

Syllabus of Combined Geo-Scientist (Preliminary) Examination

Stage-I (Objective Type)

Paper-I: General Studies (Common for all streams)

- Current events of national and international importance.
- History of India and Indian National Movement.
- Indian and World Geography -Physical, Social, Economic Geography of India and the World.
- Indian Polity and Governance -Constitution, Political System, Panchayati Raj, Public Policy, Rights Issues, etc.
- Economic and Social Development – Sustainable Development, Poverty, Inclusion, Demographics, Social Sector initiatives, etc.
- General issues on Environmental Ecology, Biodiversity and Climate Change - that do not require subject specialization
- General Science

Stage-I (Objective Type)

Paper-II : Geology/Hydrogeology

1. Physical Geology

Principle of uniformitarianism; origin, differentiation and internal structure of the Earth; origin of atmosphere; earthquakes and volcanoes; continental drift, seafloor spreading, isostasy, orogeny and plate tectonics; geological action of rivers, wind, glaciers, waves; erosional and depositional landforms; weathering processes and products.

2. Structural Geology

Stress, strain and rheological properties of rocks; planar and linear structures; classification of folds and faults; Mohr's circle and criteria for failure of rocks; ductile and brittle shear in rocks; study of toposheets, V-rules and outcrop patterns; stereographic projections of structural elements.

3. Mineralogy

Elements of symmetry, notations and indices; Bravais lattices; chemical classification of minerals; isomorphism, polymorphism, solid solution and exsolution; silicate structures; physical and optical properties of common rock forming minerals- olivine, garnet, pyroxene, amphibole, mica, feldspar and quartz.

4. Igneous Petrology

Magma types and their evolution; IUGS classification of igneous rocks; forms, structures and textures of igneous rocks; applications of binary and ternary phase diagrams in petrogenesis;

magmatic differentiation and assimilation; petrogenesis of granites, basalts, komatiites and alkaline rocks (carbonatite, kimberlite, lamprophyre and nepheline syenite).

5. Metamorphic Petrology

Limits, types and controls of metamorphism; metamorphic structures- slate, schist and gneiss; metamorphic textures- pre, syn and post tectonic porphyroblasts; concept of metamorphic zone, isograd and facies; geothermal gradients, facies series and plate tectonics.

6. Sedimentology

Origin of sediments; sedimentary textures, grain-size scale; primary sedimentary structures; classification of sandstone and carbonate rocks; siliciclastic depositional environments and sedimentary facies; diagenesis of carbonate sediments.

7. Paleontology

Fossils and processes of fossilization; concept of species and binomial nomenclature; morphology and classification of invertebrates (Trilobites, Brachiopods, Lamellibranchs, Gastropods and Cephalopods); evolution in Equidae and Hominidae; microfossils-Foraminifera, Ostracoda; Gondwana flora.

8. Stratigraphy

Law of superposition; stratigraphic nomenclature- lithostratigraphy, biostratigraphy and chronostratigraphy; Archaean cratonic nuclei of Peninsular India (Dharwar, Singhbhum, and Aravalli cratons); Proterozoic mobile belts (Central Indian Tectonic Zone, Aravalli-Delhi and Eastern Ghats); Purana sedimentary basins (Cuddapah and Vindhyan); Phanerozoic stratigraphy of India- Spiti, Kashmir, Damodar valley, Kutch, Trichinopoly, Siwaliks and Indo-Gangetic alluvium.

9. Economic Geology

Properties of mineral deposits- form, mineral assemblage, texture, rock-ore association and relationship; magmatic, sedimentary, metamorphic, hydrothermal, supergene and weathering-related processes of ore formation; processes of formation of coal, and petroleum; distribution and geological characteristics of major mineral and hydrocarbon deposits of India.

10. Hydrogeology

Groundwater occurrence and aquifer characteristics, porosity, permeability, hydraulic conductivity, transmissivity; Darcy's Law in homogenous and heterogenous media; Bernoulli equation, Reynold's number; composition of groundwater; application of H and O isotopes in groundwater studies; artificial recharge of groundwater.