GEOLOGY : CODE NO. (07)

PART-I

(a) **General Geology :** Solar System. The Earth : its origin, age and internal constitution. Volcanoes—types, distribution, geological effects and products. Earthquakes—intensity, magnitude, distribution, causes and effects. Elementary ideas about isostasy, geosynclines, mountain building, continental drift, sea floor spreading and plate tectonics.

(b) **Geomorphology :** Basic concepts. External and internal processes. Rock weathering. Cycle of erosion. Fluvial landforms and drainage patterns. Landforms of aeolian, marine, glacial and 'Karst' landscapes. Elements of Remote Sensing.

(c) **Structural and field Geology :** Primary and secondary structures. Dip and strike of beds. Unconformities. Study of folds, joints, faults, foliation and lineations. Overthrusts and nappe structures. Stages of rock deformation. Construction of block diagrams. Stereographic and equal-area nets. Solution of simple problems by stereographic net.

Topographic maps and their interpretation. Use of clinometer compass in the field. Measurements of bed, foliation, folds, joints, faults and lineations in the field. Principles of geological mapping. Effects of topography on outcrops. Drawing of sections.

PART-II

(a) **Crystallography :** Elements of crystal structure. Laws of crystallography, Symmetry elements of normal classes of seven crystal systems.

Properties and interaction of light and crystalline matter. Petrological microscope and accessories. Construction and use of Nicole prism. Pleochroism, double refraction, extinction angle, birefringence and twinning in crystals, Isotropic, uniaxial and biaxial minerals.

(b) **Mineralogy :** Physical, chemical and optical properties of the following common rock forming minerals: quartz, feldspar, mica, pyroxene, amphibole, olivine, garnet, chlorite, carbonates, aluminosilicates. Structure of silicates and crystal chemistry of minerals. Gemstones.

(c) **Economic Geology :**Ore, ore mineral and gangue. Classification of ore deposits. Important processes of their formation. Occurrence, origin and distribution in India of the ores of aluminium, chromium, copper, gold, lead, zinc, iron, manganese and radioactive elements. Deposits of minerals use as abrasives, refractories and in ceramics, deposits of coal and petroleum. Elements of prospecting for mineral deposits.

PART -III

(a) **Igneous Petrology :**Origin of magma and formation of igneous rocks. Bowen's reaction principle. Crystallisation of binary systems. Classification of igneous rocks. Textures and structures of igneous rocks. Composition, origin and mode of occurrence of granite, syenite, diorite, mafic and ultramafic groups, anorthosites and alkaline rocks.

(b) **Sedimentary Petrology :** Sedimentary process and products. Classification of sedimentary rocks. Sedimentary structures. Residual deposits—their mode of formation, characteristics and types, Clastic deposits—their classification, mineral composition and texture. Elementary ideas about the origin and characteristics of quartz arenites, arkoses and graywackes. Siliceous and calcareous deposits of chemical and organic origin.

(c) **Metamorphic Petrology :** Types and factors of metamorphism. Zones, grades and facies of metamorphism. Regional and contact metamorphism. Textures and structures of metamorphic rocks. Metamorphism of argillaceous, arenaceous, calcareous and basic rocks. Metasomatism.

PART-IV

(a) **Palaeontology :** Habits and habitats of animals. Fossils and fossilization. Modes of preservation. Application of fossils, Study of morphology and geological history of Foraminiferida, Brachiopoda, Bivalvia, Gastropoda, Cephalopoda, Trilobita, Echinoidea and Anthozoa.

Mammals of Siwalik Group. A brief study of Gondwana flora.

(b) **Stratigraphy and Geology of India :**Fundamental laws of stratigraphy. Stratigraphic classification lithostratigraphic, biostratigraphic and chronostratigraphic. Geological time scale.

Physiographic divisions and outline of stratigraphy of India. Brief study of Dharwar, Vindhyan and Gondwana Supergroups and Siwalik Group with reference to their major subdivisions, lithology, fossils, areal distribution and economic importance.