- fission anu fusion, Semiconductors junction Transistor.

Subject: Chemistry   Full marks : 20

Language of Chemistry & Physical Chemistry

Symbol, formulate valency and chemical questions, Problems based on chemical equations (relation with weight and weight, and weight and volume)

Atomic Structure

Study of Cathode rays and discovery of electrons, Rutherford's X-ray scattering experiment and discovery of nucleus, Rutherford model of atom, Elementary concept of quantum numbers, Electron configuration of the elements.

Electronics Theory to Valency:

Octet rule, electro and coordinate valency covalency and coordinate valency, General characteristics ionic and covalent compounds.

Oxidation and Reduction:

Classical definitions, Electronic interpretations of oxidation and reduction, Balancing of redox equations by oxidation number method.

Periodic Classification of Elements

Mendeleev's periodic law, anomalies of Mendeleev's periodic table, Moderns periodic properties viz. ionization potential, Electro negativity and atomic radii and their variation in the periodic table, Equivalent, weight and atomic weight: Concept of equivalent weight and valency, Determination by hydrogen displacement method and oxide method, Concept of atomic Weight, equivalent weight and valency, Determination of atomic weight using Dulong and Petit's rule.

Molecular Weight and Mole

Avogadro's hypothesis and its deductions, Avogardo number and concept of mile, Determination of molecular weight by Victor Meyer's method, Electro- Chemistry: Electrolytes and no electrolytes, strong electrolytes and week electrolytes, Faraday's laws of electrolysis, Solubility product principle and its applications in qualitative analysis, Theories of Acids and Bases: Arrthenius theory, Bronsted and Lowry theory, Lewis theory , Volumetric analysis Equivalent weights of acids base and salts, Principles of acidimetry and alkalimetry, pH and pH scale.

Non-Metals

Water: Hard water and soft water, Causes and removal of hardness of water, Nitrogen and its Compounds: Nitrogen cycle, Preparation of ammonia and nitric acid in the lab and their properties, Manufacture of ammonia and nitric acid, Sulphur and its Compound. Allotropy of Sulphur, Preparation of hydrogen sulphide, sulphure dioxide in the lab, their properties, Manufacture of sulphuric and by contact process, Halogens and Their Compound, Position of halogens in the periodic table, Preparation of chlorine and hydrogen chloride in the lab, their properties.

Metals

Compounds of Metals: General methods of Preparation and Properties of oxides, hydroxides, chlorides, nitrates. sulphates and carbonates of metals; Sodium: Extraction of copper from copper pyrite, Manufacture of Blue vitriol: Zinc: Extraction of zinc from zinc blend, Galvanization ; Iron Extraction of cast from hematite, Cast iron, steel and wrought iron, Types of steel, Manufacture of steel.

Organic Chemistry
Sources and Purification of organic Compounds: Sources of organic compounds, Purification of organic compounds; Classification and nomenclature of organic Compounds: Functional group, homologous series and isomerism (structural only), Classification of organic compounds, Common names, and IUPAC naming system

Subject: English   **Full marks : 20**

Grammer - Familiarity with the following aspects:
Parts of speech, Basic Grammatical Patterns/Structures, Tense and Aspect, Conditional sentences, Verbals: infinitives, Participles and Gerunds, Direct and Indirect Speech, Active and Passive voice, Kinds of Sentences, Transformation of sentences, Concord/Agreement, Vocabulary, Use of Prepositions, Idiomatic expressions, Punctuation, Phonemes and phonetic symbols, Word Stress.