

**Model Question Paper**  
**First Semester M.Sc Geology Degree Examination**  
**GL 211- Physical Geology and Geomorphology**  
**(2020 Admission Onwards)**

**Time: 3 hours**

**Max Marks: 75**

**Answer all questions**  
**Draw neat sketches wherever necessary**

I. a) Elaborate on the Geomorphology of Kerala with special emphasis on its river.

Or

b) Describe the seismotectonics and elaborate on plate tectonics.

(1x15=15 Marks)

II a) Explain Geomagnetism and geothermal gradient.

Or

b) Execute and explain the concept of grade, equilibrium, lateral planation and rejuvenation of drainage system. Elucidate the major kinds of contribution of water flow to the stream channel.

(1x15=15 Marks)

III. Write short notes on any nine of the following

- a) Discuss Density vs Depth profile
- b) Summarise Earth's magnetic field
- c) Summarise Limitations of isotope dating
- d) Executing geomorphology in mineral prospecting
- e) Recall Pediplanation cycle
- f) Explain Morphogenetic landforms
- g) Give a brief description about Catastrophism
- h) Describe Origin of Kayals of Kerala
- i) Give a note on Neotectonism
- j) Evaluate Fluvial transport
- k) Give an account of Thermal evolution of the earth
- l) What is Dynamic equilibrium?

(9x5=45 Marks)

**Model Question Paper**  
**First Semester M.Sc Geology Degree Examination**  
**GL 212- Structural Geology and Engineering Geology**  
**(2020 Admission Onwards)**

**Time: 3 hours**

**Max Marks: 75**

**Answer all questions**  
**Draw neat sketches wherever necessary**

I.

a) What are the engineering properties of rocks? Comment on the effect of weathering on these properties.

Or

b) How do geological structures affect the designing and construction of reservoirs and dams? Are the geological concerns in building a dam the same as in building a bridge? (1x15=15 marks)

II.

a) Differentiate between shearing and fracturing. What are the types of fractures? Discuss the criteria for development of fractures.

Or

a) Write a note on the genetic classification of folds. Explain the mechanics of folding with the help of a strain ellipsoid. (1x15=15 marks)

III. Write short notes on any **nine** of the following:-

- a) Differentiate between the stress acting on a surface and a point.
- b) State the significance of stress-strain diagrams in the study of deformations.
- c) What are the properties that make a rock a building stone and another a decorative stone?
- d) A force of 320N is acting on a rock surface with a surface area of 2km<sup>2</sup> at an angle of 45°. Find out the normal and shear stress acting on that surface.
- e) List out the kinematic indicators of shear zones. Comment on their use in shear sense analysis?
- f) Discuss about the various foundation problems that can be occurred during the construction of bridges.
- g) Critically analyze the role of Geology in Civil Engineering.
- h) What are the factors controlling the stability of slopes and how we can improve the stability using engineering techniques?
- i) How are dip isogons used in Ramsay's classification of folds.
- j) Explain the concept of stereographic projection. Comment on its use in structural analysis.

- k) Describe the use of minor folds in determining the associated major fold structure
- l) Analyze the significance of axial plane cleavages and fracture cleavages in structural analysis. (9x5=45 marks)

**Model Question Paper**  
**First Semester M.Sc Geology Degree Examination**  
**GL 213- Crystallography and Mineralogy**  
**(2020 Admission Onwards)**

**Time: 3 hours**

**Max Marks: 75**

**Answer all questions**  
**Draw neat sketches wherever necessary**

I.

- a) Discuss in detail the identification of different minerals from XrayDiffractogram. Add a noyte on Bragg's law  
Or
- b) Explain the elements of symmetry and forms present in the normal class of Isometric system (1x15=15 Marks)

II.

