

GEOLOGY

(POST GRADUATE DEGREE STANDARD)

Code No.240

UNIT I - GENERAL GEOLOGY AND GEOMORPHOLOGY

Origin and age of the Earth - Interior of the Earth - Isostasy – Continental drift – Seafloor spreading – Plate tectonics - Volcanoes and earthquakes - Effects and causes – Seismic zonation of India.

Landforms - their types and developments - Classification of shorelines and their evolution – submarine canyons - Geosynclines - Island arcs.

UNIT-II - STRATIGRAPHY

Modern methods of stratigraphic correlation - Cretaceous - Tertiary (K/T) boundary problem with special reference to Tamil Nadu - Nature and age of the Deccan Traps - Cretaceous of Trichy - Classification and economic importance of Dharwar, Cuddapah, Vindhyan, Gondwana group – Palaeozoic formations - Jurassic of Kutch – Siwaliks.

UNIT III - PALEONTOLOGY

Evolution and stratigraphic importance of Ammonoids, Trilobites and Graptolites - Gondwana flora - their significance and paleoclimatic conditions - Field and laboratory techniques of micropaleontology - Application of micropaleontology in oil exploration.

UNIT IV - STRUCTURAL GEOLOGY

Mechanical properties of rocks - Mechanics and causes of folding and faulting - Classification of folds and faults - Recognition of folds and faults in the field - Joints - Types of unconformity and their recognition in the field.

UNIT V MINERALOGY AND CRYSTALLOGRAPHY

Physical, chemical and optical properties of Feldspars, Feldspathoids, Pyroxene, Amphibole, Olivine and Mica groups - Stereographic and Gnomonic projections of natural crystals of normal classes - Derivation of 32 classes of symmetry - Napier's theorem - Equations of a normal - Bragg's law - X-ray diffraction method.

UNIT VI - IGNEOUS PETROLOGY

Classification of Igneous rocks - Petrography and petrogenesis of Granites, Alkaline rocks, Anorthosites, Carbonatite, Ultramafics - Study of binary and ternary system of crystallisation - Bowen's reaction principle - Diversity of Igneous rocks - variation diagrams - Crystallisation of Basaltic magma.

UNIT VII – SEDIMENTARY AND METAMORPHIC PETROLOGY

Sedimentary depositional environments – Important clastic and non-clastic rocks – Lithification and Diagenesis – heavy minerals and provenance – Tectonics and sedimentation – Sedimentary basins of India – Paleocurrents and Basin Analysis.

Classification of metamorphic rocks – Metamorphic grades and depth zones – Metamorphic facies – Metamorphic differentiation – Thermal – Cataclastic and Regional Metamorphism – Origin of Eclogites – Charnockitisation – Granitisation - Metasomatism.

UNIT VIII - ECONOMIC GEOLOGY

Classification of ore minerals - Geological thermometry - processes of ore formation - minerals used in cement, refractory and ceramic industries.

Origin, occurrence, distribution and uses ores of Iron, Manganese, Copper, Lead, Zinc and Aluminum - Barite, Graphite, Asbestos and Quartz - occurrence and origin of coal and petroleum in India - Beach placers.

UNIT IX - HYDROGEOLOGY

Hydrologic cycle - origin and vertical distribution of Groundwater – Aquifers – Porosity – specific yield and retention - Hydrological properties of important deposits and rocks - Groundwater provinces of India -- Groundwater flow- Hydraulic conductivity - Darcy's Law – Tracer techniques – permeameter - pumping tests – Drilling methods - Estimates of groundwater recharge – Managed aquifer recharge – Seawater intrusion – Groundwater quality and pollution – Electrical methods of groundwater exploration

UNIT X - APPLIED GEOLOGY

Electrical, magnetic, gravity and seismic methods of prospecting - Prospecting for radioactive minerals - Geochemical cycle - Geochemical prospecting – geochemical classification of elements and anomaly - Geological investigation pertaining to Dam foundation, tunnels and roads - Engineering properties of rocks - Types of sampling - ore reserve estimation - Mining methods - Environmental impacts due to mining and mineral processes - Renewable and non-renewable resources – Landslides – Geological hazards including tsunami – Remote sensing, GIS and GPS applications.