

RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER
SYLLABUS FOR COMPETITIVE EXAMINATION FOR THE POST
OF LECTURER IN GEOLOGY FOR COLLEGE EDUCATION
DEPARTMENT
Paper I

Unit –I Physical Geology, Structural Geology, Tectonics and Remote Sensing

Earth as a part of the Solar System, its origin, evolution and composition. Endogenic and Exogenic processes of the Earth. Landforms; their origin and evolution.

Distribution of continents and oceans, basic idea about oceanic crust and ocean surface morphology, continental crust (cratons, shield areas and terranes).

Theory of Continental Drift. Concept of Sea floor spreading and evolution of Plate Tectonics theory. Mountain Building processes and evolution of Himalaya. Tectonic subdivisions of India. Theory of Isostasy. Structure and geological characteristics of Island Arcs, Mid Oceanic Ridges, Rift Valleys, Oceanic Trenches, and their distribution.

Seismicity, origin and classification of earthquakes, seismic waves, magnitude and intensity of earthquakes, world distribution of earthquakes and seismic zones of India. Seismicity and interior of the Earth. Volcanoes: their types, distribution and products, submarine volcanism. Seismicity and volcanism in relation to Plate Tectonics.

Mechanical principles and properties of rocks and their controlling factors. Theory of rock failure. Concept of stress and strain. Two-dimensional strain and stress analyses. Types of strain ellipses and ellipsoids, their properties and geological significance. Strain markers in naturally deformed rocks.

Folds; morphology and classification. Mechanics of folding and buckling. Fold development and distribution of strains in folds. Faults; classification, causes and dynamics of faulting, strike-slip, normal and reverse faults, thrust and nappe.

Shear zones, joints, cleavages, lineations: their types, classification, genesis and significance. Unconformity: types and geological significance.

Dynamic evolution of continental and oceanic crust, Tectonics of Precambrian Orogenic Belts of India. Formation of mountain roots. Anatomy of orogenic belts. Origin of the Alpine – Himalayan belt, the Appalachian- Caledonian belt, the Andes, the North American Cordillera.

Principles of Remote Sensing; general idea about electromagnetic spectrum, aerial photographs and their geometry, application of Photogrammetry. Satellite image characters and image analysis. Identification of ground objects based on tone, texture and pattern; principles of terrain analysis, ground water potential, rock type identification; and interpretation of topographic and tectonic features.

Unit – II Mineralogy, Geochemistry and Petrology

Crystals: their symmetry elements and classification. Concept of space lattice. Properties of light, Optical properties of minerals; Orthoscopic and Conoscopic properties. Silicate structures and classification of minerals. Mode of occurrence, chemical, physical, optical properties and genesis of Silica, Feldspar, Feldspathoid, Amphibole, Pyroxene, Mica and Olivine groups.

Geochemical classification of elements. Abundance of elements in the Earth.

Trace and Rare Earth Elements: their significance in geological processes. Graphical presentation and interpretation of geochemical data. Stable isotopes and their geological significance. Radioactive dating based on U-Pb, Sm-Nd, Rb-Sr, Ar-Ar decay schemes and concept of ^{14}C dating.

Origin of magma and its emplacement. Magma evolution and controlling factors. Mode of occurrence, texture and classification (mineralogical and chemical) of igneous rocks. Phase Rule and its application in binary (Albite-Anorthite, Diopside-Anorthite, Albite-Orthoclase, Forsterite-Silica and Leucite-Silica) and ternary (Diopside- Albite- Anorthite and Nepheline – Kaliophyllite – Silica) magmatic systems. Mode of occurrence, classification and petrogenesis of mafic-ultramafic, granitic and alkaline rocks.

Metamorphism: its types and factors. Texture, structure and classification of metamorphic rocks. Concept of metamorphic grade, zones and facies. Paired metamorphic belts and ocean floor and burial metamorphism. Study of low-grade, medium-grade and high-grade metamorphic rocks. Metamorphic reactions and pressure-temperature conditions of metamorphism. Metamorphic differentiation, Anatexis and origin of migmatites. Petrogenesis of hornfelsic and cataclastic rocks, schist, gneiss, amphibolites, granulite and eclogite.

Sedimentary rocks; their classification, texture and structure. Concept of diagenesis and lithification. Petrology of sand, shale, carbonate, chemical and biochemical sedimentary rocks.

Sedimentary environments and facies (continental alluvial-fluvial, lacustrine, desert-aeolian, glacial, marine and continental). Palaeocurrent, palaeoenvironmental, and basin analysis. Evolution of sedimentary basins, tectonics and sedimentation.

Note :-

Pattern of Question Paper

- 1. Objective type paper**
- 2. Maximum Marks : 75**
- 3. Number of Questions : 150**
- 4. Duration of Paper : Three Hours**
- 5. All questions carry equal marks.**
- 6. There will be Negative Marking.**