B.Sc. 1st Year Geology
w.e.f. session 2016-2017

Scheme of Examination, Maximum Marks and Internal Assessment

1st Semester

Paper Code	Title of Paper	Max. Marks	Theory	I.A.	Periods/Week
Paper-101	General Geology	50	40	10	3
Paper-102	Crystallography	50	40	10	3
Paper-103	Practical /Field Work related to papers 101, 102	50	--	--	6
	Total Marks	**150**			

2nd Semester

Paper Code	Title of Paper	Max. Marks	Theory	I.A.	Periods/Week
Paper-201	Physical Geology	50	40	10	3
Paper-202	Mineralogy	50	40	10	3
Paper-203	Practical / Field Work related to papers 201, 202	50	50	--	6
	Total Marks =	**150**			

Note:-

1. **The examiner will set nine questions in all, selecting two questions from each unit and one question (Q. No. 1) of short answer type having eight sub-parts and covering all units.**
2. **The candidate will attempt five questions in all, selecting one question from each unit and the compulsory Q. No. 1. All Questions carry equal marks**.

B.Sc. Ist Year- Geology
Ist- Semester w.e.f. 2016-2017
Paper-101- General Geology (Theory)

Max Marks: 40 (Theory)
I.A=10 Marks
Periods/week: 3
Time: 3 Hrs.

Note:-

1. **The examiner will set nine questions in all, selecting two questions from each unit and one question (Q. No.-1) of short answer type having eight sub-parts and covering all units.**
2. **The candidate will attempt five questions in all, selecting one question from each unit and the compulsory Q. No. - 1. All Questions carry equal marks.**

UNIT-I

Geology and its perspective. Earth in relation to solar system, origin, size, shape, mass, density and its development. Internal constitution of the Earth.

UNIT-II

Rock weathering and its type, factors influencing weathering, atmospheric circulation and its impact on weathering. Formation of hydrosphere, atmosphere and biosphere. Elementary ideas of continental drift and plate tectonics.

UNIT-III

Elementary ideas about outcrops, dip, strike, outlier, inlier and overlap.
Folds: Parts offold, classification and description of fold types, causes of folding.

UNIT-IV

Faults: Fault terminology, classification of faults, Recognition of faults, causes of faulting.
Unconformity: Formation of unconformity, types of unconformity, detection of unconformity in the field.

References:

1. Dutta A.k., Physical Geology
2. Thornbury W.D., Principals of Geomorphology, John Wiley.
3. Bangar K.M, Engineering Geology.

B.Sc. Ist Year- Geology
Ist- Semester w.e.f. 2016-2017

Paper-102- Crystallography (Theory)

Max Marks: 40 (Theory)
I.A=10 Marks
Periods/week: 3
Time: 3 Hrs.

Note:-

1. **The examiner will set nine questions in all, selecting two questions from each unit and one question (Q. No.-1) of short answer type having eight sub-parts and covering all units.**
2. **The candidate will attempt five questions in all, selecting one question from each unit and the compulsory Q. No. - 1. All Questions carry equal marks.**

UNIT-I

ElementryIdeas about crystal structures, Crystal faces, edges, solid angle and zones, type of forms. Interfacial angle and its measurement. Law of constancy of interfacial angles. Normal class of the cubic system.

UNIT-II

Parameter System of weiss. Index system of miller. Normal class of Tetragonal and Monoclinic systems.

UNIT-III

Study of normal classes of (a) Hexagonal system (b) Triclinicsystem.

UNIT-IV

Twinning and its types. Normal class of orthorhombic system.

References:

1. Read H.H., Rytley's Elements of Mineralogy.
2. Dana E.S. and Ford W.D., A text book of Mineralogy.

Practical and Field work
Practical Paper-103

Max Marks: 50
Periods/week: 3
Time: 3 Hrs.

Study of important geomorphological models and their interpretation. Use of Clinometer and Brunton Compass.
Drawing of clinographic Projection of import and crystal models from various classes.
Geological Field Work.

B.Sc. Ist Year- Geology
IInd - Semester w.e.f. 2016-2017

Paper-201- Physical Geology (Theory)

Max Marks: 40 (Theory)
I.A=10 Marks
Periods/week: 3
Time: 3 Hrs.

