

GEOLOGY

PAPER -I

Group A : General geology and structural geology :

Introduction to geology - Scope of geology, its subdivision and relation to the other branches of science, Rocks— Igneous, sedimentary and metamorphic— their characters, abundance, distribution and distinguishing characters. Geological time scale.

Solar system and the position of the earth in its origin age and constitution of the earth, weathering of rocks, Geological work of river, glacier, wind and sea, Volcanoes types, distribution products and geological effects, Earthquakes - causes, distribution affects. Earthquake waves types and uses in the interpretation of the earth, interior, ground water meaning of the term, water, table artesian, well, aquifer and springs.

Basic concept of geomorphology, normal cycle of erosion. Drainage patterns. Landforms by the action of water, ice and wind.

Structural geology - Goniometer compass and its use, Primary and Secondary structures, Dip and strike and their representation. Folds, faults, joints and unconformities- their description, classification, recognition in the field and effects on outcrop patterns. Criteria for the recognition of the top and bottom of sedimentary strata. Preliminary knowledge of foliation, Schistosity and lineation elementary ideas about geosyncline progenesis, isostasy, continental drift, Island arcs, Structural features of India.

Group B : Palaeontology :

Fossils - Definition, conditions of entombment, types of preservation and uses, Broad division of the fossils into micro and macrofossils, vertebrate and invertebrate fossils, palaeobotany and palynology.

Morphological features and geological distribution of coral branchiopode, bivalves (Lamellibranchs) gastropode, cephalopods, trilobites, echinoids, A brief study of the Gondwana flora and the Siwalik mammals.

Group C : Crystallography and mineralogy :

Crystallography - Crystalline and amorphous substances, Crystal structure definition and morphological characteristics, elements of crystal structures - lattice, unit cell, 14 lattice types, crystallographic axes, axial ratio, parameter and indices, crystal forms and zones, their mathematical relations, Law of crystallography, Symmetry elements, symmetry elements of the normal classes of the crystal systems crystal habits. Twinning crystals and twinning in feldspars, Clinographic projection of crystals.

Mineralogy - Principles of optics, Polarisation of light, Construction of the Nicol prism, Behaviour of light through isotropic and anisotropic substances, refractive index, birefringence and interference colours, Pleochroism, extinction and extinction angles.

Physical, Chemical and optical properties of the following groups of minerals— feldspar, pyroxene, Amphibole, mica and garnet and the following minerals are provided, zircon, calcite, tourmaline, apatite, aluminate, kyanite, epidote, sphene magnetite, haematite, serpentine, ilmenite, staurolite and topaz.

GEOLOGY

PAPER - II

GROUP A : Petrology :

Igneous petrology - its types, composition and nature, Crystallisation of magma, differentiation and assimilation, Bowen's reaction principle, Mode of occurrence and mineralogy of igneous rocks. Textures and structures of igneous rocks. Classification of igneous rocks mineralogical and quasichemical, descriptive petrography of granite, aplite, pegmatite, rhyolite gabbro, dolerite, basalt and andesite, diorite, trachyte and gabbro.

Sedimentary petrology - sedimentary processes and products, An outline of the classification of sedimentary rocks. Important sedimentary structures - bedding, graded bedding, ripple marks, sole marks, rain prints and mud cracks.

Residual deposits - laterites, their origin, types and use.

A preliminary idea of clastic, organic and chemical sediments, Descriptive petrography of sandstone, shale, gruwacke, arkose, grit, limestone, Marl, conglomerate and colitic limestone.

Metamorphic petrology — Definition, agents and types of metamorphism, distinguishing characters of metamorphic rocks, Zones and grades of metamorphism. A preliminary idea of metamorphic facies. The textures and structures of metamorphic rocks, Regional metamorphism of argillaceous sediments.

Brief petrographic description of quartzite, marble, slate, phyllite, schist, gneiss, amphibolite, granulite and calcogneiss.

GROUP B : Economic Geology :

Processes of formation of mineral deposits. Ore, ore mineral and gangue. Simple classification of ore deposits. Brief study of mode of occurrence, origin distribution (in India) and economic uses of gold ores, iron, manganese, chromium, copper, aluminium, lead and Zinc and mica, sillimanite, diamond, coal and petroleum, limestone, coal and hydrocarbon deposits of Assam. Minerals for cement and fertiliser Industries and their occurrence in N.E. India.

An introduction to Geological prospecting.

Physical Characters, chemical composition and occurrence in India of Graphite, azurite, malachite, chalcophyrite, pyrite, siderite, chromite, psilomelane, bauxite, asbestos, corundum, barite, dolomite, fluorite, galena and laterite.

GROUP C : Stratigraphy :

Fundamental laws of stratigraphy, Classification of stratified rocks into lithostratigraphic and biostratigraphic units, Chronostratigraphy, An outline of the geology of the Indian subcontinent. A brief study of the following with respect to their distribution, lithology, fossil content (if any) and economic importance Precambrian rocks of Karnataka, Shingbhum and A/ N.E. India, Cuddapah rocks of the types area Vindhyan of Son Valley, Gondwanas of Bihar, Triassic rocks of Spiti Jurassic rocks of Cutch, Cretaceous rocks of Trichinopoly and Meghalaya and Cretaceous rocks of N. E. India.

Study of the modes of occurrence, composition and Geological age of the following rocks types Charnokite Khondalite, Khasi Greenstone, Myllem Granite, Sylhet, Traps and Deccan Traps.