

S-1023

Sub. Code

23MGE1C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Geology

PHYSICAL GEOLOGY AND GEOMORPHOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Define asthenosphere.
2. What are the different types of plate boundaries?
3. How does palaeomagnetism contribute to geological studies?
4. What is isostasy in geology?
5. Define epeirogeny.
6. What is the role of climate in geomorphology?
7. Mention any two seismic belts of the Earth.
8. What is pedogenesis?
9. Differentiate between fluvial and glacial landforms.
10. Why is slope analysis important in watershed studies?

Part B

(5 × 5 = 25)

Answer **all** the questions, choosing either (a) or (b).

11. (a) Explain the structure and composition of the Earth's interior.

Or

- (b) Explain the significance of isostasy in geological studies.

12. (a) How do plate tectonics influence the formation and evolution of the Earth's surface?

Or

- (b) What are the different weathering mechanisms? Explain their significance.

13. (a) What are accretionary wedges? Explain their formation.

Or

- (b) Describe the process of mass movement and its effects on landscapes.

14. (a) Describe how earthquakes cause landscape alterations.

Or

- (b) Explain the formation of glacial landforms.

15. (a) Write a short note on the principles of geodesy.

Or

- (b) What are karst landforms? Give examples.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. What are the major causes of earthquakes? Discuss their influence on landforms.
 17. Explain the fundamental concepts of geodesy and their significance in understanding Earth's shape and size.
 18. What are the major factors controlling erosion, transportation, and deposition in geomorphology?
 19. Describe the role of glaciers in landform development with suitable examples.
 20. What are the geomorphic consequences of tectonic movements? Explain with examples.
-

S-1024

Sub. Code

23MGE1C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Geology

**MINERALOGY AND INSTRUMENTATION
TECHNIQUES**

(CBCS – 2023 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. What are symmetry elements in crystallography?
2. Define axial ratio.
3. Define plane lattice.
4. What are X-rays?
5. What are staining techniques in mineral identification?
6. What are feldspathoids? How do they differ from feldspars?
7. Define polarization.
8. Explain the transmissivity and reflectivity in minerals.
9. What is flame photometry used for?
10. Define mass spectroscopy and its application in mineral studies.

Part B

(5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Discuss the different types of crystal systems with suitable examples.

Or

- (b) Describe the symmetry elements of tetragonal crystal system with mineral examples.

12. (a) Explain the tangent relations in the crystals.

Or

- (b) Describe the concept of space lattice with examples.

13. (a) Discuss the chemical composition and physical properties of olivine.

Or

- (b) Explain the structural classification of silicate minerals.

14. (a) Explain the magnetic and electric properties of minerals.

Or

- (b) Discuss the principles of conoscopic observation in optical mineralogy.

15. (a) Describe the working principle of X-ray spectroscopy in mineral identification.

Or

- (b) Explain the importance of Spot tests in mineralogical studies.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain in detail the derivation of the 32 crystal classes.
 17. Write an essay on Hermann Mauguin symbols.
 18. Explain the physical, chemical and optical properties of Feldspars.
 19. Describe the various interference figures and their significance in mineral optics.
 20. Discuss the different types of spectroscopy techniques used in mineralogical studies.
-

S-1025

Sub. Code

23MGE1E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Geology

**Elective — STRATIGRAPHY OF INDIA AND ITS
APPLICATIONS**

(CBCS – 2023 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. Define saline series of India.
2. What is the geological age of the Vindhyan Supergroup?
3. What is Talchir Tillites?
4. Name the main lithology of the Gondwana supergroup.
5. Name the rocks that form the Deccan Traps.
6. Define the stratigraphy of sequences.
7. What is Terai belt?
8. What is biozone?
9. Define lithodemic units.
10. What is magneto stratigraphy?

Part B

(5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Discuss the Cambrian System of India, its geological significance, and the key fossil discoveries made during this period.

Or

- (b) Discuss the primary rock types found in the Salt Range, focusing on the significant salt deposits and their associated minerals.

12. (a) Discuss the Mesozoic stratigraphy of Rajasthan.

Or

- (b) Write an short note on the Gondwana flora in India.

13. (a) Explain the main groups of Palaeogene rocks in the northeast Himalaya.

