

B. Sc. First Year Science 2020-2021 GEOLOGY

The examination shall consist of three theory papers and one practical

| | | Hrs / week | Exam. Hrs. | M. Marks |
|-------------------------|--------------------------------|------------|------------|------------|
| A. Theory Papers | | | | |
| Paper I: | Physical Geology | 2 | 3 | 50 |
| Paper II: | Paleontology | 2 | 3 | 50 |
| Paper III: | Crystallography and Mineralogy | 2 | 3 | 50 |
| B. Practical: | | 4 | 4 | 75 |
| Total Marks | | | | 225 |

Note:

Time: 3 hrs

MM 50

Note: Each paper will be divided into THREE parts.

Part I – Ten questions (short type answer) two from each Unit will be asked. Each question will be of one mark and the candidates are required to attempt **ALL** questions. **Total - 10 marks**

Part II – Five questions (answer not exceeding 250 words) one from each Unit with internal choice will be asked and the candidates are required to attempt **ALL** questions. Each question will be of 05 marks. **Total 25 marks**

Part III – Four questions may be in parts covering all five Units (answer not exceeding 500 words) will be asked. The candidates are required to attempt any **TWO** questions. Each question will be of 10 marks. **Total 20 marks**

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B. Sc. First Year Science 2020-2021
PAPER-I: PHYSICAL GEOLOGY

Time: 3 hrs

MM 50

UNIT-I

Earth as a member of the Solar system. Origin and age of the Earth. Physical parameters of the Earth. Internal constitution of the Earth. Concept of lithosphere. Isostasy.

UNIT-II

Surface features of the Earth. Distribution of land and ocean and peculiarities. Coral reefs. Distribution and causes of earthquakes. Seismic waves as indicator of the Earth's interior. Volcanoes: causes, distribution and types.

UNIT-III

Weathering and erosion. Geological work of wind, groundwater, rivers, ocean, and glacier.

UNIT-IV

Major tectonic features of the Earth: Mountain belts, shields, island arcs, trenches, mid-oceanic ridges, and ocean basins.

UNIT-V

Concept of Plate Tectonics. Evolution of Himalayas and Indo-Gangetic Plain.

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PAPER-II: PALAEOLOGY

Time: 3 hrs

MM 50

UNIT-I

Definition, subdivisions of Paleontology and its relation with allied subjects. Fossils, their modes of preservation. Uses of fossils. Habitats and Habits. Elementary ideas of organic evolution. Classification and Nomenclature.

UNIT-II

Morphology and geological distribution of Foraminifera, Graptoloidea and Echinoidea.

UNIT-III

Morphology and geological distribution of Gastropoda, Pelecypoda and Cephalopoda.

UNIT-IV

Morphology and geological distribution of Brachiopoda, Corals and Trilobita.

UNIT-V

Elementary knowledge of Gondwana plant fossils. Vertebrate fossils of Siwaliks of India. Evolutionary history of man.

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PAPER-III: CRYSTALLOGRAPHY AND MINERALOGY

Time: 3 hrs

MM 50

UNIT-I

Fundamental Laws of Crystallography, Elements of crystal symmetry, Millers and Weiss systems of Notation. Crystal forms and their classification into crystal system.

UNIT-II

Study of holohedral classes of following crystal systems- Cubic system, Tetragonal system, Hexagonal system, Orthorhombic system, Monoclinic system and Triclinic system.

UNIT-III

Physical properties of minerals, Concept of isomorphism and polymorphism. Elementary ideas about structure and classification of silicate minerals. Study of physical properties of Quartz, Feldspar, Olivine, Pyroxene, Amphibole and Mica families.

UNIT-VI

Petrologic microscope and its construction; principles of optics as applied to orthoscopic study of minerals; color, form, birefringence, and pleochroism. Ideas about uniaxial and biaxial characters of minerals.

UNIT-V

Study of the optical properties of following rock forming mineral families: Olivine, pyroxene, amphibole, and nepheline. Study of optical properties in particular of following minerals: Muscovite, biotite, quartz, orthoclase, microcline, albite, olivine, augite, diopside, hypersthene, hornblende and tremolite.

