

# GEOLOGY

CLASS-XI

THEORY

One Paper

3 Hours

70 Marks

Unit	Unitwise Weightage	Marks	Periods
I.	General Geology and Physical Geology	15	40
II.	Crystallography and Mineralogy	20	50
III.	Palaeontology	20	50
IV.	Economic Geology	15	40

## Unit I : General Geology and Physical Geology

40 Periods : 15 Marks

- (i) Introduction of Geology, definition, scope of Geology and branches of Geology.
- (ii) The Earth as Planet, shape, of the Planet.
- (iii) Origin of the Earth–Nabular hypothesis. Planetesimal hypothesis. Double star hypothesis and Recent hypothesis.
- (iv) Age of the earth–Concept of determination of the age of the earth by Radioactive method.
- (v) Internal constitution and structure of the earth as revealed by Seismic waves.
- (vi) Earthquake-definition, causes, effects and types.
- (vii) Volcanoes–definition, causes, structure and products.
- (viii) Concept of Plate tectonics.
- (ix) Definition, agents and processes of weathering, erosion, denudation and deposition.

## Unit II : Crystallography and Mineralogy :

50 Periods : 20 Marks

- (i) Crystal-definition, form, face, edge, solid angle, interfacial angle and its measurements, Symmetry elements, intercepts and parameters, indices and axial ratio.
- (ii) Crystal systems-Classification of seven crystal systems, -Study of the Normal Classes of Isometric system, Tetragonal system, Hexagonal system with examples.
- (iii) Mineral - definition, types of minerals (amorphous, Crystalline, rock forming minerals, ore forming minerals)
- (iv) Physical properties of minerals-form, Colour, streak, lustre, cleavage, fracture, hardness, tenacity, taste, feel, odour etc.

- (v) Nicol Prism and its construction, Part of Petrological microscope.
- (vi) Moh's scale of Hardness and its uses.
- (vii) Study of Physical properties, Chemical composition and uses of the following rock forming minerals-Quartz, Orthoclase, Microcline, Plagioclase, Calcite, Hornblende, Olivine, Tourmaline, Muscovite, Biotite, Talc, Gypsum, Garnet, Fluorite, Apatite, Corundum.

**Unit III : Palaeontology :**

**50 Periods : 20 Marks**

- (i) Definition and branches of palaeontology
- (ii) Definition-fossil, index fossil, Megafossil, Macrofossils, Microfossils.
- (iii) Conditions for fossilisation, mode of preservation and uses of fossils
- (iv) Classification, Morphological study, time range and distribution of Lamellibranchia, Brachiopoda and Gastropoda.

**Unit IV : Economic Geology**

**40 Periods : 15 Marks**

- (i) Definition - Ore, Gangue, tenor
- (ii) Classification of mineral deposits.
- (iii) Formation of mineral deposits-Magmatic and oxidation processes.
- (iv) Study of - Origin, mode of occurrence, Geographical distribution and uses of the following ore minerals-Galena, Gold, Hematite, Magnetite, Chromite, Chalcopyrite, Pyrite, Coal, Petroleum, Bauxite.
- (v) Mineral resources of Manipur.

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# GEOLOGY

## CLASS-XI PRACTICAL

One Paper

3 Hours

30 Marks

Unit	Unitwise Weightage	Marks
I.	Crystallography	06 marks
II.	Mineral Hand Specimens	08 marks
III.	Mineral Slides	04 marks
IV.	Fossils	06 marks
V.	Practical Note Book	04 marks
VI.	Viva-Voce	02 marks

### Experiments :

- (i) Study of crystal belonging to the Normal Classes of Isometric, Tetragonal, Hexagonal Systems 4 marks
- (ii) Measurements of Interfacial angles on crystal models with the help of contact Goniometer. 2 marks
- (iii) Determination of specific gravity of minerals with the help of Jolly's spring balance, walker's steelyard balance or Chemical balance. 2 marks
- (iv) Recognition of mineral hand specimens by physical characters and simple chemical tests of the following miners - Quartz, Orthoclase, Microcline, Plagioclase, Muscovite, Biotite, tourmaline, Calcite, Hornblende, talc, Gypsum, Beryl, Olivine, Garnet, Chromite, Magnetite, Hematite, Bauxite Pyrite, Galena, Chalcopyrite, Apatite, Corundum. 6 marks
- (v) Recognition of the following rock forming mineral thin slides under polarising microscope-Garnet, Quartz, Orthoclase, Microcline, Augite, Hornblende, Biotite, Muscovite and Plagioclase. 4 marks
- (vi) Study of the morphological characters, time range of the following fossils - Arca, Spirifer, Productus Terebratula, Atrypa, Unio, Pecten, Cardita, Conus Voluta, Turritella, Mytilus, Physa. 6 marks
- (vii) Practical Note Book. 4
- (viii) Viva-Voce. 2