Note:-

1. **The examiner will set nine questions in all, selecting two questions from each unit and one question (Q. No.-1) of short answer type having eight sub-parts and covering all units.**
2. **The candidate will attempt five questions in all, selecting one question from each unit and the compulsory Q. No. - 1. All Questions carry equal marks.**

UNIT-I

Soil formation, soil profile and soil types. Geological work of a river: erosion, transportation and deposition. Erosional and depositional features produced by the river.

UNIT-II

Wind: Erosion and its types, transportation and deposition by wind. Study of important erosional and depositional features of wind.

Lake : Definition , formation and geological work of lakes, importance of lakes and important examples of Indian lakes.

UNIT-III

Glacier: Geological work of glaciers: erosion , transportation and deposition. Features of erosion and deposition by glaciers.

UNIT-IV

Volcanoes : Types, origin and distribution. **Mountains :**
Types and origin ; Indian mountain system.

References:

1. Dutta A.k., Physical Geology
2. Thornbury W.D., Principals of Geomorphology, John Wiley.
3. Bangar K.M, Engineering Geology.

Paper-202- Mineralogy (Theory)

Max Marks: 40 (Theory)
I.A=10 Marks
Periods/week: 3
Time: 3 Hrs.

1. **The examiner will set nine questions in all, selecting two questions from each unit and one question (Q. No.-1) of short answer type having eight sub-parts and covering all units.**
2. **The candidate will attempt five questions in all, selecting one question from each unit and the compulsory Q. No. - 1. All Questions carry equal marks.**

UNIT-I

Minerals : Definition and classification, physical properties and chemical composition, classification of silicate structures with suitable examples. Elementary ideas about atomic minerals. Polymorphism,isomorphism and Pseudomorphism .

UNIT-II

Study of Physical Properties, chemical composition, systematic classification and mode of occurrence of the (i) Silica group (rock forming group), (ii) Pyroxene group and (iii) Mica group

UNIT-III

Study of Physical Properties , chemical composition, systematic classification and mode of occurrence of the (i) Feldspar group (rock forming group), (ii)Amphibole group and (iii) Garnet group

UNIT-IV

Study of mineralogy of the following groups of ore minerals with special emphasis on their physical properties, chemical composition & occurrence of (i) Iron group (ii) Copper group (iii) Aluminium group and (iv) Manganese group

References:

1. Read H.H., Rytley's Elements of Mineralogy.
2. Dana E.S. and Ford W.D., A text book of Mineralogy.

Practical and Field work

Practical Paper-203

Max Marks: 50
Periods/week : 3
Time : 3 Hrs.

Study ofelements of symmetry of at least one representative crystal from Normal classes of all crystal systems.

Study of Physical properties of important rock forming minerals in hand specimen. Geological Field Work.

B.Sc IInd Year Geology

w.e.f. session 2017-2018

Scheme of Examination, Maximum Marks and Internal Assessment

IIIrd Semester

		Max. Marks	Theory	I.A.	Periods/Week
Paper-301	Petrology & Optical Mineralogy	50	40	10	3
Paper-302	Palaeontology	50	40	10	3
Paper-303	Practical and Field Work	50	--	--	6

IVth Semester

		Max. Marks	Theory	I.A.	Periods/Week
Paper-401	Petrology & Optical Mineralogy	50	40	10	3
Paper-402	Palaeontology	50	40	10	3
Paper-403	Practical and Field Work	50	--	--	6

Note:-

1. **The examiner will set nine questions in all, selecting two questions from each unit and one question (Q. No.-1) of short answer type having eight subparts and covering all units.**
2. **The candidate will attempt five questions in all, selecting one question from each unit and the compulsory Q. No. - 1. All Questions carry equal marks.**

B.Sc. IInd Year- Geology
IIIrd- Semester w.e.f. 2017-2018

Paper-301- Petrology and Optical Mineralogy (Theory)

Max Marks: 40 (Theory)
I.A=10 Marks
Periods/week: 3
Time: 3 Hrs.

Note:-

1. **The examiner will set nine questions in all, selecting two questions from each unit and one question (Q. No.-1) of short answer type having eight sub-parts and covering all units.**
2. **The candidate will attempt five questions in all, selecting one question from each unit and the compulsory Q. No. - 1. All Questions carry equal marks.**

UNIT-I

Rock association in time and space. Concept of rocks series. **Magma:** Definition, composition, origin and process of crystallization. Crystallization of unicomponent magma, Bawen reaction series.

