

**Geology (Subject Code -11)**

**PAPER – I**

(General, Geology, Geomorphology, Structural Geology, Palaeontology and Stratigraphy)

**(I) General Geology :**

Energy in relation to Geo-dynamic activities, Origin and interior of the Earth, Dating of rocks by various methods and age of the Earth, Volcanoes-causes and products; volcanic belts, Earthquakes – causes, geological effect and distribution; relation to volcanic belts.

Geosynclines and their classification, Island areas, deep sea trenches and mid-ocean ridges, sea-floor spreading and plate tectonics, Isostracy Mountains – types and origin, brief ideas about continental drift, origin of continents and oceans, Radioactivity and its application to geological problems.

**(II) Geomorphology :**

Basic concepts and significance, Geomorphic processes and parameters, Geomorphic cycles and their interpretation, Relief features; topography and its relation to structures and lithology, Major landforms, drainage systems, Geomorphic features of Indian subcontinent.

**(III) Structural Geology :**

Stress and strain ellipsoid, and rock deformation. Mechanics of folding and faulting. Linear and planer structures and their genetic significance, Petrofacric analysis, its Graphic representation and application to geological problems, Tectonic frame work of India.

**(IV) Palaeontology :**

Micro and Macro-fossils, Modes of preservation and utility of fossils, General idea about classification and nomenclature, Organic evolution and the bearing of palaeontological studies on it.

Morphology, classification and geological history including evolutionary trends of brachiopods, bivalves, gastropods, ammonids, trilobites, echinoids and corals.

Principal groups of vertebrates and their main morphological characters, Vertebrates life through ages; dinosaurs; Siwalik vertebrates, Detailed study of horses, elephants and man, Gondwana flora and its importance.

Types of microfossils and their significance with special reference to Petroleum exploration.

**(V) Stratigraphy :**

Principles of Stratigraphy, Stratigraphic classification and nomenclature, Standard stratigraphical scale, Detailed study of various geological systems of Indian Sub-continent, Boundary problems in stratigraphy, Correlation of the major Indian formations with their world equivalents, An outline of the stratigraphy of various geological systems in their type-areas, Brief study of climates and igneous activities in Indian sub-continent during geological past, Palaeogeographic reconstitutions.

**PAPER - II**

(Crystallography, Mineralogy, Petrology and Economic Geology)

**(I) Crystallography :**

Crystalline and non-crystalline substances, Special groups, Lattice symmetry, Classification of crystals into 32 classes of symmetry, international system of crystallographic notation, Use of stereographic projections to represent crystal symmetry, Twinning and twin laws, Crystal irregularities, Application of X-Rays for crystal studies.

**(II) Optical Mineralogy :**

General principles of optics, Isotropism and anisotropism; concepts of optical indicatrix. Pleochroism; interference colours and extinction, Optic orientation in crystals. Dispersion, Optical accessories.

**(III) Mineralogy :**

Elements of crystal chemistry-types of bondings, ionic radii-coordination number. Isomorphism polymorphism and pseudomorphism, Structural classification of silicates, Detailed study of rock-forming minerals-their physical Chemical and optical properties, and uses, if any, study of the alteration products of these minerals.

**(IV) Petrology :**

Magma, its generation, nature and composition, Simple-phase diagrams of binary and tertiary system and their significance, Bowen's Reaction Principle, Magmatic differentiation; assimilation, Textures and structures and their petrogenetic significance, Classification of igneous rocks, Petrography and petrogenesis of important rock-types of India; granites and granites charnockites and charnockites, Deccan basalts.

Processes of formation of sedimentary rocks, Diagenesis and lithification, Textures and structures and their significance, Classification of sedimentary rocks, clastic and

non-clastic. Heavy minerals and their significance, Elementary concept of depositional environments, sedimentary facies and provenance, Petrography of common rock types.

Variable of metamorphism, Types of metamorphism, Metamorphic grades, zones and facies, ACF, AKF and AEM diagrams, Textures, structures and nomenclature of metamorphic rocks, Petrography and petrogenesis of important rock types.

**(V) Economic Geology :**

Concept of ore, ore mineral and gangue; tenor of ores, processes of formation of mineral deposits, common forms and structures of ore deposits, classification of ore deposits, Control of ore deposition Metallogenic epochs, Study of important metallic and non-metallic deposits, oil and natural gas fields, and coal fields of India, Mineral wealth of India, Mineral economics, National Mineral policy, Conservation and utilization of minerals.

**(VI) Applied Geology :**

Essentials of prospecting and exploration techniques, Principal methods of mining, sampling, ore dressing and beneficiation, Application of Geology in Engineering works. Elements of soil and groundwater geology and geochemistry, Use of aerial photographs in geological investigations.