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# DESIGN OF QUESTION PAPER

Subject : **GEOLOGY**  
 Paper : Theory  
 Class : XI  
 Full Mark : 70  
 Time : 3 Hours

<b>WEIGHTAGE TO OBJECTIVES :</b>						
<b>Objectives</b>			<b>Marks</b>	<b>Percentage</b>		
<b>I.</b>	Knowledge (K)		10	15		
	Understanding (U)		35	50		
	Application (A)		21	30		
	Skill (S)		04	05		
	<b>Total :</b>		<b>70</b>	<b>100</b>		
<b>WEIGHTAGE TO FORM OF QUESTIONS :</b>						
<b>Form of Questions</b>		<b>No. of Question</b>	<b>Time (in minutes)</b>	<b>Marks</b>	<b>Percentage</b>	
<b>II.</b>	Essay/Long Answer (E/LA)		3	52	15	21
	Short Answer (SA-I)		6	54	18	26
	Short Answer (SA-II)		10	50	20	29
	Very Short Answer (VSA)		7	14	7	10
	MCQ		10	10	10	14
	<b>Total :</b>		<b>36</b>	<b>180</b>	<b>70</b>	<b>100</b>
<b>WEIGHTAGE TO CONTENTS :</b>						
<b>Unit/Content:</b>			<b>Marks</b>	<b>Percentage</b>		
<b>III.</b>	I.	General Geology and Physical Geology	15	21		
	II.	Crystallography and Mineralogy	20	29		
	III.	Palaeontology	20	29		
	IV.	Economic Geology	15	21		
	<b>Total :</b>		<b>70</b>	<b>100</b>		
<b>IV.</b>	<b>SCEHEME OF SECTIONS :</b> Nil					
<b>V.</b>	<b>SCHEME OF OPTIONS :</b> 50% in SA-I and 100% in Essay.					
<b>VI.</b>	<b>DIFFICULTY LEVEL :</b>					
	Difficult	:	30% of the total marks			
	Average	:	50% of the total marks			
	Easy	:	20% of the total marks			

**Abbreviation:** K(Knowledge), U(Understanding ), C(Comprehension), Exp.(Expression), Skill(S),  
 E(Essay Type), SA (Short Answer Type), VSA (Very Short Answer Type),  
 MCQ(Multiple Choice Question)

N.B.: \*Assertion and Reasoning: At least 2 questions in MCQ.

\*Case Based Q/ Source Based Q : At least 1 question each SA-I and SA-II

## DESIGN QUESTION PAPER/UNIT TEST

**Subject : GEOLOGY**  
**Unit/Paper : Practical**  
**Class : XI**  
**Time : 3 Hours**  
**Full Marks : 30**

<b>I.</b>	<b>WEIGHTAGE TO OBJECTIVES :</b>						
	Objectives	<b>K</b>	<b>U</b>	<b>A</b>	<b>S</b>	<b>Total</b>	
	Percentage of Marks	13	20	27	40	100	
	Marks	04	06	08	12	30	
<b>II.</b>	<b>WEIGHTAGE TO FORM OF QUESTIONS :</b>						
	Forms of Questions	<b>E</b>	<b>SA-I</b>	<b>SA-II</b>	<b>VSA</b>	<b>O</b>	<b>Total</b>
	No. of Questions	02	08	04	02	-	16
	Marks Allotted	08	16	04	02	-	30
	Estimated Time (in Minutes)	30	120	20	10	-	<b>180</b>
<b>III.</b>	<b>WEIGHTAGE TO CONTENT :</b>						
	<b>Units/Sub-units</b>					<b>Marks</b>	
	1.	Study of Crystals				4	
	2.	Measurement of interfacial angle (s)				2	
	3.	Determination of Specific Gravity				2	
	4.	Recognition of Mineral hand Specimens				6	
	5.	Microscopic study of Minerals				4	
	6.	Study of Fossils				6	
	7.	Practical Note book				4	
	8.	Viva Voce				2	
<b>Total :</b>					<b>30</b>		
<b>IV.</b>	<b>SCHEME OF SECTIONS : Nil</b>						
<b>V.</b>	<b>SCHEME OF OPTIONS: Nil</b>						
<b>VI.</b>	<b>DIFFICULTY LEVEL :</b>						
<b>Difficult : 30%</b> <b>Average : 50%</b> <b>Easy : 20%</b>							

