

Total No. of Questions : 8]

[Total No. of Pages :2

P 885

[4037] - 101

M.Sc. (Sem. - I)

GEOLOGY

GL - 101 : Mineralogy

(2008 Pattern)

Time : 3 Hours]

[Max Marks : 80

Instructions to the candidates :

- 1) *You are advised to attempt not more than 5 questions.*
- 2) *All questions carry equal marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*

Q1) Write in details about Bravais Lattices.

Q2) What is conoscopic light? Explain generation of uniaxial interference figure. How is their Optical sign determined with the help of interference figure?

Q3) What is X-ray diffraction? Explain how X-ray diffraction methods are useful in mineral investigation?

Q4) Write notes on: any two

- a) Paragenesis of olivine.
- b) Isomorphism in Felspars.
- c) Epidote minerals.
- d) Structure and varieties of Zeolite minerals.

Q5) Give an account of structure, chemical composition, Paragenesis and alteration products of ortho-pyroxene minerals.

Q6) Give an account of structure, chemical composition and paragenesis of alkali-felspars.

P.T.O.

Q7) Write on the structure, chemical composition and paragenesis of Mica minerals.

Q8) Write notes on : any two

- a) Symmetry Operations.
- b) Characteristic axes of symmetry for 7 crystal systems.
- c) Biaxial indicatrix.
- d) Isotropic and anisotropic minerals.

⌘⌘⌘

Total No. of Questions : 8]

[Total No. of Pages : 1

P886

[4037]-102

M.Sc. (Sem. - I)

GEOLOGY

**GL - 102 : Principles of Stratigraphy & Palaeontology
(2008 Pattern)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) You are advised to attempt not more than 5 questions.*
- 2) All questions carry equal marks.*
- 3) Neat diagrams must be drawn wherever necessary.*

Q1) Describe in brief the subsurface methods of establishment of stratigraphic column.

Q2) Explain the term biostratigraphy. Write in detail on the biostratigraphic zones and their significance in well to well correlation.

Q3) Describe in brief the formal chronostratigraphic units.

Q4) Write notes on any two of the following :

- a) Geological time scale
- b) Unconformity
- c) Marine transgression
- d) Uniformitarianism

Q5) Write on the criteria for the classification of foraminifera.

Q6) Write a detailed account of morphology of Hard parts in Brachiopoda.

Q7) Write on the field and laboratory Procedures used in processing samples for micropalaeontological studies.

Q8) Write notes on any two of the following :

- a) Corals and their significance
- b) Index fossil
- c) Comparison between ammonoids and nautiloids
- d) Extinction



Total No. of Questions : 8]

[Total No. of Pages : 1

P887

[4037]-103

M.Sc. (Sem. - I)

GEOLOGY

GL - 103 : Physics & Chemistry of the Earth

(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) You are advised to attempt not more than 5 questions.*
- 2) All questions carry equal marks.*
- 3) Neat diagrams must be drawn wherever necessary.*

Q1) Give a detailed classification of meteorites.

Q2) What are quasars? Describe the quasar red shift.

Q3) What are various factors responsible to cause earthquake. Explain.

Q4) Write short notes on (any two) :

- a) Globular clusters.
- b) Stellar evolution from protostars.
- c) Shadow zone.
- d) β rays

Q5) Explain in detail the internal structure of the earth.

Q6) Explain the formation and radioactive behaviour of C^{14} .

Q7) Discuss the role of outer core in the generation of earth's magnetic field.

Q8) Write short notes on (any two) :

- a) Magnetic lineation
- b) Age of the earth
- c) Isotopes
- d) Meteor showers.



Total No. of Questions : 8]

[Total No. of Pages : 1

P888

[4037]-104

M.Sc. (Sem. - I)

GEOLOGY

GL - 104 : Sedimentology

(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) You are advised to attempt not more than 5 questions.*
- 2) All questions carry equal marks.*
- 3) Neat diagrams must be drawn wherever necessary.*

Q1) Give brief account of factors controlling texture of sediments. Write a note on importance of granulometric analysis.

Q2) What are evaporites? Describe the types of evaporite deposits. Comment on their genesis.

