

University of Rajasthan
Jaipur
Registrar
(Academic)
F. No. 1234

5. GEOLOGY

Scheme:

Theory

Max. Marks 100

Min. Pass Marks: 36

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Paper I : Physical Geology	3 hrs. duration	Max. Marks 50
Paper II : Crystallography and Mineralogy	3 hrs. duration	Max. Marks 50
Practical (One)	4 hrs. duration	Max. Marks 50

Note: Each paper will contain nine questions having three questions in each section. Candidates are required to attempt five questions in all selecting at least one question from each section.

Paper- I : Physical Geology

Section-A

Earth system science- its sub disciplines, their mutual relationship and relationship with other subjects; scope and relevance to society. Earth history and solar system. Shape, size and origin of earth, internal structure, constitution and composition of earth. Earthquake and volcanism.

Section- B

Elements of continental drift, sea floor spreading, plate tectonics, magnetic area, mid oceanic ridges and transform fault. Geosyncline, Mountain building and Isostasy.

Section-C

Geological time scale and time record; Natural water cycle and ground water, weathering and erosion, geological work of river, wind, groundwater, glacier and ocean.

Books Recommended

1. Allen, P. 1997 : Earth Surface Processes. Blackwell Scientific.
2. Scott, W.B. : Introduction to Geology, Vol. 1., McMillan.
3. Holmes, A.: Physical Geology. Thomas Nelson & Sons, London.
4. Datta, A.K. : Physical Geology.

Paper II Crystallography and Mineralogy

Section-A

Definition of mineral and crystal-crystalline, cryptocrystalline and amorphous state. Geometric properties of crystals- Faces, edges, solid angle. Interfacial angle, use of contact goniometer. Elements of symmetry, axial ratio, crystal structures-unit cell, crystal notation and zones.

Tetrahedrite type or hexatetrahedral class; Tetragonal- Zircon type or ditetragonal bipyramidal class; Hexagonal- [Beryl] type or

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Hexagonal bipyramidal class, calcite type of ditrigonal scalenohedral class, Tourmaline type of ditrigonal pyramidal (hemimorphic class), Quartz type or trigonal trapezohedral class; Orthorhombic-Barytes types or bipyramidal class; Monoclinic Gypsum type or prismatic class and Triclinic system-Axinite type or pinacoidal class.

Section-B

Definition of mineral: rock forming, ore minerals and gemstones. Physical properties of minerals and their identification. Formation of minerals, elementary idea about experimental work on mineral stability, Isomorphism, polymorphism, pseudomorphism and solid solution.

Optical Mineralogy- Construction of petrological microscope, pleochroism, extinction angle, refractive index, interference colours, Optical properties of Quartz, Biotite, Hornblende, Hypersthene and Feldspars.

Section-C

Classification of silicates. Description of following rock forming mineral groups; Quartz, Feldspar, Felspathoid, Pyroxene, Amphibole, Mica and Garnet.

Physical and optical properties of following minerals: Olivine, Epidote, Beryl, Apatite, Cordierite, Tourmaline, Staurolite, Topaz, Zircon, Sphene, Chlorite, Serpentine, Andalusite, Kyanite, Sillimanite, Talc, Kaolin, Fluorite, Magnetite and Rutile.

Concept on twinning in crystals, laws of twinning and important types of twinning.

Practical

Min. Pass Marks 18 4 hrs duration Max. Marks 50

Crystallography and mineralogy:

Crystallography: Determination of symmetry in crystal models and measurement of interfacial angles with contact goniometer.

Drawing of crystals of cubic system by Clinographic Projection.

The study of the symmetry, forms and combination of forms in crystals given below.

Cubic system- Galena, Fluorite Magnetite and Garnet, Pyrite tetrahedrite.

Tetragonal system- Zircon, Rutile, Cassiterite. Hexagonal system- Beryl, Calcite, Tourmaline and Quartz.

Orthorhombic system- Barite, Olivine, Staurolite, Sulphur.

Monoclinic system- Gypsum, Orthoclase, Augite, Hornblende, Epidote.

Triclinic system- Axinite, albite, Study of simple twinning in crystals.

Sp. Gr. determination by Minerals Walkers steel yard balance.

Study of Hardness: Lustre, Fracture, Cleavage and streak of minerals.

Study of the Physical properties and diagnostic features of the following minerals:

Opal, hematite, magnetite, halite, calcite, fluorite, tourmaline, magnetite, orthoclase, microcline, plagioclase, hypersthene, augite, Tourmaline, tremolite, hornblende, asbestos, beryl, nepheline, sodalite, garnet, olivine, zircon, topaz, sillimanite, kyanite, quartz and its varieties, chalcedony, flint and jasper; epidote, staurolite, muscovite, biotite, natrolite, talc, chlorite, serpentine, kaoline, sphene, apatite, garnet, wollastonite and augite.

Study of petrological microscope and its parts inclusive of polarizer and their function, observation of Becke line and relative refractive index. Study of pleochroism in biotite, hornblende, tourmaline, hypersthene, andalusite and staurolite; study of twinkling in calcite.

Books Recommended:

1. Read, H.H. : Elements of Mineralogy, John Wilcy & Co. London.
2. Mason, Berry : Mineralogy : Asian Publication.
3. Font, W.E. : Dana's Text book of Mineralogy. John Wiley and Sons, New York.
4. Sharma, N.L. : Determinative Table, ISM, Dhanbad.

Field Training : Geological Field work for at least 7 days duration and report thereon. The field work would be carried out locally including collection of specimens.