S–6430

Sub. Code
23MGE1C1

M.Sc. DEGREE EXAMINATION, APRIL 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 mid-ocean ridges?

3. Define isostasy.

4. Define weathering.

5. What are the different zones of earthquake?

6. Give an example of erosional landform created by wind.

7. How are sand dunes related to coastal processes?

8. What is the main material erupted by a cinder cone of volcano?

9. Define proglacial lake and outwash plain

10. How climate change can influence the formation of beach?

Part B

$(5 \times 5 = 25)$

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

11. (a) Describe the different layers of Earth's interior and their compositions.

Or

(b) Explain the theory of plate tectonics, including different plate boundaries.

12. (a) Discuss the concept of uniformitarianism and its role in geomorphic processes.

Or

(b) Explain the difference between endogenic and exogenic processes.

13. (a) Explain the process of mechanical weathering, with neat sketches.

Or

(b) Describe the process of pedogenesis and formation of soil.

14. (a) Explain the different fluvial landforms-valleys, floodplains, deltas and meanders.

Or

(b) Describe the erosional and depositional processes associated with glaciers.

15. (a) Discuss the impact of glacial cycles on river systems during the Quaternary.

Or

(b) Describe the role of Quaternary climate changes in shaping the aeolian landscapes.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Enumerate the plate tectonics movements and its effects.

17. Discuss the distribution of major seismic belts around the world.

18. Discuss the impact of mass movements on landscapes and human settlements.

19. Describe the process of dissolution in carbonate rocks that create karst landscapes.

20. Discuss the potential benefits and challenges for downstream ecosystems.

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S–6431

Sub. Code
23MGE1C2

M.Sc. DEGREE EXAMINATION, APRIL 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 is Miller Indices?

2. Describe the nature of axis and symmetry elements of the mineral Barite.

3. Define unit cell.

4. What is sine ratio?

5. What is lustre and hardness of Nepheline minerals?

6. What is the name of Lithium bearing mica mineral and mention the source rock?

7. Define euhedral and anhedral.

8. What is an interference colour?

9. Give expansion of XRF and ICPMS.

10. What is Turbidimetry?

Part B

$(5 \times 5 = 25)$

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

11. (a) Describe the nature of axis, symmetry elements, no of faces miller indices of the crystal Gypsum.

Or

(b) Explain the axial ratio of Galena, Zircon, Beryl, Barite, Calcite and Axinite.

12. (a) Give a note on Spherical projection.

Or

(b) Write a short note on Stereographic projection.

13. (a) What are felspathoid minerals and give a note on their Paragenesis?

Or

(b) What is pyroxene group of minerals and add a note on their Paragenesis?

14. (a) What are polaraisation and cross nicol characters of Hornblende mineral?

Or

(b) Give a note on mineralogical spectroscopy.

15. (a) Give a short note on paper chromatography.

Or

(b) Write a short note on Nephelometry.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe the irregularities in crystal.

17. What is Braggs law and explain X-ray powder diffraction method?

18. Explain various silicate structures of minerals.

19. Describe electrical, magnetic and optical properties of minerals.

20. Explain Accelerator Mass Spectroscopy, chemical preparation of carbonate samples, limits of detection and Quantification.

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S–6434

Sub. Code
23MGE2C1

M.Sc. DEGREE EXAMINATION, APRIL 2025.

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. What is shear stress?

2. What are ellipsoids?

3. What is a ductile shear zone?

4. Explain point diagrams used in petrofabric studies.

5. Define sheath folds.

6. What is gravity induced structures?

7. Define orogeny.

8. What is strike-slip fault?

9. Write the importance of paleomagnetism.

10. Explain the magnetic anomalies in mid oceanic ridges.

Part B (5 × 5 = 25)

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

11. (a) Explain the types of stress and strain.

Or

(b) Describe L, S, L-S tectonic fabrics.

12. (a) Explain the petrofabric diagram of Quartz.

Or

(b) How do you differentiate brittle deformation from ductile deformation?

13. (a) Explain the joints in rocks and its types.

Or

(b) Explain the Unconformity in rocks and its types.

14. (a) Distinguish between Airy's hypothesis and Pratt's hypothesis.

Or

(b) Differentiate orogeny from epeirogeny in terms of geological processes.

15. (a) Explain the relationship between magnetic anomalies and mid-oceanic ridges.

