C 1961 **(Pages : 2)** **Name**.....

Reg. No.....

FOURTH SEMESTER M.Sc. DEGREE (REGULAR) EXAMINATION MARCH 2021

(CBCSS)

Applied Geology

GEL 4C 10—GEOCHEMISTRY AND ISOTOPE GEOLOGY

(2019 Admissions)

Time : Three Hours Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend* **all** *questions in each section.*
2. *The minimum number of questions to be attended from the Section / Part shall remain the same.*
3. *There will be an overall ceiling for each Section / Part that is equivalent to the maximum weightage of the Section / Part.*

Draw neat diagrams wherever necessary.

I. Short Answer Type Questions. Answer any *four* questions :

1 Enthalpy.

2 Law of radioactivity.

3 Mass independent fractionation.

4 Chemical Index of Alteration.

5 Flame photometer.

6 Ionization potential.

7 Variation Diagrams.

(4 × 2 = 8 weightage)

II. Short Essay Questions. Answer any *four* questions :

8 Cosmic abundance of elements.

9 Laws of thermodynamics.

10 Geochemical prospecting.

Turn over

11 K-Ar method of dating.

12 Chemical composition of meteorites.

13 Applications of non-traditional stable isotope systems.

14 Radiation damage methods of geochronology.

(4 × 3 = 12 weightage)

III. Long Essays. Answer any *two* questions :

15 Describe the distribution of elements in core, mantle and hydrosphere of our Earth. Add a brief note on the structure of Earth.

16 Explain the significance of trace elements and REEs in modeling fractional crystallization and petrogenetic history of igneous rocks.

17 Explain the principles and applications of U-Th-Pb method of dating.

18 Describe the basic principles of analysis and geological applications of SHRIMP, TIMS and SIMS.

(2 × 5 = 10 weightage)

C 1962 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER M.Sc. DEGREE (REGULAR) EXAMINATION MARCH 2021

(CBCSS)

Applied Geology

GEL 4E 04 (A)—EXPLORATION GEOLOGY

(2019 Admissions)

Time : Three Hours Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend* **all** *questions in each section.*
2. *The minimum number of questions to be attended from the Section / Part shall remain the same.*
3. *There will be an overall ceiling for each Section / Part that is equivalent to the maximum weightage of the Section / Part.*

Instructions : Draw neat diagrams wherever necessary.

Part A

I. Short Answer type questions : Answer any *four* questions. Each question carries 2 weightage :

1 Assaying.

2 Tesla.

3 Boxwork structures.

4 Threshold values.

5 Pathfinder elements.

6 Sampling.

7 Geochemical anomaly.

(4 × 2 = 8 weightage)

Part B

II. Short Essay questions : Answer any *four* questions. Each question carries 3 weightage :

8 Gravimeters.

9 Principle of self-potential electric method.

10 Primary dispersion pattern.

11 Seismic profiling.

12 Principles of air borne magnetic surveys.

13 Geochemical anomalies in surface and groundwater.

14 Well logging.

(4 × 3 = 12 weightage)

Part C

III. Long Essays. Answer any *two* questions. Each question carries 5 weightage :

15 Discuss the various phases involved in the exploration of mineral deposits in the surface and sub-surface levels.

16 Briefly explain the geo-botanical survey techniques. Comment on the biochemical anomalies.

17 Explain the principles of active and passive geophysical methods of mineral exploration.

18 Explain briefly the radiometric methods used to interpret mineral reserves.

(2 × 5 = 10 weightage)

C 1964 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER M.Sc. DEGREE (REGULAR) EXAMINATION MARCH 2021

(CBCSS)

Applied Geology

GEL 4E 05 (a)—ENGINEERING GEOLOGY

(2019 Admissions)

Time : Three Hours Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend* **all** *questions in each section.*
2. *The minimum number of questions to be attended from the Section / Part shall remain the same.*
3. *There will be an overall ceiling for each Section / Part that is equivalent to the maximum weightage of the Section / Part.*

Draw neat diagrams wherever necessary.

