

S-3211

Sub. Code

23MGE2C1

M.Sc. DEGREE EXAMINATION, APRIL 2026

Second Semester

Geology

STRUCTURAL GEOLOGY AND GEOTECTONICS

(CBCS – 2023 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Name one common method used in paleostress analysis.
2. Name two common types of rock failure.
3. What is petrofabric analysis?
4. Name a technique used for strain measurement.
5. What is neotectonics?
6. Define foliation in metamorphic rocks.
7. Name a major tectonic feature of the Indian Plate.
8. What is isostasy?
9. What is paleomagnetism?
10. What is sea floor spreading?

Part B

(5 × 5 = 25)

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

11. (a) Describe the construction of Mohr's circle for a given stress state.

Or

- (b) Explain the difference between tensile and shear failure in rocks.

12. (a) Explain the relationship between fabric symmetry and deformation mechanisms.

Or

- (b) Compare geometric features of brittle and ductile shear zones.

13. (a) Explain how boudins form and their geological significance.

Or

- (b) Describe common interference patterns formed by superposed folds.

14. (a) Explain the principle of isostasy and its geological significance.

Or

- (b) Outline the major geodynamic processes affecting the Indian Plate.

15. (a) Explain the role of paleomagnetism in understanding continental drift.

Or

- (b) Describe evidence supporting the theory of sea floor spreading.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss the principles and significance of paleostress analysis.
 17. Describe the methods for preparing petrofabric diagrams for quartz, biotite, and calcite.
 18. Analyze gravity-induced structures and explain their formation and importance in structural geology.
 19. Discuss the concept of plate tectonics and how it evolved from the theory of continental drift.
 20. Discuss the geodynamic evolution of the Himalayas, highlighting key tectonic processes involved.
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S-3212

Sub. Code

23MGE2C2

M.Sc. DEGREE EXAMINATION, APRIL 2026

Second Semester

Geology

APPLIED PETROLOGY

(CBCS – 2023 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Define porphyritic texture in igneous rocks.
2. What are steady-state geotherms?
3. State the significance of ternary phase diagrams.
4. Define metasomatism.
5. What is a metamorphic facies?
6. What do you mean by grain size analysis?
7. Mention any two structures of sedimentary rocks.
8. Define provenance in sedimentology.
9. What is magma mixing?
10. Define petrogenesis.

Part B

(5 × 5 = 25)

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

11. (a) Write a short note on the formation and classification of granites.

Or

- (b) Briefly explain the concept of magma immiscibility.

12. (a) Give on account a binary phase diagram with a suitable example.

Or

- (b) Write a short note on the petrogenesis of Deccan Trap basalts.

13. (a) Describe the mineral assemblages of eclogites.

Or

- (b) Write a short note on contact metamorphism in impure calcareous rocks.

14. (a) Define sedimentary basin and explain its classification.

Or

- (b) Briefly describe sedimentary structures found in fluvial environments.

15. (a) Write a short note on paired metamorphic belts.

Or

- (b) Discuss the importance of plate tectonics in rock petrogenesis.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain in detail the different types, structures, and textures of igneous rocks.
 17. Discuss the experimental phase equilibrium studies of binary and ternary silicate systems.
 18. Describe the petrogenesis and mineral assemblages of charnockites and khondalites.
 19. Write an essay on classification and provenance analysis of sedimentary rocks.
 20. Explain the processes of magma differentiation and their relation to plate tectonics.
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S-3213

Sub. Code

23MGE2E1

M.Sc. DEGREE EXAMINATION, APRIL 2026

Second Semester

Geology

Elective – APPLIED REMOTE SENSING AND GIS

(CBCS – 2023 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Define fiducial marks.
2. What is overlap in aerial photography?
3. Define blackbody radiation.
4. Mention the principle of thermal remote sensing.
5. What is the use of push broom scanners?
6. Define FOV.
7. What is geometric correction?
8. Define FCC Image.
9. What is topology in GIS?
10. List two applications of GIS in mineral exploration.

Part B

(5 × 5 = 25)

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

11. (a) Write a short note on scale and flight planning in aerial surveys.

Or

- (b) Write a short note on the use of stereoscopes in relief measurements.

12. (a) Describe the spectral characteristics of vegetation and soil.

Or

- (b) Write a brief account of Stefan-Boltzmann and Wien's law in remote sensing.

13. (a) Discuss TRS, IRS, and LISS satellite characteristics.

Or

- (b) Explain the types of satellite-based sensors and their uses.

