Geology, B. Sc. Part - I

(M.M. 50 days)

1. Introduction, Geology and its branches, their interrelationship. Aims and scope of geology.
2. Earth and Solar system, shape, size and surface relief of earth, materials of earth's crust, mantle and core, minerals and rocks.
3. Earth-origin, age and interior, volcanoes and earthquakes.
4. Continents and oceans, Geosynclines, Mountains.

(B). Mineralogy:

(At least one question be set from each unit)

6. Minerals, classification and physical properties.
7. Description of common minerals of following groups:
9. Optical properties of the following: Quartz, Orthoclase, Microcline, Plagioclase, Olivine, Augite, Hornblende, Muscovite, Biotite, Garnet, Calcite, Tourmaline, Sillimanite.

Practical:

(M.M. 50)

1. Geological maps and structural problems
2. Minerals in Hand Specimen
3. Crystal Models
4. Physiographic and structural Models
5. Tour Report
6. Sessional and Viva-voce

(Tour - A minimum 3 days trip in a Himalayan terrain).

Text/ Reference Books:

1. A. K. Dutta- Physical Geology
2. Parbin Singh- Text Book of Geology
3. M. P. Billings- Structural Geology
4. H. H. read- Rutley's Mineralogy
Paper - IV : Petrology

(Minimum one question be set from each unit)

I. Rocks, their classification, megascopic description of the following:
   Granite, Rhyolite, Syenite, Diorite, Gabbro, Charnockite, Peridotite, Dunite, Basalt, Pitchstone, Obsidian, Sandstone, Shale, Conglomerate, Limestone, Phyllite, Slate, Schist, Gneiss, Quartzite, Marble.

II. Igneous rocks, composition, texture, structures and classification, evolution of Magma. Differentiation and Assimilation.

III. Crystallisation of Unicomponent, Biocomponent magmas and Mixed crystals, Bowen's reaction series.

IV. Sedimentary rocks-Formation, classification, Texture and Structures.

V. Metamorphic rocks-Facies and Grades of Metamorphism. Texture, structures, classification of metamorphic rocks.

Paper - V : Paleontology

(Minimum one question be set from each unit)

I. Fossils, Modes of preservation, nomenclature and uses.

II. Brief idea of various Eco-systems, Origin and evolution of Life.

III. Morphology and geological distribution of following groups:
   - Lamellibranchs, Gasteropods, Cephalopods.
   - Actiniza, Brachiopods, Trilobites, Echinoids and Graftible.

Study of following genera:

Paper - VI: Stratigraphy

(Minimum one question be set from each unit)

I. Stratigraphy - Principle, correlation, Nomenclature, Geological Time-Scale.

II. Physiological divisions of India, elementary idea of tectonics of Peninsula, Himalaya and Ganga plain.

III. Description of:
(a) Dharwarians-Karnataka, Rajasthan, Bihar, Andhra Pradesh, Delhi.
(b) Vindhyan-U.P., M.P., A.P. and Rajasthan.
(c) Pre-Cambrians of Himalaya.

IV. Lower Paleozoic of Salt Range and Spiti, Gondwana sequence, Upper Paleozoic of Salt range. Mesozoic of Spiti, Kutch, Rajasthan, Tamilnadu, Deccan Traps.

V. Tertiary of Assam, Gujarat and Himalays, Siwalik, Karewas, and Quaternaries of Himalaya.

Practicals:

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<td>Rocks in hand specimen</td>
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<td>Rocks in Thin-section</td>
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<td>iii)</td>
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<td>Tour report</td>
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Tour - A minimum 5 days trip to a fossiliferous terrain.
Text/Reference Books:
1. G.W. Tyrell - Principles of Petrology
3. H. Woods - Invertebrate Fossils
4. P.C. Jain and M.S.A. Raman - Paleontology
5. M.S. Krishnan - Geology of India.
6. R. Kumar - Historical geology and Stratigraphy.
Paper - VII : Economic Geology  M.M. 50

(Minimum one question be set from each unit)

I. Economic geology - definition and Scope. Concept of ore and ore deposits. Forms, structures and Textures of Ore deposits.


III. Distribution of important metallic and non-metallic deposits in India. Ore minerals of Fe, Mn, Cr, Ti, W, Cu, Pb, Zn, and Al. Industrial minerals-Kyanite, sillimanite, Magnesite, Talc, Gypsum, Fluorite, Phosphorite, Apatite, Baryte, Corundum, Graphite, Mica, Asbestos, Ochre and China Clay.

IV. Origin, mode of Occurrence and distribution of coal in India: Origin migration, accumulation and distribution of Hydrocarbons in India.


VI. Mineral resources of Uttar Pradesh.

Paper - VIII : Elements of Applied Geology  M.M. 50

(Minimum one question be set from each unit)

I. Engineering properties of rocks, soils, soil groups of India.

II. Dams, Reservoirs and Tunnels. Hill roads and Landslide hazards.

III. Ground water cycle. Hydrological properties of rocks, springs, Hot springs.

IV. Geological prospectings for ground water. Hydrological provinces of India.

V. Mineral exploration-elementary idea of geological and geophysical prospecting.
Paper - IX: Environmental Geology

(Minimum one question be set from each unit)

I. Biosphere and Man, Earth materials, concept of change.

II. Rock weathering and soils, Mass wastings, hydrologic cycle, Solar radiation.

III. Climatology, Global environments - Coastal, Riverine, Desertic, Tropical, Cold, Polar.


V. Energy resources - non-conventional, watershed management. Land use planning, Wastelands, Management of water resources. Land reclamation.

Practicals:

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<td>Economic Minerals in Land specimen</td>
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Tour will consist of at least 7 days work in a Himalayan terrain, preferably near an Engineering project.

Text/Reference Books:

2. N.L. Shrma - Mineral resources of India.
3. H. Legget - Engineering Geology
4. A.M. Todd - Ground water geology
5. S. Arogyaswami - Mineral exploration