B.Sc – I
GEOLOGY
Syllabus

The examination in geology at the end of every semester shall comprise of two theory papers, practicals and internal assessment as follows:-

Semester I and II

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<th>Paper</th>
<th>Theory</th>
<th>50 marks</th>
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<td>Internal assessment</td>
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**Practicals** ................................................................................. 30 marks

**Candidate must pass separately in practicals and total of theory papers and Internal Assessment.**

**Semester-I**

**Paper-1**

*(Physical Geology)*

**UNIT-I** Geology: - Definition, branches, scope and relation to other sciences. Earth as a member of solar system: its size, shape, mass, density, rotational and revolution parameters. Formation of core, mantle, crust, hydrosphere, biosphere and atmosphere.

**UNIT-II** Volcanoes:-Definition, structure of a typical volcano, active, dormant and extinct volcanoes, types of volcanic eruptions, product of volcano. Distribution and origin of volcanoes.
Earthquakes-Definition, Earthquake waves, causes and measurement of earthquake, effects of earthquake, tsunamis and earthquake belts.

**UNIT-III** Rock weathering, soil:-definition, formation, soil profile and types, geological work done by Underground water and oceanic currents.

**UNIT-IV** Geological work done by the wind, river and glaciers.
Semester-I

Paper - II

Mineralogy and elementary mineral optics


Unit-II Properties dependant on magnetism, electricity and radioactivity. Silicate structure. Rock forming minerals-silicates, oxides and sulphides. Chemical and physical properties and geological occurrences of the mineral groups such as quartz, Feldspars, feldspathoids (Pyroxene) and zeolites.

Unit-III Chemical and physical properties and geological occurrences of the mineral groups such as amphiboles, micas, olivine, garnet, and aluminous silicates.

Unit-IV Petrological microscope: Its parts and functioning.

Elementary mineral optics: Nature of light, ordinary and plane polarized light, Reflection and Refraction, critical angle, refractive index by 1) Becke line method and 2) Abbe refractometer and Nicol prism.

Practical:

Study of physical properties in hand specimen of following rock forming minerals-

Quartz and its varieties, orthoclase, microline, albite, labradorite, nepheline, leucite, sodalite, natrolite, stilbite, apophylite, muscovite, biotite, chlorite, hypersthene, augite, diopsid, hornblende, tremolite, actinolite, asbestos, olivine, garnet, kyanite, sillimanite, topaz, staurolite, tourmaline, epidote, serpentine, talc, rhodonite, aragonite, calcite, dolomite, magnesite, siderite, rhodocrosite, barites, gypsum, apatite, beryl, fluorite, corundum, kaolinite, zircon, halite.
SEMESTER II
Paper I

GENERAL GEOLOGY


UNIT-IV Continental drift theory: evidences and causes, Evolution of plate tectonic theory: nature and types of plate margins, sea floor spreading, origin and significance of mid-oceanic-ridges and trenches, origin and distribution of island arcs.

PAPER- II Crystallography and Optical Mineralogy

UNIT-I Definition of crystal, space lattice and unit cell, Crystal structure by X-rays considering unit cell of NaCl. Crystallography and Geometric symmetry. Laws of Crystallography: Constancy of Interfacial angle, rationality of indices and symmetry, Contact goniometer and measurement of interfacial angle. Elementary ideas about crystal structure, crystal faces, edges, solid, angles and zones. Crystallographic axes and axial angles. Crystal notations: Miller indices and Weiss parameters.

UNIT-II Crystal Symmetry and classification of Crystals into six systems. Study of Crystals of galena class of cubic system, zircon class of tetragonal system and Baryte class of orthorhombic system.

UNIT-III Study of Crystals of Beryl class of Hexagonal system, Gypsum class of Monoclinic system and Axinite class Triclinic system.

UNIT-IV Properties under plane polarized light and Crossed Nicol: - colour, cleavage, relief, form, pleochroism, twinkling, isotropism and anisotropism, extinction and extinction angle, twinning, birefringence, interference colours. Optical characters of the following rock forming minerals in ordinary and plane polarized light: Quartz,
microcline, orthoclase, albite, labradorite, muscovite, biotite, chlorite, hornblende, augite, olivine, garnet, calcite, kyanite, sillimanite, tourmaline, epidote, tremolite and actinolite.

Practical:

I) Study of elements of symmetry and description of various forms of crystals from normal classes of six crystal systems.
II) Study of the optical characters of minerals listed for theory course using polarizing microscope.

Geological field work:

Student will be required to carry out field work of a short duration in an area of geological interest to study the elementary aspects of field Geology (study of Topographic Features, reading of Topographical maps, use of compass clinometer, making location on toposheets) and submit a report thereon.

Books Recommended (For Field Work)

Books Recommended for Paper I of Semester I and II

2. Emmons, Theil, Staffer and Allison: Geology principles and processes
5. Judson, DeffeywS and Hargrave.R:Physical Geology
7. Cazen, Hatcher and Siemekowski: Physical Geology
Geology, volume I and II Himalaya publishing House.


Books Recommended for Paper II of Semester I and II

1. H.F. Read: Rutley's Elements of Mineralogy

2. Berry, L.G., Mason, Brian and Dietrich, R.V. (1985)


5. Smith: Minerals and Microscopes

6. Roger and Kerr: Optical Minerology