14. (a) Explain the techniques used for digital image enhancement and edge detection.

Or

- (b) Write a note on data fusion and GIS integration.

15. (a) Discuss the role of GIS in natural hazard assessment.

Or

- (b) Describe how remote sensing helps in structural and lithological mapping.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe aerial photo interpretation techniques and their geological significance.
 17. Explain various EMR interactions and spectral reflectance curves of Earth features.
 18. Compare different remote sensing platforms and sensor systems.
 19. Describe the digital image processing techniques used in geology.
 20. Write an essay on the role of GIS in earthquake and landslide hazard mapping.
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S-3214

Sub. Code

23MGE2E2

M.Sc. DEGREE EXAMINATION, APRIL 2026

Second Semester

Geology

Elective – ENVIRONMENTAL EARTH SCIENCE

(CBCS – 2023 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Define the term biome.
2. Name two tools used for environmental monitoring.
3. What is acid rain?
4. Name two primary air pollutant.
5. Define photochemical smog.
6. Mention two health effect of ozone exposure.
7. What is meant by the waste hierarchy?
8. Give two examples of energy production from waste.
9. Name two health problems caused by arsenic contamination.
10. What is the toxic effect of lead on children?

Part B

(5 × 5 = 25)

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

11. (a) Explain the concept of environment and its components.

Or

- (b) Explain how groundwater becomes polluted and the consequences for human health.

12. (a) Differentiate between natural and anthropogenic sources of air pollution with examples.

Or

- (b) Explain the roles and responsibilities of government agencies in enforcing air quality standards.

13. (a) What are alternate energy resources? Give examples and discuss their benefits.

Or

- (b) Describe the role of PAN in photochemical smog and its effects.

14. (a) Discuss the role of compactors in reducing waste volume and optimizing space usage.

Or

- (b) What are the advantages and disadvantages of incineration?

15. (a) Explain the concept and scope of medical geology.

Or

- (b) Discuss the health hazards of asbestos in mining areas.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe various environmental monitoring methods and their applications in controlling pollution.
 17. Discuss the effectiveness of current mitigation measures and policies in reducing acid rain and improving air quality.
 18. Evaluate strategies and policies that have been successful in controlling photochemical smog in major cities worldwide.
 19. Evaluate the effectiveness of trash compactors and landfills in managing urban solid waste.
 20. Discuss the occurrence, toxicity, and health impact of asbestos exposure in mining and industrial areas.
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S-3215

Sub. Code

23MGE2S1

M.Sc. DEGREE EXAMINATION, APRIL 2026

Second Semester

Geology

DISASTER MANAGEMENT

(CBCS – 2023 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What are storm surges?
2. What is seismograph?
3. Define climate refugees.
4. Name two greenhouse gases responsible for global warming.
5. Name the tool used for hazard mapping.
6. Define GIS.
7. What is disaster relief?
8. What is CBDRM stands for?
9. Explain the term “Displaced person”.
10. State the roles and responsibility of NDMA.

Part B

(5 × 5 = 25)

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

11. (a) List the different type of floods and its impact.

Or

- (b) Briefly explain the global trends in the occurrence of natural catastrophes in the 21st century.

12. (a) Describe the effects of climate change on polar regions.

Or

- (b) Disaster impacts differential groups at various level. Justify.

13. (a) Write a short note on sea level changes along global coasts.

Or

- (b) How does risk zonation benefit emergency response planning?

14. (a) Describe the importance of early warning systems in risk reduction.

Or

- (b) How did coastal management help in the reconstruction efforts after the 2004 Indian Ocean tsunami?

15. (a) What are five key components of effective disaster management.

Or

- (b) How does community participation help in disaster mitigation?

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss the impact of climate change on the frequency and intensity of wildfires worldwide.
 17. Evaluate the role of technology and innovation in addressing global environmental change.
 18. Discuss the importance of multi-layered GIS data in vulnerability and risk assessment of natural disasters.
 19. Evaluate the role of stakeholders in comprehensive disaster management.
 20. Discuss the role of government policies and community involvement in successful disaster recovery.
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S-3218

Sub. Code

23MGE4C1

M.Sc. DEGREE EXAMINATION, APRIL 2026

Fourth Semester

Geology

ENGINEERING GEOLOGY AND MINING GEOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Define compressive strength of rocks.
2. Mention any two geological considerations for dam construction.
3. What is the purpose of geotechnical investigation before tunneling?
4. Define coastal erosion.
5. What is meant by prospecting in mining geology?
6. Define quarrying.
7. What is shrinkage stoping?
8. Define artificial support in underground mining.
9. What is longwall retreating?
10. Mention any two advantages of Board and Pillar method.