Q3) What are tracks and trails? Explain their types with environmental significance.

Q4) Write brief account of deltaic sediments.

Q5) Write short notes on any two of the following.

- a) Source and genesis of phosphorites
- b) Flysch and molasse
- c) Subaqueous surface textures.
- d) Primary and secondary dolomites

Q6) What do you mean by Reynold's and Fraude Numbers? Comment on the sedimentary gravity flow.

Q7) Describe in brief importance of crossbedding in paleocurrent analysis with a note on tilt correction.

Q8) Write short notes on any two of the following.

- a) Weathering and its types.
- b) Volcano clastic sediments.
- c) Stromatolites
- d) Clay minerals in mudstone.



Total No. of Questions : 8]

[Total No. of Pages : 1

P889

[4037]-201

M.Sc. - I (Sem. - II)

GEOLOGY

GL - 201 : Igneous Petrology

(2008 Pattern) (New)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *You are advised to attempt not more than 5 questions.*
- 2) *All questions carry equal marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*

- Q1)** Explain the terms textures and structures of the Igneous rocks. Describe the different types of textures of the Igneous rocks.
- Q2)** Explain the importance of trace elements in igneous petrogenesis.
- Q3)** Give the historic perspective of the classification of Igneous rocks.
- Q4)** Write notes on (any two) :
- | | |
|--------------------------|---------------------------------------|
| a) Hot spots. | b) Igneous rocks at subduction zones. |
| c) Anatomy of the Earth. | d) Ophiolites. |
- Q5)** Give the account of Amba Dongar carbonatites with respect to their geographical distribution and structural characters.
- Q6)** Enlist different separation mechanisms to remove crystals from the magma. Describe any two processes in detail.
- Q7)** Give detailed account of Deccan Volcanic Province with respect to its geographical distribution, tectonic setting and stratigraphy.
- Q8)** Write notes on (any two) :
- a) Origin and occurrence of Anorthosite.
 - b) Zone melting.
 - c) Bushveld complex.
 - d) Binary system showing complete solid solution.



Total No. of Questions : 8]

[Total No. of Pages : 1

P890

[4037]-202

M.Sc. - I (Sem. - II)

GEOLOGY

GL - 202 : Metamorphic Petrology

(2008 Pattern) (New)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) You are advised to attempt not more than 5 questions.*
- 2) All questions carry equal marks.*
- 3) Neat diagrams must be drawn wherever necessary.*

- Q1)** Define metamorphism. Explain types of metamorphism. Give a brief account of their controlling factors.
- Q2)** Describe in detail element exchange and P-T conditions of isograds in metamorphic Petrology.
- Q3)** What is Prograde and Retrograde metamorphism? Differentiate with suitable examples between prograde and retrograde metamorphism.
- Q4)** Explain the concept of paired metamorphic belts, with the help of a suitable examples. Explain their significance and origin.
- Q5)** Write notes on any two of the following :
- a) Metamorphic facies series.
 - b) Metamorphic phase diagrams.
 - c) ACF diagram.
 - d) Common minerals of metamorphic rocks.
- Q6)** Describe the orogenic metamorphism of dolostone with PTX phase relationship.
- Q7)** Give an account of regional metamorphism of basic and ultrabasic rocks.
- Q8)** Write notes on any two of the following:
- a) Metasomatism.
 - b) Impact Metamorphism.
 - c) Metamorphic facies of burial metamorphism.
 - d) Textures related to recrystallisation.



Total No. of Questions : 8]

[Total No. of Pages : 1

P891

[4037]-203

M.Sc. - I (Sem. - II)

GEOLOGY

GL - 203 : Structural Geology and Tectonics

(2008 Pattern) (New)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *You are advised to attempt not more than 5 questions.*
- 2) *All questions carry equal marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*

Q1) What is stress? Explain the behaviour of rocks under different stress conditions.

Q2) Explain jointing and fracturing in rocks.

Q3) Describe the elements of fold. Explain the genetic aspects of folds.

Q4) Write notes on (any two)

- a) Microstructures of deformed rocks.
- b) Tension Gashes.
- c) Component of stress.
- d) Slaty cleavages.