- a) Give an account of silicate structure, Chemical and optical properties of Pyroxene Group of minerals.  
Or
- b) What are biaxial minerals? Write detailed notes on a) Biaxial Indicatrix b) Optic sign and orientation in biaxial minerals and c) Biaxial interference figures (1x15=15 Marks)

III. Write short notes on any **nine** of the following:-

- a) What is interfacial angle? Explain the measurement of interfacial angle with contact goniometer.
- b) Differentiate Hemimorphic and enantiomorphic forms
- c) Give an account on polysynthetic twinning
- d) Recall Repetition theory
- e) Describe Snell's law
- f) Exemplify Twinkling on minerals with examples
- g) Give a note on physical and optical properties, chemical composition of clay minerals.
- h) Classification of gemstones
- i) Explain Optical accessories
- j) Summarise Garnet family
- k) Exemplify with examples

- 1) Give a brief account of Solid solution in minerals  
(9x5=45 Marks)

**Model Question Paper**  
**Second Semester M.Sc Geology Degree Examination**  
**GL 221- Environmental Geology**  
**(2020 Admission Onwards)**

**Time: 3 hours**

**Max Marks: 75**

**Answer all questions**  
**Draw neat sketches wherever necessary**

I.

- a) Explain in detail about the role of medical geology in human health  
Or  
b) Write an essay on Environmental Impacts of Mining and construction of dams and tunnels. (1x15=15 Marks)

II.

- a) Describe ground water pollution, causes and effects. Add a note on current ground water scenario in India.  
Or  
c) Explain the Role of geologist in environmental studies and briefly explain about the need of environment protection. (1x15=15 Marks)

III. Write short notes on any **nine** of the following:-

- a) What is Land reclamation?
- b) Explain Radioactive waste
- c) Classification of Renewable resources
- d) Summarise Carbon sequestration
- e) Give a note on Water logging
- f) Explain Hazard zonation maps
- g) Discuss EIA
- h) Classify Air pollution
- i) Describe Sustainable development
- j) Give a brief description on Earthquake prediction
- k) Comparison of Land slides
- l) Explain about Seismic zones of India (9x5=45 Marks)

**Model Question Paper**  
**Second Semester M.Sc Geology Degree Examination**  
**GL 222- Sedimentology and Geochemistry**  
**(2020 Admission Onwards)**

**Time: 3 hours**

**Max Marks: 75**

**Answer all questions**  
**Draw neat diagrams wherever necessary**

I (a) Describe in detail about sedimentary facies and its role in understanding depositional environments

Or

(b) Discuss about Primary sedimentary structures. Add a note on the significance of primary sedimentary structures. (1x15= 15 Marks)

II (a) Discuss about the significance of rare earth elements in understanding geochemical evolution of mantle and crust.

Or

(b) Explain Gibbs phase rule and its applications in geochemistry.

(1x15=15 Marks)

III Write short notes on any **nine** of the following:-

Exemplify Evaporites .a

- b. Differentiate Scour and Scour marks
- c. Define Diagenesis
- d. Classify Carbonate platform
- e. Give an account of Stable isotopes
- f. What are Conglomerates?
- g. Discuss about textures of sedimentary rocks
- h. Recall Dolomitisation
- i. Give a note on Eh-pH diagram
- j. What is Reynolds Number
- k. Summarise Diagenesis of limestone
- l. sediment transport mechanisms (9x5=45 Marks)

**Model Question Paper**  
**Second Semester M.Sc Geology Degree Examination**  
**GL 223- Remote Sensing and Geographic Information System Applications**  
**(2020 Admission Onwards)**

**Time: 3 hours**

**Max Marks: 75**

**Answer all questions**  
**Draw neat diagrams wherever necessary**

**I.** (a) Write a note on concept of Remote sensing and Electromagnetic Spectrum.

Or

(b) Write a note on Aerial Photography- types of aerial photographs.

(1×15=15 Marks)

**II.** (a) Briefly explain digital image processing with particular reference to remote sensing data.

Or

(b) Write an essay on Microwave remote sensing.

(1×15=15 Marks)

**III.** Write short notes on any **nine** of the following.

(a) Define GIS and its components.

(b) Discuss Stereoscopic parallax.

(c) Give a brief note on Multispectral scanner.

(d) Application of GIS.

(e) Describe IRS series of satellite.

(f) Differentiate Vector and Raster data.

(g) Give an account of Map overlay.