Part A

I. Short Answer Type Questions. Answer any *four* questions :

1 Atterberg Limits.

2 Parts of a tunnel.

3 Gravity dams.

4 Hazard zonation mapping.

5 Sea bed mining.

6 Seismic exploration survey for petroleum.

7 Froth Floatation process.

(4 × 2 = 8 weightage)

Part B

II. Short Essay Questions. Answer any *four* questions :

8 Engineering properties of rocks.

9 Geological and geotechnical aspects of bridges.

Turn over

10 Classification of landslides.

11 Aseismic design of building.

12 Alluvial mining methods.

13 Magnetic and electrostatic separation of ores.

14 Mineral legislation in India.

(4 × 3 = 12 weightage)

Part C

III. Long Essay Questions. Answer any *two* questions :

15 Discuss the geologic aspects involved in the selection of sites for dams.

16 Give an account of analysis of slope stability and monitoring of slope movements.

17 Describe the different methods of coal mining.

18 Outline the principles and applications of crushing and grinding.

(2 × 5 = 10 weightage)

C 2607 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER P.G. DEGREE EXAMINATION, APRIL 2021

(CCSS)

Applied Geology

GEL 4C 14—ECONOMIC GEOLOGY

(2015 Admissions)

Time : Three Hours Maximum : 80 Marks

Draw neat sketches wherever necessary.

Part A

Answer **all fifteen** *questions in one word* **or** *one sentence each.*
Each question carries 1 *mark.*

1. The fluorescence color exhibited by oil droplets.
2. Fusain.
3. Kaolinisation.
4. Exsolution texture.
5. Fissure vein.
6. V, Ni, Cr mineral deposits and magma type.
7. Paragenetic sequence.
8. Porosity and permeability of source rock.
9. Brown coal.
10. Allemtonite-myrmekitic texture.
11. Paraffins
12. Durchbewegung texture.
13. Stratabound deposits.
14. Superior type BIF.
15. Strategic minerals.

(15 × 1 = 15 marks)

Turn over

Part B (Short Answer Type Questions)

Answer any **five** *questions.*
Each question carries 3 *marks.*

16. Grade of ore.
17. Fuel ratio and rank of coal.
18. Exsolution texture.
19. Flash point of crude oil.
20. Critical non -fuel minerals in India.
21. Mineral deposits formed by metamorphism.
22. Sphalerite star.
23. Chromite deposits of Sittampundi.

(5 × 3 = 15 marks)

Part C (Short Essay Type Questions)

Answer any **six** *questions.*
Each question carries 5 *marks.*

24. Origin of coal.
25. Lindgren's classification of ore deposits.
26. Current National mineral policy.
27. Current National mineral status.
28. Carbonatites and associated mineral deposits.
29. Physical and chemical properties of crude oil.
30. Metallogenic epochs of Indian mineral deposits.
31. Ore deposits associated with subduction zones.
32. Chromium-platinoid associations.

(5 × 6 = 30 marks)

Part D (Essay Type Questions)

Answer any **two** *questions.*
Each question carries 10 *marks.*

33. Give an account of the spatial -temporal distribution of ore deposits in India.
34. Explain the physical and chemical properties of ore bearing fluids and controls of ore localization.
35. Give an account of the Metallogenesis and magma types.
36. Discuss the concepts of origin of Petroleum. Add a note on chemistry of Petroleum.

(2 × 10 = 20 marks)

C 2608 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER P.G. DEGREE EXAMINATION, APRIL 2021

(CCSS)

Applied Geology

GEL 4C 15—GEOCHEMISTRY AND SEDIMENTOLOGY

(2015 Admissions)

Time : Three Hours Maximum : 80 Marks

Draw diagrams wherever necessary.

Part A

Answer **all** *questions.*
Answer in one word **or** *in one sentence each of the following.*
Each question carries 1 *mark.*

1. Reduction potential.
2. Closure temperature.
3. Reynold's number.
4. Textural maturity.
5. Carbonaceous chondrites.
6. Spheroidal weathering.
7. Synsedimentary deformation.
8. Enthalpy.
9. Spectrophotometer.
10. Aulacogene.
11. phi scale.
12. Skewness.
13. Flaser bedding.
14. Diagenesis.
15. Sphericity.

(15 × 1 = 15 marks)

Part B

Write short notes on any **five** *of the following.*
Each question carries 3 *marks.*

16. Radioactive decay schemes.
17. Geological significance of heavy minerals.
18. Geochemical cycle.
19. Marine depositional environments.