**Abbreviation :** K (Knowledge), U (Understanding), A (Application), S (Skill), E (Essay Type), SA (Short Answer Type), VSA (Very Short Answer Type), O (Objective Type)

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**GEOLOGY**  
**CLASS-XII**  
**THEORY**

**One Paper**

**3 Hours**

**70 Marks**

<b>Unit</b>	<b>Unitwise Weightage</b>	<b>Marks</b>	<b>Periods</b>
I.	Structural Geology	15 marks	40 periods
II.	General Stratigraphy and Indian Stratigraphy	20 marks	50 periods
III.	Petrology	20 marks	50 periods
IV.	Applied Geology	15 marks	40 periods

**Unit I : Structural Geology**

**40 Periods : 15 Marks**

- (i) Definition and scope of structural Geology.
- (ii) Study and measurement of the dip and strike of beds.
- (iii) Concept of contour.
- (iv) Definition, parts and types of fold.
- (v) Definition, Parts, relative movements and types of fault.
- (vi) Definition and types of joints.
- (vii) Definition, types and significance of unconformities.

**Unit II : General Stratigraphy and Indian Stratigraphy**

**50 Periods : 20 Marks**

- (i) Definition, Principles and units of Stratigraphy.
- (ii) Development and sub divisions of Geological time scale and factors of stratigraphic correlation.
- (iii) Geomorphic divisions of India.
- (iv) Study of following stratigraphic systems of India-Dharwar system of Mysore, Vindhyan system of some Valley, Gondwana system and Tertiaries of N.E. India (Assam and Manipur)

**Unit III : Petrology**

**50 Periods : 20 Marks**

- (i) Definition and types of rocks-Igneous, Sedimentary and Metamorphic and the Criteria for distinguishing them in hand specimens.
- (ii) Magma-definition and composition.
- (iii) Igneous rock-Intrusive and extrusive forms and study of texture, structures, classification of igneous rocks based on Chemical composition, mineralogical composition and mode of occurrence.

- (iv) Sedimentary rocks-Environment of deposition, Classification of Sedimentary rocks into Clastic and Non-clastics, Structure and texture of Sedimentary rocks.
- (v) Metamorphic rock-agents and types of Metamorphism, study of simple structure and texture of Metamorphic rocks.
- (vi) Study of mineralogical, structural feature and mode of occurrence of the following rock types-Granite, Dolerite, Diorite, Gabbro, Dunite, Peridotite, Pegmatite, Rhyolite, Basalt, Slate, Schist Gneiss, Marble Quartzite, Sandstone, Limestone, Shale, Conglomerate.

**Unit IV : Applied Geology**

**40 Periods : 15 Marks**

- (i) Elementary knowledge of - Mineral deposits, mineral exploration and prospecting
- (ii) Soil erosion - causes and its prevention.
- (iii) Landslide - causes and its prevention.
- (iv) Geology of underground water.
- (v) Selection of construction materials.
- (vi) Site selection of dam construction.

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# GEOLOGY

## CLASS-XII PRACTICAL

One Paper

3 Hours

30 Marks

Unit	Unitwise Weightage	Marks
I.	Geological Maps	10 marks
II.	Rock hand specimens	08 marks
III.	Geographical distribution of Stratigraphic System	02 marks
IV.	Geological field report	04 marks
V.	Practical Note Book	04 marks
VI.	Viva-Voce	02 marks

### Experiments :

- (i) Determination of strike direction, dip direction and amount of dip of an incline surface with the help of clinometer compass.
- (ii) Description of geological map and drawing of profile.
- (iii) Recognition of rock hand specimens of the following-Granite, Gabbro, Dolerite, Dunite, Peridotite, Pegmatite, Rhyolite, Basalt, Slate, Schist, Marble, Quartzite, Sandstone, Limestone, Shale, Conglomerate.
- (iv) Geographical distribution of the following stratigraphic systems-Dharwar system; Vindhyan system of some valley, Gondwana system, Tertiaries of N.E. India.
- (v) Geological Field Report-Field work is compulsory and reports of the field work are to be submitted at the time of examination.  
No student can appear practical examination without submission of field report.
- (vi) Practical Note Book.
- (vii) Viva-Voce.

