

Syllabus for Entrance Test, 2016

M.SC. Geology

1. Physical Geology and geomorphology: Origin of the Earth, age of the earth, earth's interior. Composition of the earth. Earth's geological process. Exogenous Processes and Endogenous processes. Weathering and Mass-wasting. Geological action of rivers, glaciers, wind, waves and currents, and ground water. Earth Quakes, Volcanoes. Landforms of various origin.

2. Crystallography: Elementary ideas about crystal morphology in relation to internal structures. Morphological Properties of crystals. Classification of crystal systems, Axial Ratio, Axial Angle, Twinning in crystals, Miller indices and symmetry elements, type minerals of various crystal systems.

3. Mineralogy: Basics of mineralogy- physical properties, characters depending upon elasticity, cohesion, light, electricity, magnetism. Chemical Bonding – Ionic, covalent, metallic, vander Waals. Classification of minerals based on chemical composition and structure. Rock forming minerals. Ore minerals. Oxides, carbonates, phosphates, sulphates, sulphides, and hydrocarbon. Silicates-quartz, feldspar, olivine, garnet, pyroxene, amphibole.

4. Petrology : Classification of Rocks, Igneous, sedimentary and metamorphic rocks. Forms, Structures and textures of Igneous Rocks. Lithification and diagenesis. Structures of sedimentary rocks. Classification of sedimentary rocks based on grain size, and mode of formation. Agents and structures of metamorphic rocks. Grades and facies of metamorphism. Petrographic properties of all kinds of rocks.

5. Palaeontology : Introduction to palaeontology, scope and subdivision, classification, definition of fossil, types of fossils, nature and mode of preservation of fossils, uses of fossils, evolution of life, life through ages. General characters, morphology, classification, geological history and evolution of phylum mollusca, class, paleocypoda, gastropoda, cephalopoda, Phylum-Protozoa, morphology, geological history and stratigraphic importance. Palaeobiogeography and palaeoclimate.

6. Principles of Stratigraphy and Indian Stratigraphy: Principles of stratigraphy. Law of order of superposition, law of uniformitarianism, law of faunal and floral succession, unconformities and its types, stratigraphic concept of correlation, standard stratigraphic scale, elements of lithostratigraphic, biostratigraphic, chronostratigraphic classification and their units. Physiographic division of India, Distribution of Archaeans, Proterozoic, Mesozoic and Tertiary rock in India.

7. Structural Geology and geotectonics: Geotectonics: Introduction, Branches of Geotectonics, Methods of Geotectonics, Importance of Geotectonics, Plate tectonics, continental margins, plate boundaries, causes and movement of the plates,

palaeomagnetism. Primary structural forms and secondary structural forms of sedimentary, igneous rocks. Concept of deformation. Forces of deformation. Folds- Parts of folds, types of folds and classification. Joints – Geometric and genetic classification. Faults-Geometric and genetic classification. Criteria for recognition of faults in the field. Unconformities.

8. Economic Geology: Processes of formation of ores: Endogenous processes: magmatic concentration, contact metasomatic, skarns, greisens, pegmatites and hydrothermal deposits. Exogenous processes: sedimentation as a process of ore formation. Chemical and bacterial precipitation. Weathering products and residual deposits: oxidation and supergene enrichment. Evaporation of brine and metamorphism as ore forming processes. Metallic ores: oxides of Fe, Mn, Cr, W and sulphides of Cu, Pb, Zn, metallogenic provinces and epochs. Important deposits of India including atomic minerals. Nonmetallic and industrial rocks and minerals, their nature and distribution in space and time in India: refractory, chemical, fertilizer, cement, chemical and gemstone industry including building stones.

9. Hydrogeology and Engineering Geology: Global water distribution, Hydrological cycle, origin of water. Vertical distribution of water. Occurrences, movement and storage of water. Aquifers and types of aquifers. Hydrological properties of aquifers. Darcy's law, Water table fluctuation. Ground water quality, Artificial recharge of ground water. Salt water intrusion in coastal aquifers, hydrogeomorphic units, radio isotopes in hydrogeological studies. Hydrostratigraphic units. The role of geology in civil engineering, Engineering properties of rocks, construction materials, stones and rocks, physical, chemical and classifications of rocks, soil and stones. Geological investigation for dam site selection, laying tunnels, bridges and roads on ghats.

10. Environmental Geology: Ecosystems and their components. Kinds of ecosystems. Earth's natural resources and their distribution. Energy Resources and crisis. Natural Hazards, Earthquakes, floods, landslides and avalanches, drought anthropogenic activities. Soil, water, air pollution, causes and effects of mining on environment. Noise pollution. Global warming, climate change and acid rain. Impacts of global warming. Solid wastes. Radioactive wastes, Mining waste.