UNIT-II

Crystallization of bi-componet magma. Magmatic Differentiation and assimilation. Formation of rocks: Igneous, sedimentary and metamorphic. Differentiate between Igneous, sedimentary & metamorphic rocks.

UNIT-III

Igneous Petrology: Formation of Igneous rocks and their types. Composition, Forms of Igneous rocks : concordant and discordant bodies. Classification of Igneous rocks : chemical , mineralogical and tabular.

UNIT-IV

Igneous Structures: Definition, origin and important types of structures of Igneous rocks.
Texture: definition, origin and important types of textures of Igneous rocks. Descriptive megascopic study of important igneous rocks.

References:

1. Tyrrel G.W., Principles of Petrology
2. Turner F.J., Metamorphic Petrology, McGraw Hill, New York 1980.
3. WinchallA.N., Elements of Optical Mineralogy.

Paper-302- Paleaontology(Theory)

Max Marks: 40 (Theory)
I.A=10 Marks

Periods/week: 3
Time: 3 Hrs.

Note:-

1. **The examiner will set nine questions in all, selecting two questions from each unit and one question (Q. No.-1) of short answer type having eight subparts and covering all units.**
2. **The candidate will attempt five questions in all, selecting one question from each unit and the compulsory Q. No. - 1. All Questions carry equal marks.**

UNIT-I

Palaeontology : Definition and scope. Applications of palaeontology in palaeoecology, evolution , stratigraphy and palaeogeographic reconstruction. Standard geological times scale : Era , Periods, Age and their major geological events.

UNIT-II

Trilobite : Introduction, morphological characters of a Trilobite shell. Geological History of Trilibite. Important fossils of Trilobite with their morphological characters, age and distribution. Echinodermata: Introduction,morphological characters and geological history of echinoids.

UNIT-III

Morphological characters and geological history of Gastropods. Important fossils, their morphological characters and age - Physa,Natica, Trochus, Turritella, Certhium, Murex, Voluta, Cypraea.

UNIT-IV

Lamellibranchia : Morphological characters and geological history of Pelecypods. Dentition in lamellibranchia. Study of plant fossils of Lower Gondwana. Fossils of Pelecypoda : Pecten, Nucula, Arca, Gryphaea,Trigonia, Cardita, Unio.

References:

1. **Woods H., Palaeontology.**
2. **Moore, Lalicker and Fisher, Invertibrate Fossils.**

Practical and Field work
Practical Paper-303 (w.e.f. 2017-18)

Max Marks: 50
Periods/week : 3
Time : 3 Hrs.

Study of important primary sedimentary structures in hand specimen.
Study of common Igneous, Sedimentary & Metamorphic rocks in hand specimen and their identification. Microscopic study of common rock forming minerals with the help of their diagnostic optical properties.

B.Sc. IInd Year- Geology
IVth- Semester

w.e.f. 2017-2018

Paper-401- Petrology and Optical Mineralogy(Theory)

Max Marks: 40 (Theory)
I.A=10 Marks
Periods/week: 3
Time: 3 Hrs.

Note:-

1. **The examiner will set nine questions in all, selecting two questions from each unit and one question (Q. No.-1) of short answer type having eight sub-parts and covering all units.**
2. **The candidate will attempt five questions in all, selecting one question from each unit and the compulsory Q. No. - 1. All Questions carry equal marks.**

UNIT-I

Sedimentary Rocks : Formation , composition , texture and structures of sedimentary rocks. Classification of Sedimentary rocks.

UNIT-II

Metamorphic Rocks : Metamorphism, definition , factores affecting metamorphism. Types of metamorphism. Metasomatism. Metamorphic grades and zones. Stress and antistress Minerals.

UNIT-III

Textures, structures and classification of metamorphic rocks.
Descriptive study of important sedimentary and metamorphic rocks.

UNIT-IV

Petrological microscope : Its parts and functioning.

Optical Mineralogy : Colour and Pleochroism Refractive index. Cleavage, birefringence, Extinction and twinning. Optical Properties of common rock forming minerals.