Q5) Discuss the evidences which supported the concept of continental drift.

Q6) What are convection currents? Explain and discuss.

Q7) Define subduction. Describe the magmatism related to convergent plate margins.

Q8) Write notes on (any two)

- a) Obduction
- b) Ophiolites
- c) Magnetic strip
- d) Heat flow.



Total No. of Questions : 8]

[Total No. of Pages : 2

P892

[4037] - 204

M.Sc. - I (Sem. - II)

GEOLOGY

**GL - 204 : Geomorphology and Remote Sensing in
Geology**

(2008 Pattern) (New)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) You are advised to attempt not more than 5 questions.*
- 2) All questions carry equal marks.*
- 3) Neat diagrams must be drawn wherever necessary.*

Q1) Explain with the help of neat diagrams the development of valleys.

Q2) Write an account of erosional landforms created by the action of sea.

Q3) What are “Neotectonic movements”? Write an account of signatures of neotectonism.

Q4) Write notes on any two of the following:

- a) Types and tools in geomorphology
- b) Delta and its types
- c) Fjords
- d) Geomorphic zones of India

Q5) What is photogrammetry? Write an account of determination of dip amount from the aerial photographs.

Q6) Write an account of photointerpretation of the following:

- a) Basalt
- b) Granite
- c) Limestone
- d) Sandstone

P.T.O.

Q7) Write an account of advantages and disadvantages of satellite data over aerial photographs.

Q8) Write notes on any two of the following:

- a) Stefan Boltzman Law
- b) Atmospheric windows
- c) SLAR and its image interpretation
- d) Tone and scale of aerial photographs.



Total No. of Questions : 8]

[Total No. of Pages : 2

P893

[4037]-301

M.Sc. (Sem. - III)

GEOLOGY

GL - 302 : Exploration Methods

(2008 Pattern) (New)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) You are advised to attempt not more than 5 questions.*
- 2) All questions carry equal marks.*
- 3) Neat diagrams must be drawn wherever necessary.*

Q1) Discuss the concept of Total field Intercity and explain how Magnetic anomalies are generated? Describe the modeling techniques developed in Magnetic method.

Q2) Explain the principle of seismic Reflection method, and briefly describe the terms, zero off-set time, normal move out, CDP technique and multiple coverage.

Q3) What is Geochemical dispersion? Distinguish between Primary and Secondary dispersion.

Q4) Write notes on. (any two)

- a) Geobotanical indicators,
- b) Seismic instruments.
- c) La Coste-Romberg Gravimeter,
- d) Radioactivity logging.

Q5) Describe the self-potential method with reference to principle, instruments and field procedures.

Q6) Describe the field procedures involved in Resistivity method and explain the problems associated with the interpretation of Resistivity data.

P.T.O.

Q7) Describe the induced polarization method with reference to principles, processes causing I.P and applications.

Q8) Write notes on (any two):

- a) Electrical logging methods.
- b) Delay time method.
- c) Parallel line dip angle method.
- d) Geochemical Provinces.



Total No. of Questions : 8]

[Total No. of Pages : 2

P894

[4037]-302

M.Sc. (Sem. - III)

GEOLOGY

GI - 303 : Petroleum Geology

(2008 Pattern) (New)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) All questions carry equal marks.*
- 2) Attempt not more than 5 questions.*
- 3) Draw neat labelled diagrams wherever necessary.*

Q1) What are reservoir rocks? Explain the factors responsible to form a reservoir rock. Add a note on fragmental reservoir rock.

Q2) Describe the classification and composition of petroleum.

Q3) Enlist methods of Geophysical prospecting in hydrocarbon exploration. Explain types of seismic exploration and its advantage in petroleum exploration.

Q4) Write notes on. (any two)

- a) Cambay Basin.
- b) Physical and optical properties of petroleum.
- c) Source rock.
- d) Subsurface maps.

Q5) Write an account of stratigraphy, structure and reservoir characteristics of Krishna-Godavari Basin.

Q6) Mention the Uses of well logging. Enlist the types of well logging. Explain self Potential or SP logs.