Or

(b) Explain the concept of sea floor spreading.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain how rocks behave under various stress conditions and how this behavior is represented on Mohr's Circle.

17. Describe the field and laboratory techniques used for strain analysis.

18. Explain the geometry and mechanics of fold development in rocks.

19. Discuss the geodynamics of the Indian plate.

20. Write an account on the island arcs, volcanic arcs and oceanic islands.

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S–6435	Sub. Code
	23MGE2C2

M.Sc. DEGREE EXAMINATION, APRIL 2025.

Second Semester

Geology

APPLIED PETROLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Polymineralic.

2. Intergrowth texture.

3. What is Alkali Lime Index?

4. Peraluminous.

5. Eutectic point.

6. Define regional metamorphism.

7. Explain Arkose.

8. Write the categories of sedimentary basins.

9. Volcanoclasts.

10. Trace element.

Part B (5 × 5 = 25)

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

11. (a) What are the various structures in igneous rock?

Or

(b) Give a short note on magmatic differentiation.

12. (a) Give a note on alkaline rocks.

Or

(b) Discuss the effect of pressure in silicate system.

13. (a) Define metamorphism. Explain types of metamorphism.

Or

(b) Explain the structure and textures of the metamorphism.

14. (a) Write the classification of sedimentary rock.

Or

(b) Write short note on classification of sedimentary basin.

15. (a) Write the short note on application of trace elements.

Or

(b) Give a short note on Paleoenvironment analysis.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Explain the IUGS classification of igneous rock.

17. Discuss the ternary silicate system and its petrological implications.

18. Explain the petrogenesis of eclogite and migmatite.

19. Explain the provenance and diagenesis of sedimentary rocks.

20. Give an elaborate note on sedimentary environment and facies.

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S–6436

Sub. Code
23MGE2E1

M.Sc. DEGREE EXAMINATION, APRIL 2025

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 Photogrammetry.
2. What is side lab in aerial photographs?
3. Define the term passive remote sensing system.
4. What is spectral reflectance curve?
5. State the sensor characters of SPOT.
6. Give short account on Across-track scanning system.
7. Explain the term Edge Enhancement.
8. Describe hybrid image classification.
9. Write any two basic principles of GIS.
10. How GIS is used in lithological interpretation?

Part B (5 × 5 = 25)

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

11. (a) Explain the term mosaics. Add notes on various types of mosaics.

Or

(b) Enumerate shortly on factors affecting vertical exaggeration.

12. (a) Discuss shortly about Stefan Boltzmann's law.

Or

(b) Differentiate between thermal and microwave remote sensing.

13. (a) List the IRS series of satellites with its resolution.

Or

(b) Enumerate the fundamentals of UAV based mapping.

14. (a) Write short account on elements of image interpretation.

Or

(b) Describe the image restoration and rectification techniques.

15. (a) Explain the software components of GIS.

Or

(b) Briefly explain the remote sensing and GIS in Geomorphological studies.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write an essay on aerial photography with various types of aerial photographs.

17. Explain the definition, types and uses of platforms.

18. Enumerate the fundamental of ALTM and LIDAR based mapping.

19. Explain the image interpretation strategies and keys.

20. Discuss the applications of Remote sensing and GIS in earthquake, landslide and volcanoes zonation mapping.

S–6437

Sub. Code
23MGE2E2

M.Sc. DEGREE EXAMINATION, APRIL 2025

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. Write short notes on point water pollution.

2. List out the various Non point pollution sources.

3. What are the primary air pollutants?

4. List any two-mitigation process of air pollution

5. Describe shortly on Catalytic converters.

6. Define Smog.

7. Describe the tam Landfills.

8. List out the primary concept of waste management.

9. What are the problems associated with the uses of fluoride?

10. Write any two major issues of lead contaminations.

Part B (5 × 5 = 25)

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

11. (a) Write the importance and necessity of environmental monitoring.

Or

(b) Discuss the causes and effects of ground water pollution.

12. (a) Write short notes on anthropogenic air pollution and its effect.

Or

(b) Enumerate shortly on Water Quality Standard.

13. (a) Describe the causes and effects of climate change.

Or

(b) Enumerate the process involved in removal of greenhouse gases.

14. (a) Distinguish between incineration and recycling.

Or

(b) Describe about waste handling and transport methods.

15. (a) Explain the sources of zinc contamination.

