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Geology Syllabus for Uttarakhand State Civil Services Main Exam-2011

GEOLOGY

PAPER-I

GENERAL GEOLOGY, GEOMORPHOLOGY, STRUCTRUAL GEOLOGY, PALAEONTOLOGY AND STRATIGRAPHY

(i) General Geology: Origin and interior of the Earth . Geological Time Scale Dating of rocks by various methods and age of the earth. Radio-activity and its application to geological problems. Volcanoes, causes and products, volcanic belts. Earthquak secauses, effects, distributions and its relation to volcanic belts.

Geosynclines and their classification, island arcs, deep sea trenches and mid-oceanic ridges; sea-floor spreading and plate tectonics; isostasy. Mountains-types and origin. Origin of continents and oceans.An outline of continental drift. Origin and evolution of Himalaya, Neotectionics.

(ii) Geomorphology : Basic concepts and significance, Geomorphic processes and parameters. Mass movement, Geomorphic cycles and their interpretation, Relief features, topography and its relation to structures lithology. Major landforms, Drainage system, Morphometry, Geomorphic features of Indian subcontinent, Himalaya glaciers.

(iii) Structural Geology: Stress and strain ellipsoid, and rock deformation. Mechanics of folding, faulting and Thrusting. Linear and planar structures and their genetic significance. Petrofabric analysis, its graphic representation and application to geological problems. Tectonic frame work of India, Himalayan tectonics.

(iv) Palaentology: 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, ammonoids, trilobites, echinoids and corals.

Principal groups of vertebrates and their main morphological characters. Vertebrate life through ages. Dinosaurs. Detailed study of evolution 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 system of Indian subcontinent. General statigraphy of Uttarakhand Himalaya.

Boundary problems in stratigraphy: Pre-cambrian and Cambrian, Permian-Triassic, cretaceous Tertiary and Neogene-Quaternary. Correlation of the major Indian formations with their world equivalents. An outline of the stratigraphy of various geological systems. Brief study of climates and igneous activities in Indian sub-continent: during geological past. Palaeogeographic reconstructions. Recent researches in Himalayan Geology.

PAPER-II

CRYSTALLOGRAPHY, MINERALOGY, PETROLOGY AND ECONOMIC GEOLOGY

(i) Crystallography: Crystalline and non-crystalline substances, space group. Lattice symmetry. Classification of crystals, forms and their habits, Weiss and Miller's symbol of Crystallographic notation. Symmetry element and forms of the normal class of all crystal systems. Twinning in crystals. Crystal irregularities. Application of X-Rays for crystal studies.

(ii) Optical Mineralogy: General principles of optics, isotropism and anisotropism, concepts of optical indicatrix, Pleochroism, Birefringence and interference colours; and extinction. Optical orientation in crystals, dispersion, optical accessories.

(iii) Mineralogy: Elements of crystal chemistry, types of bondings, ionic radii, co-ordination 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 ternary systems and their significance. Bown's Reaction Principle. Magmatic differentiation and assimilation. Texture and structure and their petrogenetic significance. Classification of igneous rocks. Petrography and petrogenesis of important rock types of India: granites, alkaline rock, charnockites, anorthosite and Deccan basalts. Processes of formation of sedimentary rocks. Diagenesis and lithification. Textures and structures and their Petrogenetic significance. Classification of sedimentary rocks: clastic and no-clastic. Heavy minerals and their significance. Elementary concept of depositional environments, sedimentary, facies and provenance. Petrography of common rock types. Metamorphic processes and types of metamorphism. Metamorphic grades, zones and facies. ACF, AKF and AFM diagrams. Textures, structures and nomenclature of metamorphic rocks. Petrography and petrogenis of important rock types.

(v) Economic Geology: 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. Metallogenetic epochs and Provinces. Study of important metalliferous and non-metalliferous 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 mineral beneficiation. Geological considerations in Engineering, works: Dam, Tunnels, Bridges and Roads. Natural hazards and their mitigation.

Elements of soil and groundwater geology and geochemistry. Use of aerial photographs and satellite immageries in geological investigations. Water resources of Uttarakhand. Himalayar Environment.