(h) Summarise GIS database.

(i) Thermal IR remote sensing.

(j) Analyse Types of resolution.

- (k) Define Buffering.  
(l) Explain Digital Terrain Model.

(9×5=45 Marks)

**Model Question Paper**  
**Third Semester M.Sc Geology Degree Examination**  
**GL 231- Stratigraphy and Paleontology**  
**(2020 Admission Onwards)**

**Time: 3 hours**

**Max Marks: 75**

**Answer all questions**  
**Draw neat diagrams wherever necessary**

I. a) Describe the stratigraphic principles in geology

Or

b) Discuss the boundary problems in Indian stratigraphy (1×15=15 Marks)

II. a) Write an essay on the Morphology, Geological Range, Classification and Applications of Foraminifera

Or

b) Explain the importance of microfossils in palaeoclimatic studies

(1×15=15 Marks)

II. Write short notes on any nine of the following

- a) Describe Crustal evolution
- b) Explain Siwalik vertebrate fauna
- c) Discuss Geologic time scale
- d) GSSP
- e) What are Nano fossils and their applications
- f) Give short notes on Ostracods
- g) Analyse Precambrian shield of India
- h) Summarise about Nature of fossil records
- i) Explain Mobile belt concept
- j) Classification of Deccan traps
- k) Discuss Evolution of Man
- l) Give an account of Magnetostratigraphy

(9×5=45 Marks)

**Model Question Paper**  
**Third Semester M.Sc Geology Degree Examination**  
**GL 232- Igneous and Metamorphic Petrology**  
**(2020 Admission Onwards)**

**Time: 3 hours**

**Max Marks: 75**

**Answer all questions**  
**Draw neat diagrams wherever necessary**

- I. a) Describe the simple basalt system of Barth  
Or  
b) Describe the intrusive rocks of Kerala (1x15=15 Marks)
- II. a) Explain clock wise and anti clock wise P-T paths. Add a note on their tectonic significance  
Or  
a) b) Critically evaluate the different models put forth to explain the origin of charnockites. (1x15=15 Marks)
- III. Write short notes on any **nine** of the following:-
- a) Application of phase rule in igneous petrology
  - b) Discuss Crystallisation and zoning in plagioclase feldspar
  - c) Illustrate Chemographic diagrams
  - d) Describe Mixing and mingling of magma
  - e) Explain IUGS classification of Peridotites
  - f) What are Layered Igneous complexes
  - g) Write short notes on Continental alkaline rocks
  - h) State Schreinmarker's rule and bundle
  - i) Differentiate Impact and shock metamorphism
  - j) Distinguish between Prograde and retrograde metamorphism
  - k) Analyse Migmatites and anatexis

- 1) Summarise about Snow ball garnet  
(Marks)

(9x5=45)

**Model Question Paper**  
**Third Semester M.Sc Geology Degree Examination**  
**GL 233- Hydrogeology**  
**(2020 Admission Onwards)**

**Time: 3 hours**

**Max Marks: 75**

**Answer all questions**  
**Draw neat diagrams wherever necessary**

(a). Explain with neat diagram the hydrological cycle and its components. Add a note on ground water in hydrological cycle.

Or

(b) Write an essay on vertical distribution of subsurface water and types of aquifers.  
(1x15 = 15 Marks)

II.

(a). Write an essay on significances of ground water quality. Add a brief note on ground water sample collection and analysis.

Or

(b). Explain the problems associated with coastal aquifers and remedial measures.  
(1x15 = 15 Marks)

III. Write short notes on any **nine** of the following:-

- a) Classification of sub surface water
- b) Types of water
- c) Explain Aquifer properties of rocks
- d) Describe Types of aquifers
- e) Experimental verification of Darcy's Law
- f) Applications of Flow net
- g) Application of Remote sensing in Ground water
- h) Give short notes on types of geoelectrical surveys

- i) Discuss Maintenance of production well
- j) Analyse Problems of ground water quality due to contamination of fluoride
- k) Summarise Artificial ground water recharge
- l) Give an account of Salt water intrusion (9x5=45 Marks)

**Model Question Paper**  
**Fourth Semester M.Sc Geology Degree Examination**  
**GL 241- Economic Geology**  
**(2020 Admission Onwards)**

**Time: 3 hours**

**Max Marks: 75**

**Answer all questions**  
**Draw neat diagrams wherever necessary**

I.(a) How plate tectonics controls the ore mineralization process? Explain on the light of metallogenic provinces.