Turn over

20. ICP-AES.

21. Formation of dolomite.

22. Chemistry of Rb and Sr for radiogenic dating.

23. Textures of clastic sedimentary rocks.

(5 × 3 = 15 marks)

Part C

Write short essays on any **six** *of the following.*
Each question carries 5 *marks.*

24. Advantages and disadvantages of Sm-Nd dating technique.

25. Processes of mechanical weathering.

26. Provenance of sandstones.

27. Grain size analyses of sediments.

28. Applications of oxygen isotopes in geology.

29. Physico-chemical controls on sedimentation.

30. Petrology of mudstones.

31. Cosmic abundance of elements.

32. Controls of stable isotope fractionation.

(6 × 5 = 30 marks)

Part D

Write short essays on **two** *of the following.*
Each question carries 10 *marks.*

33. Describe the Principles of Sm-Nd dating method and its applications in geosciences.

Or

34. Describe the principles and application of radiocarbon dating in geological studies.

35. Give a detailed account of the sedimentary basins of India.

Or

36. Explain the grain size and grain morphology of sediments. Add a note on various statistical parameters used in grain size analyses.

(2 × 10 = 20 marks)

C 2609 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER P.G. DEGREE EXAMINATION, APRIL 2021

(CCSS)

Applied Geology

GEL 4C 14—ECONOMIC GEOLOGY

(2018 Admissions)

Time : Three Hours Maximum : 80 Marks

(Instruction : Draw neat diagrams wherever necessary)

Part A

Write short notes on **all** *of the following.*
Each question carries 2 *marks.*

1. Strategic and critical minerals.
2. Metallogenic epochs.
3. Wall rock alterations.
4. Ore paragenesis.
5. Ores of felsic associations.
6. Ore deposits associated with plate boundaries.
7. Coal petrography.
8. Gas hydrates.

(8 × 2 = 16 marks)

Part B

Write short essays on any **six** *of the following.*
Each question carries 6 *marks.*

9. Physical and optical properties of hematite and chalcopyrite.
10. Controls of ore localization.
11. Micro textures of ores.
12. Ultramafic-mafic chromium platinoid associated ore bodies.
13. Ores of carbonatite associations.
14. Stratabound and stratiform ore deposits.

Turn c

15. Ore deposits of metamorphic affiliations.

16. Distribution of oil fields in India.

17. Distribution of coal fields in India.

18. Classification of petroleum reservoir traps.

(6 × 6 = 36 marks)

Part C

Write essays on any **two** *of the following.*
Each question carries 14 *marks.*

19. Discuss the significance of minerals in national economy with reference to the status of India in mineral production. Add a note on the National Mineral Policy.

Or

20. Give an account of the Bateman's classification of ore deposits.

21. Describe the ores of Anorthosite-Fe-Titanium associations with reference to their form, distribution, setting, constitution and origin.

Or

22. Explain the genesis and classification of coal.

(2 × 14 = 28 marks)

C 2610 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER P.G. DEGREE EXAMINATION, APRIL 2021

(CCSS)

Applied Geology

GEL 4C 15—GEOCHEMISTRY AND SEDIMENTOLOGY

(2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Draw neat diagrams wherever necessary.

Part A

Write short notes on **all** *of the following.*

1. Entropy.
2. Guano.
3. Grain size.
4. Lithification.
5. Tektites.
6. Free energy.
7. Redox potential.
8. Swash marks.

(8 × 2 = 16 marks)

Part B

Write short essays on any **six** *of the following.*

9. Statistical parameters of grain size.
10. Eh-pH diagrams.
11. Elements of Hydraulics.
12. Evaporites.
13. Heavy mineral separation.
14. Provenance.

Turn over

15. Diagenesis.

16. Radioactivity.

17. Grade scale.

18. Atomic Absorption Spectrometer.

(6 × 6 = 36 marks)

Part C

Write essays on any **two** *of the following.*

19. Describe in detail about the origin, cosmic abundance and geochemical classification of elements.

Or

20. Give an account of the Inductive Coupled Plasma Atomic Emission Spectrophotometer (ICP-AES) and its uses.

21. Explain the physico-chemical controls on sedimentation and the relationship between tectonics and sedimentation.

Or

22. Give a brief account on the structures and textures of sedimentary rocks and their significance.

(2 × 14 = 28 marks)

C 2611 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER P.G. DEGREE EXAMINATION, APRIL 2021

(CCSS)

Applied Geology

GEL 4E 05—DISASTER MANAGEMENT

(2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Draw neat diagrams wherever necessary.

Part A

Write short notes on **all** *of the following.*

1. Comprehensive Disaster Management Plan.
2. Type of volcanic products causing disasters.
3. Tsunami.
4. Biological disasters.
5. Ozone depletion.
6. Risk and Vulnerability.
7. Role of IT and communication in disasters.
8. Landslides in Kerala.