References:

1. Tyrrel G.W., Principles of Petrology
2. Turner F.J., Metamorphic Petrology, McGraw Hill, New York 1980.
3. Winchall A.N., Elements of Optical Mineralogy.

Paper-402- Paleaontology(Theory)

Max Marks: 40 (Theory)
I.A=10 Marks
Periods/week: 3
Time: 3 Hrs.

Note:-

1. **The examiner will set nine questions in all, selecting two questions from each unit and one question (Q. No.-1) of short answer type having eight sub-parts and covering all units.**
2. **The candidate will attempt five questions in all, selecting one question from each unit and the compulsory Q. No. - 1. All Questions carry equal marks.**

UNIT-I

Palaeontology :Fossils essential conditions of fossilization . Modes of preservation of fossils. Index fossils. Economic and stratigraphic significans of fossils. Standard geological time scale.

UNIT-II

Morphological characters and geological history of Brachiopods shell. Brachial skeleton. Morphology and geological history of corals.

UNIT-III

Morphological characters and geological history of Cephalopods. Suture line in Cephalopods. Morphology and geological history of Graptolite.

UNIT-IV

Morphological characters, ageand distribution of plant fossils of upper Gondwana. Morphology and geological history of Foraminifera.

References:

1. Woods H., Palaeontology.
2. Moore, Lalicker and Fisher, Invertibrate Fossils.

Practical and Field work
Practical Paper-403 (w.e.f. 2017-18)

Max Marks: 50
Periods/week : 3
Time : 3 Hrs.

Studyof morphological characters and identification of important fossils phyla as mentioned in theory papers.

Study of important plant fossils of lower and upper Gondwana and their identification.

Study of common Igneous, Sedimentary and metamorphic rocks in hand specimen and their identification.

B.Sc IIIrd Year Geology

w.e.f. session 2018-2019

Scheme of Examination, Maximum Marks and Internal Assessment

Vth Semester

		Max. Marks	Theory	I.A.	Periods/Week
Paper-501	Structural Geology	50	40	10	3
Paper-502	Economic Geology	50	40	10	3
Paper-503	Practical and Field Work	50	40	10	6

VIth Semester

		Max. Marks	Theory	I.A.	Periods/Week
Paper-601	Stratigraphy	50	40	10	3
Paper-602	Indian minerals & Environmental Geology	50	40	10	3
Paper-603	Practical and Field Work	50	40	10	6

Note:-

1. **The examiner will set nine questions in all, selecting two questions from each unit and one question (Q. No.-1) of short answer type having eight subparts and covering all units.**
2. **The candidate will attempt five questions in all, selecting one question from each unit and the compulsory Q. No. - 1. All Questions carry equal marks.**

B.Sc. IIIrd Year- Geology
Vth- Semester
w.e.f. 2018-2019

Paper-501- Structural Geology(Theory)

Max Marks: 40 (Theory)
I.A=10 Marks
Periods/week: 3
Time: 3 Hrs.

Note:-

1. **The examiner will set nine questions in all, selecting two questions from each unit and one question (Q. No.-1) of short answer type having eight sub-parts and covering all units.**
2. **The candidate will attempt five questions in all, selecting one question from each unit and the compulsory Q. No. - 1. All Questions carry equal marks.**

UNIT-I

Study of outcrop, Identification of bedding, effect of topography, Dip & Strike, outlier and Inlier.
Unconformity : Types, significance and recognition in the field.

UNIT-II

Folds : Morphology, classification,mechanics and causes of folding.

UNIT-III

Faults : Parts ,geometric and genetic classification, effect of faulting on outcrop. Recognition of fault infield.

UNIT-IV

Joints : geometrical and genetic classification, mechanism of jointing and significance of joints.

References:

1. Billings, M.P., Structural Geology.
2. Mukharjee, P.K., A text book of Geology

Paper-502- Economic Geology (Theory)

Max Marks: 40 (Theory)
I.A=10 Marks
Periods/week: 3
Time: 3 Hrs.