### Prescribed Textbook for Classes XI & XII :

1. Text Book of Geology - P.K. Mukherjee  
(The world Press Pvt. Ltd. Calcutta)
2. Text Book of Geology - G.B. Mahapatra  
(C.B.S. Publisher and Distributor, New Delhi)
3. Laboratory Manual of Geology - A.K. Sen  
(Modern Book Agency Pvt. Ltd. Calcutta)



**Reference Books for Classes XI & XII :**

1. Physical Geology - Dutta A.K.  
(Modern Book Agencies Pvt. Ltd. Calcutta)
2. Economic Geology - Sen and Guha  
(Modern Book Agencies Pvt. Ltd. Calcutta)
3. Principles of petrology - Tyrrel G.W.  
(B.I. Publication Pvt. Ltd. New Delhi)
4. Text Book of Palaeontology-Woods  
(C.B.S. Publisher and Distributor, Delhi)
5. Rutley's Elements of Mineralogy-Read N.H.  
(C.B.S. Publisher and Distributor, Delhi)
6. Structural Geology - M.P. Billings  
(Prentice Hall of India Ltd. New Delhi)

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**FOR THE ACADEMIC SESSION 2024-25****DESIGN OF  
QUESTION PAPER**

Subject : **GEOLOGY**  
 Paper : Theory  
 Class : XII  
 Full Mark : 70  
 Time : 3 Hours

<b>WEIGHTAGE TO OBJECTIVES :</b>					
<b>I.</b>	<b>Objectives</b>			<b>Marks</b>	<b>Percentage</b>
	Knowledge (K)			14	20
	Understanding (U)			35	50
	Application (A)			18	26
	Skill (S)			3	4
<b>Total :</b>			<b>70</b>	<b>100</b>	
<b>WEIGHTAGE TO FORM OF QUESTIONS :</b>					
<b>II.</b>	<b>Form of Questions</b>	<b>No. of Question</b>	<b>Time (in minutes)</b>	<b>Marks</b>	<b>Percentage</b>
	Essay/Long Answer (E/LA)	3	60	15	21
	Short Answer (SA-I)	6	36	18	26
	Short Answer (SA-II)	10	40	20	29
	Very Short Answer (VSA)	10	30	10	14
	MCQ	7	14	7	10
	<b>Total :</b>	<b>36</b>	<b>180</b>	<b>70</b>	<b>100</b>
<b>WEIGHTAGE TO CONTENTS:</b>					
<b>III.</b>	<b>Unit/Content:</b>			<b>Marks</b>	<b>Percentage</b>
	I.	Structural Geology		20	29
	II.	General Stratigraphy and Indian spratigraphy		15	21
	III.	Petrology		20	29
	IV.	Applied Geology		15	21
<b>Total :</b>			<b>70</b>	<b>100</b>	
<b>IV.</b>	<b>SCEHEME OF SECTIONS :</b> Nil				
<b>V.</b>	<b>SCHEME OF OPTIONS :</b> Internal option may be given in Essay Type Question & SA-I.				
<b>VI.</b>	<b>DIFFICULTY LEVEL :</b>				
		Difficult	:	30%	
		Average	:	50%	
		Easy	:	20%	

**Abbreviation :** K(Knowledge), U(Understanding ), C(Comprehension), Exp.(Expression), Skill(S), E(Essay Type), SA (Short Answer Type), VSA (Very Short Answer Type), MCQ(Multiple Choice Question)

**FROM THE ACADEMIC SESSION 2025-26**

**DESIGN OF  
QUESTION PAPER**

Subject : **GEOLOGY**  
Paper : Theory  
Class : XII  
Full Mark : 70  
Time : 3 Hours