Or

(b) Write detailed notes on cadmium pollution.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the various resources of water.

17. Write detailed notes on Acid rain.

18. Enumerate the alternative energy resources. Add notes on its limitations.

19. Enumerate the Biological processing in waste disposal.

20. Write an essay on the sources, effects of mercury and chromium contaminations.

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S–6438

Sub. Code
23MGE2S1

M.Sc. DEGREE EXAMINATION, APRIL 2025

Second Semester

Geology

DISASTER MANAGEMENT

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define hazards.
2. Explain about early warning system in disaster.
3. What is Pandemic?
4. Define poverty.
5. Tell the objective of disaster damage assessment.
6. Define GIS.
7. What is disaster relief?
8. Give few examples of man-made disaster.
9. Explain the term “Displaced person”.
10. Expand NDMA.

Part B (5 × 5 = 25)

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

11. (a) List down the different type of floods.

Or

(b) What is to be done during and after the earthquake?

12. (a) Explain the global warming and environmental changes.

Or

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

13. (a) Give a short note on sea level changes.

Or

(b) Explain the hazards mapping and its applications.

14. (a) How disaster affect the development activities in a society?

Or

(b) Enumerate the concept of costal management in tsunami reconstruction.

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

Or

(b) How will you assess the loss and damage to human life in disaster?

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the various types of origin and effects of Tsunami.

17. Write the essay on food security and poverty eradication programmes in India.

18. Write the geological tools used for identifying hazards prone area.

19. Explain the role and responsibility of various agencies in disaster mitigation and management.

20. Analyse the role of the early warning system in disaster.

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S–6441

Sub. Code
23MGE3E1

M.Sc. DEGREE EXAMINATION, APRIL 2025

Third Semester

Geology

Elective : GEOCHEMISTRY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Carbon 14 method.

2. Core of the Earth.

3. HFS elements.

4. Sideropile.

5. What is thermodynamic equilibrium?

6. Define heat capacity.

7. Pedogeochemical.

8. What is geobotanical indicators?

9. Define geochronology.

10. Stable isotope of Pb.

Part B (5 × 5 = 25)

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

11. (a) Give a short note on origin of the elements.

Or

(b) Explain the major and trace element composition of sedimentary rock.

12. (a) Explain the Goldsmith classification of elements.

Or

(b) Give a short note on hydro fluorocarbon.

13. (a) Write short note on phase rule.

Or

(b) Give a note on application of phase equilibrium.

14. (a) Write a note on geochemical anomalies.

Or

(b) Write the methods of interpretation of anomalies.

15. (a) List out the major application of isotopes.

Or

(b) Write the cosmogenic nuclides and applications.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Give an essay on compositions of igneous and sedimentary rocks.

17. Write an essay on geological classification of elements.

18. Describe the laws of thermodynamic system.

19. Give a brief explanation on geochemical exploration methods.

20. Explain the concept of geochronology.

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S–6442

Sub. Code
23MGE3S1

M.Sc. DEGREE EXAMINATION, APRIL 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. What are Reservoir traps?

2. Physical and optical properties of petroleum.

3. Define primary porosity.

4. What is rheology in drilling mud?

5. Define fishing in an oil well.

6. What is lag time?

7. Looking at cut fluorescence, how will you determine the quality of oil?

8. Define drill break.

9. What is ROP?

10. Define FMI.

Part B (5 × 5 = 25)

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

11. (a) Explain the organic and inorganic origin of petroleum.

Or

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

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

Or

(b) Explain the well logging methods with neat sketch.

13. (a) Give a short note on borehole volume calculations.

Or

(b) Explain the evaluation of drill cutting analysis in mudlogging.

14. (a) Write a note on role and responsibilities of mudlogger.

Or

(b) Write a short note on the main tracks in mudlog.

15. (a) Explain :

(i) Electrical capture spectroscopy

(ii) Combinable Magnetic Resonance

Or

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

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the geological interpretation of possible hydrocarbon traps.

17. Write an essay on worksite environmental hazards on an oil well drilling.

18. Write a brief note on role and responsibilities of well site geologist.

19. Explain the working principle of mud logging sensor.

20. Describe the geological uses of various logging techniques.

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S–6443

Sub. Code
23MGE4C1

M.Sc. DEGREE EXAMINATION, APRIL 2025

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. Write short notes on the necessity of studying engineering properties of rocks.