Or

(b) List out the different types of Fe ores and add note on Fe deposits of Bailadila and Kudremukh. (1x15=15 Marks)

II (a) Differentiate between the process of formation and maturation of coal and petroleum. Where India stands in the reserves of both of these fuels?

Or

(b) Describe the genetic classification of ore deposits and explain the formation of Cr deposits in the ultramafic environment. (1x15=15 Marks)

III. Write short notes on any **nine** of the following

- a) Analyze the significance of fluid inclusion studies
- b) Describe the process of formation of Sn deposits
- c) Explain the association of Cu-Co, Cu-Mo and Cu-Ni in various Cu deposits
- d) Compare the characteristics of ore textures formed by open space filling and replacement
- e) Stratabound and stratiform deposits with examples

- f) Differentiate between the maceral groups found in coal
- g) Discuss the controlling factors of U mineralization in different types of U deposits
- h) Explain the process of mobilization of metals from source in hydrothermal process with suitable examples
- i) Critically analyse the National Mineral Policy of India
- j) What are the commonly observed microscopic properties of ore minerals and in what way ore microscopy is different from petrological microscopy
- k) Explain the significance of association of kimberlites and diamonds
- l) Comment on the classification of petroleum basins in India.

(9x5=45 Marks)

**Model Question Paper**  
**Fourth Semester M.Sc Geology Degree Examination**  
**GL 242- Exploration Geology**  
**(2020 Admission Onwards)**

**Time: 3 hours**

**Max Marks: 75**

**Answer all questions**  
**Draw neat diagrams wherever necessary**

**I.** (a) Briefly explain the stages of exploration.

Or

(b) Write an essay on drilling and types of drilling.

(1×15=15 Marks)

**II.** (a) Write an essay on gravity survey-principles, gravity correction and anomaly.

Or

(b) Write an essay on electrical surveys.

(1×15=15 Marks)

**III.** Write short notes on any **nine** of the following.

- a) Describe Sampling.
- b) Discuss Types of seismic waves.
- c) What are Coal bed methane.
- d) Give a note on Exploration of polymetallic nodules.
- e) Explain about Drilling mud-its role and effects on logging.
- f) Summarise Sonic logging.

- g) Describe Soil sampling.
- h) Exemplify Geobotanical indicators.
- i) Applications of Trace elements.
- j) Comment on Components of Earth's Magnetic behaviour.
- k) Discuss Types of Magnetic behaviour.
- l) Analyse Methods of biogeochemical prospecting for ore deposits.

(9×5=45 Marks)

**Model Question Paper**  
**Fourth Semester M.Sc Geology Degree Examination**  
**GL 243- Applied Geology and Geostatistics**  
**(2020 Admission Onwards)**

**Time: 3 hours**

**Max Marks: 75**

**Answer all questions**

- I (a) Briefly discuss about underground mining method

Or

- (b) Briefly discuss about coal mining methods and give a short note on Neyveli Lignite Formation (1×15= 15 Marks)

- II (a) Write about sampling types in data collection and its parameters.

Or

- (b) Write essay about mining of beach placers of Kerala

(1×15= 15 Marks)

- III Write short notes on any **nine** of the following:-

- a) Explain mining closure plan
- b) Give short notes about crushing and its instruments
- c) Mining legislation in India
- d) Define standard deviation and applications

- e) Define multiplication theorem
  - f) Define Binomial and Poisson
  - g) Discuss Factor Analysis
  - h) Define Scale of measurements
  - i) Define floatation process
  - j) What is Non parametric test
  - k) Analyse Electrostatic separation
  - l) Describe Open cast mining extraction methods
- (9x5= 45 Marks)