

B. Sc. Second Year Science 2020-2021 GEOLOGY

The examination shall consist of three theory papers and one practical

	Hrs per week	Exam. Hrs.	Marks
A. Theory Papers			
Paper I: Structural Geology	2	3	50
Paper II: Petrology	2	3	50
Paper III: Stratigraphy	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. Second Year Science 2020-2021
Paper-I: STRUCTURAL GEOLOGY

Time: 3 hrs

MM 50

UNIT-I

Basic concept of structural geology. Concept of strike and dip. Effects of topography on outcrops. Description and applications of clinometer compass. Primary sedimentary structures, their use in determination of top and bottom of beds.

UNIT-II

Folds-Characteristics and their types - Elementary ideas of mechanism of folding; outcrop pattern of non-plunging, plunging, and doubly plunging folds.

UNIT-III

Faults - Characteristics and classification, effects of faults on outcrop, criteria of their recognition in field.

UNIT-IV

Mechanical principles; Stress and strain. Geological examples of strain in rocks. Types of unconformity; their recognition, significance and distinction from faults. Outliers, inliers, overlap and offlap.

UNIT-V

Preliminary ideas of foliation, lineation, and joints. Structures of igneous rocks.

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Paper-II: PETROLOGY

Time: 3 hrs

MM 50

UNIT-I

Introduction to Petrology. Igneous rocks: Forms, structures, textures and microstructures. Composition of magma, Classification of igneous rocks.

UNIT-II

Processes of differentiation, gaseous transfer within liquid; immiscibility, and assimilation. Description of the following rock forming families : granite - granodiorite, syenite, diorite, gabbro, feldspathoidal - syenite, ultrabasic and ultramafic rocks.

UNIT-III

Metamorphic rocks: Definitions, controls of metamorphism. Metamorphic processes and reactions. Types of metamorphism - contact, cataclastic, regional and ocean floor metamorphism.

UNIT-IV

Texture and structure of metamorphic rocks. Nomenclature and description of important metamorphic rocks. Metasomatism, anatexis, and migmatization. Sedimentary rocks: Processes of formation of sediments, diagenesis. Textures of sedimentary rocks.

UNIT-V

Major sedimentary structures - primary, secondary and biogenetic and their significance. Classification of sedimentary rocks. Type of arenites, carbonate rocks, and argillites.

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Paper-III: STRATIGRAPHY

Time: 3 hrs

MM 50

UNIT-I

Principles of stratigraphy. Stratigraphic classification. Stratigraphic correlation. Problems of Early Precambrian stratigraphy. Brief idea about the process of early crustal evolution. Major Precambrian Provinces of India. Physical division of India and their characteristics.

UNIT-II

Geological Time Scale and its equivalent formations in India. Precambrian stratigraphy of Rajasthan, Central India, Jharkhand, Bihar, Orissa, Eastern Ghat and Southern India.

UNIT-III

Middle and Late Proterozoic platforms; Cuddapah, Vindhyan and their equivalents. Precambrian belts of extra -Peninsular region.

UNIT-IV

Geology of Gondwana Supergroup and Palaeozoic stratigraphy of India, their distribution, division, lithology, fossil content and economic importance.

UNIT-V

Mesozoic and Cenozoic geology of India, their distribution, division, lithology and fossil content.

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B. Sc. SECOND YEAR GEOLOGY PRACTICAL 2020-2021

The Examination will be of four hours' duration.

Maximum Marks 75

Petrology

- | | |
|-------------------------------------|----|
| 1. Study of rocks in hand specimens | 08 |
| 2. Microscopic study of rocks | 07 |

Structural Geology

- | | |
|---|----|
| 3. Interpretation and drawing of section of simple geological map | 10 |
| 4. Problem of true and apparent dips | 05 |

Stratigraphy

- | | |
|---|----|
| 5. Stratigraphic rocks. | 10 |
| 6. Sketch map of Indian formations and palaeographic period | 05 |
| 7. Field report | 15 |
| 8. Viva-Voce | 05 |
| 9. Record | 10 |

Total **75**

STRUCTURAL GEOLOGY:

1. Study of topographic maps. Interpretation of topography from contour maps.
2. Orientation of planes and lines; dip, strike, pitch and plunge. Use of clinometer compass.
3. Study and interpretation of outcrop patterns. True and apparent thickness of beds, study of simple geological maps and drawing of sections.
4. Basic principles of stereographic and orthographic projections.

PETROLOGY:

(1) Identification of igneous, metamorphic and sedimentary rocks in hand specimens as per list given below:

Igneous Rocks: -

Granite, granodiorite, syenite, diorite, anorthosite, norite, gabbro, pyroxenite, peridotite, nepheline syenite, pegmatite, dolerite, basalt and rhyolite.

Metamorphic Rocks: -

Quartzite, marble, granite gneiss, mica schist, phyllite, slate, amphibolite, charnockite, mylonite and migmatitic gneiss.

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Sedimentary Rocks: -

Sandstone, limestone, shale, conglomerate, arkose, grit, greywacke, and breccia.

(2) Petrographic study of the following rocks under microscope: granite, syenite, diorite, gabbro, dolerite, rhyolite, basalt, mica schist, granite gneiss, amphibolite, marble, sandstone and limestone.

STRATIGRAPHY:

Identification and description of important stratigraphic rocks of India and their assignment to respective stratigraphic position. Plotting of following stratigraphic units and their equivalents in the outline map of India. Delhi-Aravalli fold belts, Main Vindhyan Basin, Gondwana Supergroup, Deccan Traps and Siwalik Group. Preparation of palaeogeographic maps of Permocarboniferous and Cretaceous periods.

FIELD WORK:

Field work for 3 day for training in geological mapping of rock units and measurement of Structural features.

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

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BOOKS SUGGESTED

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

Billings M. P.: Structural Geology, Prentice Hall of India Pvt. Ltd., New Delhi.

Bolton T.: Geological Maps their solution and interpretation, Cambridge University Press

Haung G. N.: Petrology

Kirshnan M. S.: Geology of India and Burma, CBS Publishers & Distributors, Delhi.

Lemon R. R.: Principles of Stratigraphy, Merill Publishing Company, London

Mukerjee P. K.: A Textbook of Geology, The world Press Pvt. Ltd., Calcutta.

Naqvi S.M. & Rogers J. J.W.: Precambrian Geology of India. Oxford University Press.

Parbin Singh: Engineering & General Geology, S. K. Kataria & Sons, New Delhi.

Pettijohn F. J.: Sedimentary Rocks, CBS Publishers & Distributors, Delhi.

Ravindra Kumar: Fundamentals of Historical Geology and Stratigraphy of India, Wiley
Eastern Ltd., New Delhi.

Sinha Roy, S., Malhotra, G., & Mohanty, M., 1998: Geology of Rajasthan, Geological Society
of India, Bangalore, pp278.

Tyrrell G. W.: The principles of Petrology, B. I. Publications Pvt. Ltd., Delhi.

Weller J. M.: Stratigraphic Principles and Practice, Universal Book Stall, Delhi.

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