Part B

(5 × 5 = 25)

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

11. (a) Describe the engineering properties of soft sediments and soils.

Or

- (b) Write short notes on geological investigations for highway projects.

12. (a) Write short note on role of geologist in tunnel excavation.

Or

- (b) Write a note on shoreline engineering and its importance.

13. (a) Briefly describe the terminology used in metal mining.

Or

- (b) Describe the process and advantages of opencast mining.

14. (a) Discuss cut and fill and caving methods in underground mining.

Or

- (b) Explain the use of artificial supports in underground metal mining.

15. (a) Describe the Board and Pillar method of coal mining.

Or

- (b) Write a note on horizon mining with a neat diagram.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe in detail the engineering properties of rocks relevant to construction projects.
 17. Explain geological investigations involved in tunneling and harbor construction.
 18. Discuss the various methods of alluvial and opencast mining with examples.
 19. Describe the underground metal mining methods without artificial supports.
 20. Explain longwall coal mining methods and compare their effectiveness.
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S-3219

Sub. Code

23MGE4E1

M.Sc. DEGREE EXAMINATION, APRIL 2026

Fourth Semester

Geology

***Elective* — HYDROGEOLOGY**

(CBCS – 2023 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is groundwater?
2. Define Darcy's law.
3. What are aquitards and aquicludes?
4. What is tidal efficiency in aquifers?
5. Define drawdown.
6. What are infiltration galleries?
7. What is conjunctive use of groundwater?
8. Define geochemical cycle.
9. What is saline water intrusion?
10. Define hydrogeological modelling.

Part B

(5 × 5 = 25)

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

11. (a) Describe the distribution and types of water on Earth.

Or

- (b) Write a short note on the estimation of precipitation and evapotranspiration.

12. (a) Explain Darcy's experiment and its limitations.

Or

- (b) Describe steady and unsteady groundwater flow with diagrams.

13. (a) Briefly explain the concepts of cone of depression and specific capacity.

Or

- (b) Discuss the significance of trace and slug tests.

14. (a) Explain the major sources and effects of chemical constituents in groundwater.

Or

- (b) Write a note on pollution attenuation in aquifers.

15. (a) Discuss remote sensing and geomorphological approaches in groundwater exploration.

Or

- (b) Describe the hydrogeology of wetlands.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe various water-bearing properties of rock formations with suitable examples.
 17. Explain the methods of testing wells and preparation of water level maps.
 18. Write an essay on groundwater quality parameters and their suitability for various uses.
 19. Describe geophysical methods used for groundwater exploration.
 20. Explain the significance and application of analog and numerical groundwater models.
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S-3220

Sub. Code

23MGE4S1

M.Sc. DEGREE EXAMINATION, APRIL 2026

Fourth Semester

Geology

OCEANOGRAPHY AND CLIMATOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Name any two important surface ocean currents.
2. What is hypsography?
3. What is lapse rate?
4. Define orographic rainfall.
5. Name the two phases of the IOD.
6. Name the three types of ocean margins.
7. Define Mie scattering.
8. What is the solar constant?
9. What are cumulonimbus clouds known for?
10. What is the Bergeron process?

Part B

(5 × 5 = 25)

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

11. (a) Describe the physical properties of seawater and their spatial variation.

Or

- (b) Discuss the factors affecting biological productivity in oceans.

12. (a) What is atmospheric stability? Discuss its significance.

Or

- (b) Explain the mechanism of the El-Nino phenomenon.

13. (a) Describe the thermal structure of the atmosphere and temperature variation across layers.

Or

- (b) Explain the relationship between hydrothermal activity and mid-ocean ridge.

14. (a) Describe the seasonal variation in the net radiation budget across latitudes.

Or

- (b) Compare Rayleigh and Mie scattering based on particle size.

15. (a) Explain the role of condensation nuclei in cloud formation.

Or

- (b) Describe the mechanism of raindrop formation through the coalescence process.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the thermohaline circulation system and its role in the global climate regulation.
 17. Write an essay on the major sources and impacts of marine pollution.
 18. Explain the mechanisms of El Nino and La Nina events. Analyze their global impacts on weather, agriculture, and ocean circulation.
 19. Discuss the significance of the Clausius–Clapeyron equation in atmospheric processes.
 20. Explain the concept of atmospheric turbulence and describe the mixing length theory.
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