<b>WEIGHTAGE TO OBJECTIVES :</b>					
<b>Objectives</b>		<b>Marks</b>	<b>Percentage</b>		
<b>I.</b>	Knowledge (K)	10	15		
	Understanding (U)	35	50		
	Application (A)	21	30		
	Skill (S)	04	05		
	<b>Total :</b>	<b>70</b>	<b>100</b>		
<b>WEIGHTAGE TO FORM OF QUESTIONS :</b>					
<b>Form of Questions</b>		<b>No. of Question</b>	<b>Time (in minutes)</b>	<b>Marks</b>	<b>Percentage</b>
<b>II.</b>	Essay/Long Answer (E/LA)	3	52	15	21
	Short Answer (SA-I)	6	54	18	26
	Short Answer (SA-II)	10	50	20	29
	Very Short Answer (VSA)	7	14	7	10
	MCQ	10	10	10	14
	<b>Total :</b>	<b>36</b>	<b>180</b>	<b>70</b>	<b>100</b>
<b>WEIGHTAGE TO CONTENTS:</b>					
<b>Unit/Content:</b>			<b>Marks</b>	<b>Percentage</b>	
<b>III.</b>	I.	Structural Geology	15	21	
	II.	General Stratigraphy and Indian spratigraphy	20	29	
	III.	Petrology	20	29	
	IV.	Applied Geology	15	21	
	<b>Total :</b>		<b>70</b>	<b>100</b>	
<b>IV.</b>	<b>SCEHEME OF SECTIONS :</b> Nil				
<b>V.</b>	<b>SCHEME OF OPTIONS :</b> 50% in SA-I and 100% in Essay				
<b>VI.</b>	<b>DIFFICULTY LEVEL :</b>				
	Difficult	:	30% of the total marks		
	Average	:	50% of the total marks		
	Easy	:	20% of the total marks		

**Abbreviation :** K(Knowledge), U(Understanding ), C(Comprehension), Exp.(Expression), Skill(S), E(Essay Type), SA (Short Answer Type), VSA (Very Short Answer Type), MCQ(Multiple Choice Question)

N.B.: \*Assertion and Reasoning: At least 2 questions in MCQ.

\*Case Based Q/ Source Based Q : At least 1 question each SA-I and SA-II

## DESIGN QUESTION PAPER/UNIT TEST

**Subject : GEOLOGY**  
**Unit/Paper : Practical**  
**Class : XII**  
**Time : 3 Hours**  
**Full Marks : 30**

<b>I.</b>	<b>WEIGHTAGE TO OBJECTIVES :</b>						
	Objectives	<b>K</b>	<b>U</b>	<b>A</b>	<b>S</b>	<b>Total</b>	
	Percentage of Marks	13	20	27	40	100	
	Marks	04	06	08	12	30	
<b>II.</b>	<b>WEIGHTAGE TO FORM OF QUESTIONS :</b>						
	Forms of Questions	<b>E</b>	<b>SA-I</b>	<b>SA-II</b>	<b>VSA</b>	<b>O</b>	<b>Total</b>
	No. of Questions	03	06	04	02	-	15
	Marks Allotted	12	12	04	02	-	30
	Estimated Time (in Minutes)	60	90	20	10	-	<b>180</b>
<b>III.</b>	<b>WEIGHTAGE TO CONTENT :</b>						
	<b>Units/Sub-units</b>					<b>Marks</b>	
	1.	Determination of dip and strike				2	
	2.	Geological mapping				8	
	3.	Identification of rock and specimens				8	
	4.	Stratigraphical distribution of systems				2	
	5.	Geological field report				4	
	6.	Practical Note book				4	
	7.	Viva Voce				2	
	<b>Total :</b>					<b>30</b>	
<b>IV.</b>	<b>SCHEME OF SECTION : Nil</b>						
<b>V.</b>	<b>SCHEME OF OPTIONS: Nil</b>						
<b>VI.</b>	<b>DIFFICULTY LEVEL :</b>						
<b>Difficult : 30%</b> of the total marks <b>Average : 50%</b> of the total marks <b>Easy : 20%</b> of the total marks							

**Abbreviation :** K (Knowledge), U (Understanding), A (Application), S (Skill), E (Essay Type), SA (Short Answer Type), VSA (Very Short Answer Type), O (Objective Type)

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