2. List the basics geological investigation fir dams site selection.

3. What are the problems related to soft rock tunneling?

4. List any two importance of construction of retaining walls.

5. What are the advantages of opencast mining?

6. Define the term Quarrying.

7. What is Shrinkage sloping?

8. List out the uses of Cut and Fill methods.

9. What is longwall retreating?

10. Write any two major advantages of Longwall advancing.

Part B (5 × 5 = 25)

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

11. (a) Describe the geological investigation pertaining bridges.

Or

(b) Discuss the geological investigation pertaining to highways and airfields.

12. (a) Enumerate the various geological investigations involves in tunneling in hard rocks.

Or

(b) Describe the shoreline engineering methods.

13. (a) Explain the Mine atmosphere.

Or

(b) Enumerate the process involved in Mine support.

14. (a) Discuss the underground metal mining without artificial support.

Or

(b) Describe various Caving methods.

15. (a) Explain Board and Piller methods in coal mining.

Or

(b) Write detailed notes on longwall retreating in coal mining.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the engineering properties of sediments and soils.

17. Write the geological investigation to be carried out for coastal erosion.

18. Enumerate the terminology used in coal mines.

19. Discuss the various underground metal mining.

20. Write an essay on the horizon mining.

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S–6444

Sub. Code
23MGE4E1

M.Sc. DEGREE EXAMINATION, APRIL 2025

Fourth Semester

Geology

Elective : HYDROGEOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What are the components of the hydrological cycle?

2. Define aquifer.

3. What is hydraulic conductivity?

4. How springs are formed?

5. Explain the cone of depression in well hydraulics.

6. What is artificial recharge?

7. List the major chemical constituents commonly found in groundwater.

8. What is the purpose of graphical representation of groundwater data?

9. List the methods used for groundwater exploration.

10. What is Ghyben-Herzberg relation?

Part B (5 × 5 = 25)

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

11. (a) How water is origin in the Earth?

Or

(b) Explain the hydrologic Properties of aquifers.

12. (a) Explain Darcy's law.

Or

(b) Discuss the factors that affect the barometric and tidal efficiency of an aquifer.

13. (a) Write a short note on types of water wells.

Or

(b) Explain Infiltration galleries with a neat sketch.

14. (a) Outline the geochemical cycle of surface water and groundwater.

Or

(b) Summarize the sources of groundwater pollution.

15. (a) Write short notes on geomorphological methods of groundwater exploration.

Or

(b) Explain the electrical resistivity method of groundwater exploration.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write an essay on the hydrologic cycle with a neat diagram.

17. Explain the vertical distribution of groundwater with a neat sketch.

18. Write a detailed account on drilling of well and completion of well.

19. Illustrate the important chemical constituents in groundwater, their sources, and their impact on human health and environmental quality.

20. Discuss the causes and effects of saline water intrusion. Add a note on the techniques used for controlling saline water intrusion.

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S–6445

Sub. Code
23MGE4S1

M.Sc. DEGREE EXAMINATION, APRIL 2025

Fourth Semester

Geology

OCEANOGRAPHY AND CLIMATOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Write short notes on continental slope.

2. Define ocean currents.

3. Describe lapse rate stability.

4. Write the general weather systems of India.

5. State any two significance of ocean margin.

6. Write short note on Storm.

7. Explain the term radiation windows.

8. Describe net radiation budget.

9. What is condensation nuclei?

10. Write any two reason for atmospheric turbulence.

Part B (5 × 5 = 25)

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

11. (a) Write the types and causes of ocean waves.

Or

(b) Give a detailed account on major water masses of the world ocean.

12. (a) Discuss shortly about marine pollution.

Or

(b) Enumerate shortly on Global warming.

13. (a) List the various types of ocean circulation.

Or

(b) Describe about Coriolis Effect.

14. (a) Write short account on emission and absorption of terrestrial radiation.

Or

(b) Discuss the effects of greenhouse gases.

15. (a) Explain the precipitation mechanisms.

Or

(b) Describe the Bergeron process.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write an essay on physical and biological properties of ocean water.

17. Explain with neat sketches on the chemical composition of atmosphere.

18. Discuss the structure, composition and formation mechanism of oceanic crust.

19. Enumerate the thermal structure of the atmosphere.

20. Write an essay on Richardson criterion.