(8 × 2 = 16 marks)

Part B

Write short essays on any **six** *of the following.*

9. Classification of disasters.
10. Causes and effects of coal fire and oil fire.
11. Earthquake as a natural disaster.
12. Man-made disasters of public transport systems.
13. Adverse effects and mitigation measures of dam bursts.

14. Causes and effects of Climate change.

15. Disaster Management Cycle.

16. Role of Armed Forces and Police in disaster response.

17. Coastal erosion as a potential hazard in Kerala during the monsoons.

18. Saline water intrusion and mitigation measures.

(6 × 6 = 36 marks)

Part C

Write essays on any **two** *of the following.*

19. Give an account of the Disaster Management Act, 2005 and its Institutional Framework in India.

Or

20. Discuss Floods as natural disasters highlighting on their causes, adverse effects and mitigation measures. Add a note on the flood prone areas of India.

21. Describe Nuclear disasters and Chemical disasters as man-made disasters affecting both man and the environment. Add a note on some of the recent such man-made disasters of the world.

Or

22. Discuss cyclones and droughts as natural hazards in India with emphasis on the frequency of occurrence and vulnerable areas. Give some examples of recent cyclones and droughts that have adversely affected India.

(2 × 14 = 28 marks)

C 2612 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER P.G. DEGREE EXAMINATION, APRIL 2021

(CCSS)

M.Sc. Applied Geology

GEL 4C 09—GEOCHEMISTRY AND SEDIMENTOLOGY

(2019 Admissions)

Time : Three Hours Maximum : 80 Marks

Draw neat diagrams wherever necessary.

Part A

Write short notes on **all** *of the following.*
Each question carries 2 *marks.*

1. REE.
2. Oxygen fugacity.
3. Age of the Earth.
4. Eh-pH limits in nature.
5. Spectrophotometer.
6. Bouma sequence.
7. Herringbone structure.
8. Zingg diagram.

(8 × 2 = 16 marks)

Part B

Write short essays on any **six** *of the following.*
Each question carries 6 *marks.*

9. Primary differentiation of elements.
10. Chemical constitution of core of the earth.
11. Half-life period and its relevance in geochronological studies with examples.
12. Laws if thermodynamics.

Turn over

13. Gibb's Phase Rule.

14. Classification of limestones.

15. Graphical representation of sedimentary textures.

16. Wenthworth-Udden scale.

17. Significance of heavy minerals in provenance studies.

18. Lithification and diagenesis.

(6 × 6 = 36 marks)

Part C

Write essays on any **two** *of the following.*
Each question carries 14 *marks.*

19. Discuss any *two* major radiometric methods of dating of Precambrian rocks.

20. Explain the chemical abundance of elements of the Earth with respect to the solar system.

21. Give an account of the sedimentary structures and their significances.

22. What is sedimentary facies ? Describe the major depositional environments.

(2 × 14 = 28 marks)

C 2613 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER P.G. DEGREE EXAMINATION, APRIL 2021

(CCSS)

M.Sc. Applied Geology

GEL 4C 10—ECONOMIC GEOLOGY

(2019 Admissions)

Time : Three Hours Maximum : 80 Marks

Draw neat diagrams wherever necessary.

Part A

Write short notes on **all** *of the following.*
Each question carries 2 *marks.*

1. Grade of ore.
2. Skarn.
3. Critical minerals.
4. Fixed carbon.
5. Gas Hydrates.
6. Uraninite.
7. Paragenetic sequences.
8. Salt domes.

(8 × 2 = 16 marks)

Part B

Write short essays on any **six** *of the following.*
Each question carries 6 *marks.*

9. Textures and structures of ore minerals.
10. Form, distribution, constitution and origin of economic mineral deposits associated with carbonatites.
11. Gondwana coal fields of Central India.
12. Lead- zinc deposits of Rajasthan.
13. Structural controls of ore localization.
14. East Coast Bauxite deposits.
15. Ultimate analysis of coal.
16. National Mineral Policy of India.

17. Lindgren's classification of ore deposits.

18. Physical properties, composition and origin of petroleum.

(6 × 6 = 36 marks)

Part C

Write essays on any **two** *of the following.*
Each question carries 14 *marks.*

19. Describe mineralization associated with plate boundaries.

20. Describe different types of reservoir traps.

21. Describe the major theories of ore genesis.

22. Describe the distribution, constitution, association and origin of copper deposits of India.

(2 × 14 = 28 marks)