Or

- (b) Discuss the different types of isotopic and chemical dating techniques.

14. (a) Explain the lithostratigraphy of the Tertiary formations in India.

Or

- (b) Describe the role of glaciation in Quaternary stratigraphy.

15. (a) Explain the applications of micro fossils.

Or

- (b) Discuss the causes and effects of sea-level fluctuations in sedimentation.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Distinguishing characteristics of the Western Block and the Eastern Block of Dharwar Craton.
 17. Write a brief note on the Mesozoic stratigraphy of Kutch.
 18. Discuss how sequence stratigraphy is crucial to comprehending sedimentary environments.
 19. Summarise that fossils are categorised and the evolutionary patterns of each in biostratigraphy.
 20. Explain correlation and Write a brief note on the applications of sequence stratigraphy.
-

S-1026

Sub. Code

23MGE1E2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Geology

Elective : RECENT TRENDS IN PALAEOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. Define phylum chordata.
2. What is Eohippus?
3. Define Palingenesis.
4. What are ichnofossils?
5. What is Elephas?
6. Write two characteristic feature of Siwalik mammals?
7. Define Taxodont.
8. What is a cephalon?
9. Give two examples of calcareous foraminifera species.
10. What are pteropods?

Part B

(5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Explain the dentition pattern of paleocypoda with neat sketch.

Or

- (b) What is the significance of the fossil record in understanding the extinction of dinosaurs?

12. (a) List out the importance and uses of fossils.

Or

- (b) Give short note on theories on origin and evolution of life.

13. (a) Explain the modern theory of human evolution.

Or

- (b) Write a short note on paleogeographic implication of Indian pre-tertiary vertebrate.

14. (a) Discuss the evolution trends of Trilobites and geological history with neat sketch.

Or

- (b) Write an essay on phylum Graptoloidea.

15. (a) Write short note on Micro-palaeontological techniques.

Or

- (b) Write note on application of micropalaeontology in hydrocarbon exploration.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss the evolutionary changes in mollusca in geological time.
 17. Write an essay on major events in the history of Precambrian.
 18. Write an Essay on phylogeny of Equidae.
 19. Explain the morphological features of brachiopoda.
 20. Describe the detail on the environmental significance of Ostracoda.
-

S-1032

Sub. Code

23MGE3C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

Geology

ECONOMIC GEOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is ore genesis?
2. Define fluid inclusion studies.
3. What are stratiform and stratabound ore deposits?
4. Define core logging in mineral exploration.
5. What is the coefficient of aqueous migration?
6. What are radioactive minerals?
7. Define nuclear waste disposal.
8. What is the rank of coal?
9. Define mixed traps in petroleum geology.
10. What is the role of a geologist in ONGC?

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Write short notes on hydrothermal mineralization.

Or

- (b) Give an account of SedEx deposits.

12. (a) Write a brief note on different types of drilling methods used in mineral exploration.

Or

- (b) Give an account of subsurface sampling techniques.

13. (a) Write short notes on instrumental techniques used to detect radioactivity.

Or

- (b) Give an account of radioactive methods used in petroleum exploration.

14. (a) Write short notes on the coalification process and its causes.

Or

- (b) Give an account of stratigraphic traps in petroleum exploration.

15. (a) Write a brief note on the role of geologists in the mining industry.

Or

- (b) Give an account of geological investigations in petroleum industries.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Write an essay on magma-related mineralization through geological time.
 17. Discuss in detail the methodology and stages of mineral exploration.
 18. Give an account of the distribution of radioactive minerals in India.
 19. Explain in detail the techniques of petroleum exploration.
 20. Write an essay on the role of geologists in various industrial sectors of India.
-

S-1033

Sub. Code

23MGE3C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

Geology

GEOPHYSICS

(CBCS – 2023 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Define geophysical exploration and mention its classifications.
2. What are geophysical anomalies?
3. State Newton's Law of Universal Gravitation.
4. What is gravimeter and how does it function?
5. Explain Ohm's Law as applied in resistivity methods.
6. What are self-potential and induced polarization methods?
7. Differentiate between primary and secondary seismic waves.
8. What is seismic refraction?

9. What is palaeomagnetism?
10. Name two instruments used in magnetic prospecting.

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain the physical properties of rocks used in geophysical exploration.