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B. Sc. FIRST YEAR GEOLOGY PRACTICAL 2020-2021

Examination will be of four hours' duration.

Maximum Marks 75

| | |
|----------------------------|----|
| Physical Geology | 05 |
| Paleontology | 20 |
| Crystallography-Mineralogy | 20 |
| Field Work | 15 |
| Viva Voce | 05 |
| Record | 10 |

Total **75**

(i) Paleontology:

Identification and description of following fossils in hand specimens:

| | |
|---------------|---|
| Foraminifera | : <i>Nummulites, Assilina, Alveolina.</i> |
| Echinoidea | : <i>Cidaris, Hemiaster, Micraster.</i> |
| Brachiopoda | : <i>Rhynchonella, Terebratula, Productus, Spirifer.</i> |
| Pelecypoda | : <i>Pecten, Ostrea, Trigonina, Lima, Exogyra.</i> |
| Gastropoda | : <i>Trochus, Murex, Voluta, Physa, Turritella, Conus.</i> |
| Ammonoidea | : <i>Phylloceras, Ceratites, Perisphinctes.</i> |
| Coleoidea | : <i>Belemnites.</i> |
| Nautiloidea | : <i>Nautilus, Orthoceras.</i> |
| Trilobita | : <i>Calymene, Phacops, Agnostus, Trinucleus, Paradoxides.</i> |
| Graptoloidea | : <i>Monograptus, Diplograptus.</i> |
| Plant fossils | : <i>Glossopteris, Gangmopteris, Vertibraria, Ptilophyllum.</i> |

(ii) Crystallography and Mineralogy:

Description and identification of the following minerals in hand specimen : Quartz, feldspar, muscovite, biotite, chlorite, hornblende, augite, olivine, garnet, kyanite, staurolite, sillimanite, tremolite, asbestos, serpentine, calcite, dolomite, magnetite, hematite, epidote, tourmaline, beryl, nepheline, talc, gypsum, apatite, fluorite, topaz and corundum.

Drawing, description and identification of crystal models.

(iii) Identification of following minerals under microscope: Quartz, Plagioclase feldspar, Microcline Feldspar, Muscovite, Biotite, Garnet, Hornblende, Calcite, Olivine, Hypersthene.

(iv) Physical Geology:

Preparation of charts and diagrams illustrating important processes of erosion and weathering.

(v) Field Work:

Three days Geological field excursion and a report thereon.

Students not taking part in the field work will not be awarded marks for the field work.

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Books suggested, besides the Internet: B. Sc. Part I

- Datta A. K.:** Introduction to Physical Geology, Kalyani Publishers, New Delhi.
- Ford, W. E.:** Dana's Textbook of Mineralogy, John Wiley & Sons, New York.
- Hamblin W. K.:** Earth's Dynamic Systems, Macmillan Publishing Company, New York.
- Homes A.:** Principles of Physical Geology, Thomas Nelson & Sons, London.
- Mahapatra G. B.:** A Textbook of Geology, CBS Publishers & Distributors, Delhi.
- Mukerjee P. K.:** A Textbook of Geology, The World Press Pvt. Ltd., Calcutta.
- Parbin Singh:** Engineering & General Geology, S. K. Kataria & Sons, New Delhi.
- Read H. H.:** Rutley's Elements of Mineralogy (revised by C.D. Gribble), CBS Publishers & Distributors, Delhi.
- Sharma, N. L.:** Determinative Tables, ISM, Dhanbad.
- Shrock R. R. & Twenhofel W. H.:** Principles of Invertebrate Palaeontology, CBS Publishers & Distributors, Delhi.
- Tarbuck E. J. & Lutgens F. K.:** The Earth - An Introduction to Physical Geology, Merrill Publishing Company, London.
- Woods, Henry:** Paleontology Invertebrates, CBS Publishers & Distributors, Delhi.

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