



JAM 2027

GEOLOGY (GG)



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The Planet Earth: Origin of the Solar System and the Earth; Internal structure, composition, and age of the Earth; Pressure-temperature-density variations within the Earth; Principles of radiometric dating (Rb-Sr, Sm-Nd, ^{14}C); Volcanism and volcanic landforms; Earthquakes; Earth's magnetism and gravity, Isostasy; Concepts of Plate Tectonics and orogeny.

Geomorphology: Weathering, erosion, deposition; Endogenous and exogenous processes of landform development; Soil formation; River and drainage basin/drainage pattern, network characteristics; Fluvial, aeolian, marine, glacial and karst landforms.

Structural Geology: Concept of dip, strike, rake and plunge; Contour lines; Rule of 'V's and outcrop patterns; Interpretation of geological maps; Cross-section construction; Classification and origin of folds, faults, joints, unconformities, foliations and lineations; Stereographic and equal-area projections of planes and lines; Quantitative interpretation of structures, outcrops, and bore-hole data.

Palaeontology: Major stages in the evolution of life forms; Fossils and their mode of preservation; Application of macrofossils in age determination and pale environmental interpretations; Morphology, major evolutionary trends and ages of important groups of invertebrates – Brachiopoda, Mollusca, Trilobita, Echinodermata; Gondwana plant fossils; Vertebrate fossils (Equidae, Proboscidea) in India.

Stratigraphy: Principles of stratigraphy; Litho-, chrono - and bio-stratigraphic classification; Stratigraphic correlation techniques; Archaean cratons of Peninsular India (Dharwar, Singhbhum and Aravalli); Proterozoic mobile belts; Stratigraphy of Cuddapah and Vindhyan basins; Stratigraphy of Paleozoic – Mesozoic of Spiti and Kashmir, Gondwana Supergroup, Jurassic of Kutch, Cretaceous of Trichinopoly, Cenozoic sequences of Assam, Bengal and Siwaliks.

Mineralogy: Symmetry and forms in common crystal classes; Miller indices; Twinning and twinning laws; Isomorphism, polymorphism, solid solution and exsolution; Elements of Optical Mineralogy; Classification, structure, chemistry, physical, and optical properties of common rock-forming minerals.

Petrology: Igneous rocks – classification and texture; Forms of igneous bodies; Evolution and diversification of magma; Use of binary systems to understand melting and crystallization behaviour of rocks and magmas; Genesis of common igneous rocks and associations.

Sedimentary rocks – classification, texture, and structure; Petrology of sandstone and limestone; Basics of sedimentary environments and facies. Metamorphic rocks – classification and texture; Types of metamorphism; Controls on metamorphism – pressure, temperature and fluids; Concept of projections – ACF, AKF and AFM diagrams; Phase Rule and its applications; Concepts of zones and facies, Characteristic mineral assemblages of pelites in the Barrovian zones and mafic rocks in common facies.

Economic Geology: Physical properties of common economic minerals; Processes of formations of ore mineral deposits - magmatic concentration, hydrothermal processes, oxidation and supergene sulphide enrichment, residual and mechanical concentration; Mode of occurrence and distribution of metallic and non-metallic mineral deposits in India; Ore grade and reserve estimation; Coal and hydrocarbon geology and their Indian occurrences.

Applied Geology: Basics of groundwater geology; Types of aquifers, porosity and permeability; Groundwater flow; Principles of engineering geology; Geological considerations in construction of dams and tunnels; Basics of remote sensing.