Or

- (b) Discuss the principles of radioactive prospecting.

12. (a) Describe the field procedures for gravity surveys.

Or

- (b) Explain the significance of regional and residual gravity separation.

13. (a) Discuss the various configurations used in electrical resistivity methods.

Or

- (b) Explain the interpretation of resistivity profiling data.

14. (a) Describe seismic wave propagation through different layers of the Earth.

Or

- (b) Explain the principles of seismic reflection and refraction methods.

15. (a) Discuss the process of airborne magnetic surveying.

Or

- (b) Explain the factors affecting the magnetic susceptibility of rocks.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the principles of radiometric logging and its applications in geophysical exploration.
 17. Discuss the corrections applied to gravity field data and their significance in interpretation.
 18. Explain the field procedures for conducting an electrical resistivity survey and discuss its applications.
 19. Describe seismic energy sources, seismic detectors, and the interpretation of seismic field data.
 20. Explain the concept of magnetic anomalies and describe the correction and interpretation of magnetic survey data.
-

S-1034

Sub. Code

23MGE3E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

Geology

Elective – GEOCHEMISTRY

(CBCS – 2023 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is the estimated age of the universe?
2. Define cosmic abundance of elements.
3. What are lithophile elements?
4. What is “transition metals” with examples.
5. State the First Law of Thermodynamics.
6. Define Gibbs Free Energy.
7. What is geochemical dispersion?
8. Mention any two geobotanical indicators for mineral prospecting.
9. Define cosmogenic nuclides.
10. What is the significance of Sr isotopes in geochemistry?

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Give an account of the composition of meteorites and their significance in planetary formation.

Or

- (b) Write short notes on the element composition of the Earth's mantle.

12. (a) Write a brief note on alkali and alkaline earth elements in geochemistry.

Or

- (b) Give an account of Goldschmidt's classification of elements with suitable examples.

13. (a) Write short notes on the Second Law of Thermodynamics and its significance in geochemistry.

Or

- (b) Give an account of Gibbs Free Energy and its dependence on pressure-temperature conditions.

14. (a) Give an account of pathfinder elements and their role in mineral exploration.

Or

- (b) Write short notes on lithogeochemical exploration and its sampling techniques.

15. (a) Write a brief note on Pb isotopes and their applications in geochemistry.

Or

- (b) Give an account of the role of stable isotopes in geothermometry.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain in detail the composition of the Earth's crust, mantle, and core with reference to major and trace elements.
 17. Discuss in detail the geochemical classification of elements based on their volatility and reactivity.
 18. Write an essay on the concept of Gibbs Free Energy and its role in geochemical reactions.
 19. Give an account of geochemical exploration techniques, including hydrogeochemical and biogeochemical methods.
 20. Write an essay on the application of cosmogenic nuclides in geochronology and paleoclimate evaluation.
-

S-1035

Sub. Code

23MGE3S1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

Geology

PETROLEUM EXPLORATION AND MUD LOGGING

(CBCS – 2023 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Define hydrocarbon traps.
2. Physical and optical properties of petroleum.
3. What is fishing in an oil well?
4. What is rheology in drilling mud?
5. What does QHSE mean?
6. Define cycle time.
7. Define trouble shooting.
8. Define drill break.
9. What is MDI?
10. Define FMI.

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain the seismic exploration and its advantage in petroleum exploration.

Or

- (b) Mention the methods of Geophysical prospecting in hydrocarbon exploration.

12. (a) What are the complication in an oil well drilling?

Or

- (b) Write the short notes on bore hole environment.

13. (a) Explain every stage of the coring operation.

Or

- (b) Write a note on fluorescence and solvent cut test.

14. (a) Explain the mud logging sensors and its working principle.

Or

- (b) Give a short note on Hydrocarbon Gas Analysis.

15. (a) Write a short note on Uses of electrical logging.

Or

- (b) Explain the geological interpretation of advanced electro log.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the geological interpretation of possible hydrocarbon traps.
 17. Write an essay on an oil well drilling process and methods of exploration.
 18. Write a brief note on role and responsibilities of well site geologist.
 19. Enumerate the geological surveillance in mud logging.
 20. Describe the geological uses of electrical logging.
-