Note:-

1. **The examiner will set nine questions in all, selecting two questions from each unit and one question (Q. No.-1) of short answer type having eight sub-parts and covering all units.**
2. **The candidate will attempt five questions in all, selecting one question from each unit and the compulsory Q. No. - 1. All Questions carry equal marks.**

UNIT-I

Factors controlling mineral availability , distribution of mineral deposits in space and time. Metallogenetic Epochs & Provinces, Tenor, oremineral , gangue mineral, syngenetic and epigenetic deposits. Principles of Mineral Economics :Strategic, critical and essential minerals.

UNIT-II

Classification and origin of deposits. Processes of formation of ore deposits : Magmatic Concentration and Contact metasomatism .

UNIT-III

Processes of formation of ore deposits : Hydrothermal – Cavity filling and replacement, Sedimentation, Evaporation and brines and Metamorphism.

UNIT-IV

Processes of formation of ore deposits : Weathering products and residual deposits. Mechanical concentration- Placer deposit, Oxidation and Supergene sulphide enrichment deposits.

References:

1. Batemann, A.M., Economic Mineral Deposits.
2. Mukharjee, P.K., A text book of Geology

Practical and Field work
Practical Paper-503 (w.e.f. 2018-19)

Max Marks: 50
Periods/week : 3
Time : 3 Hrs.

Exercise on structural geology problems.
Drawing and interpretation of profile section across the geological maps.
Geological Field Work.

B.Sc. IIIrd Year- Geology
VIth- Semester
w.e.f. 2018-2019

Paper-601- Stratigraphy(Theory)

Max Marks: 40 (Theory)
I.A=10 Marks
Periods/week: 3
Time: 3 Hrs.

Note:-

1. **The examiner will set nine questions in all, selecting two questions from each unit and one question (Q. No.-1) of short answer type having eight sub-parts and covering all units.**
2. **The candidate will attempt five questions in all, selecting one question from each unit and the compulsory Q. No. - 1. All Questions carry equal marks.**

UNIT-I

Principles of stratigraphy, geological time scale, lithostratigraphic, chronostratigraphic and biostratigraphicunits, stratigraphic correlation.

UNIT-II

Classification, geographic distribution, lithological characteristics and economic importance of Archaean system, Dharwar system, Aravalli system and Cuddapah system of rocks.

UNIT-III

Classification, geographic distribution, lithologicalcharacteristics,fossil contents andeconomic importance of Kurnool system,Delhi system and Vindhyan system of rocks.

UNIT-IV

Classification, geographic distribution, lithological characteristics, fossil contents and economic importance of the Mesozoic goups- The Gondwana system. The Tertiary group- The Siwalik system and the Deccan traps.

References:

1. Krishanan, M.S., Geology of India and Burma.
2. Mukharjee, P.K., A text book of Geology
3. Wadia, D.N., Geology of India

Paper-602- Indian Minerals and Environmental Geology (Theory)

Max Marks: 40 (Theory)

I.A=10 Marks
Periods/week: 3
Time: 3 Hrs.

Note:-

1. **The examiner will set nine questions in all, selecting two questions from each unit and one question (Q. No.-1) of short answer type having eight sub-parts and covering all units.**
2. **The candidate will attempt five questions in all, selecting one question from each unit and the compulsory Q. No. - 1. All Questions carry equal marks.**

UNIT-I

Geological setting,mineralogical characteristics and Indian distribution of important ore deposits likeiron, manganese, gold and aluminium.

UNIT-II

Geological setting, mineralogical characteristics and Indian distribution of important ore deposits like Copper,leadand zinc, chromite, uranium and beach sand deposits.

UNIT-III

Geological setting, mineralogical characteristics and Indian distribution of important non-metalic mineral deposits and non-metals related to the Referectory, Fertilizer and cement industries.

UNIT-IV

Geological setting and Indian distribution of important coal and lignite deposits of india. Elementary ideas about oil field of india.
Environmental implication of exploitation of mineral resources.

References:

1. Batemann, A.M., Economic Mineral Deposits.
2. Mukharjee, P.K., A text book of Geology
3. Gokhale and Rao, Ore deposits of India
4. Keller, Environmental Geology

Practical and Field work
Practical Paper-603 (w.e.f. 2018-19)

Max Marks: 50
Periods/week : 3
Time : 3 Hrs.

Study of physicalproperties of important rock forming and ore forming minerals.

Preparation of maps showing distribution of important economic mineral in India.

Geological Field Work.