Q7) Explain the surface and subsurface modes of occurrence of petroleum. Add a note on accumulation of petroleum.

P.T.O.

Q8) Write notes on. (any two)

- a) Structural traps.
- b) Inorganic origin of petroleum.
- c) Demand and production of crude oil in India.
- d) Types of drilling operations.



Total No. of Questions : 8]

[Total No. of Pages :2

P 895

[4037] - 303

M.Sc. (Sem. - III)

Geology

GL - 304 : Engineering Geology and Geotechniques

(2008 Pattern) (New)

Time : 3 Hours]

[Max Marks : 80

Instructions to the candidates :

- 1) *Your are advised to attempt not more than 5 questions.*
- 2) *All questions carry equal marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*

- Q1)** Give an Account on the formation and Engineering use of soils.
- Q2)** What do you mean by the term 'Reservoir'. Write on the sieting of Reservoirs.
- Q3)** Explain in detail the Engineering properties of rocks which are used as building stones and road Material.
- Q4)** What do you understand by the term 'Geo Techniques' write the use of Remote sensing methods in Engineering Geology.
- Q5)** Write notes on: (any two)
- a) Significance of faults and folds in Engineering Geology.
 - b) Glacial soil and Glacial Deposits.
 - c) Topographic maps and their utility in Civil Engineering.
 - d) Types of Bridges.
- Q6)** Explain the term 'Landslide'. Discuss your Answer with special reference to its types and causes.

P.T.O.

Q7) What is the meaning of Earth work?. Discuss Embankment foundations and Embankment Control.

Q8) Write notes on : (any two)

- a) Tunnels in faulted zones.
- b) Basic features of Permafrost.
- c) Buttress Dams.
- d) Importance of Geology in Civil Engineering.

Total No. of Questions : 8]

[Total No. of Pages : 1

P896

[4037]-304

M.Sc. (Sem. - III)

GEOLOGY

**GL - 305 : Computer Applications in Geology &
Geographical Information Systems
(2008 Pattern) (New)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) You are advised to attempt not more than 5 questions.*
- 2) All questions carry equal marks.*
- 3) Neat diagrams must be drawn wherever necessary.*

- Q1)** What is GIS? Explain in details how GIS differs from other related systems.
- Q2)** Give basic organization of a computer. What is hardware and software? Distinguish between Application software and systems software.
- Q3)** What is data in GIS? Explain types of data. Write in details on primary geographic data capture methods involved in GIS.
- Q4)** Write notes on. (any two) :
- a) Conic projection.
 - b) Adjacency, Containment and connectivity.
 - c) Components of GIS.
 - d) Buffer Analysis.
- Q5)** Give input devices for computer graphics. Explain any two in details.
- Q6)** What is TIN and DEM? Explain in details construction of DEM.
- Q7)** Explain various types of overlay operations in GIS.
- Q8)** Write notes on. (any two) :
- a) Principle of duality in Boolean Algebra.
 - b) Universal Gates.
 - c) Algorithm.
 - d) Binary and hexadecimal number systems.



Total No. of Questions : 8]

[Total No. of Pages : 2

P897

[4037] - 401

M.Sc. - II (Sem. - IV)

GEOLOGY

GL - 401 : Economic Geology

(2008 Pattern) (New)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) You are advised to attempt not more than 5 questions.*
- 2) All questions carry equal marks.*
- 3) Neat diagrams must be drawn wherever necessary.*

Q1) Explain in details the structural controls for ore localization.

Q2) a) Write on physico-chemical principles of ore-deposition.

b) Write on types of ore forming fluids.

Q3) Write about classification and genesis of Fe (Iron) deposits and give their geological and geographical distribution.

Q4) Give classification and genesis of lead and zinc deposits and explain their geological and geographical distribution.

Q5) Write notes on any Two :-

- a) Gangue, grade and Tenor of Ore.
- b) Genetic classification of ore deposits.
- c) Placer deposits.
- d) Sublimation deposits.

Q6) Give classification and genesis of coal deposits and explain their geological and geographical distribution.

Q7) What are magmatic deposits? Explain them in details.

P.T.O.

Q8) Write notes on. any Two

- a) Objectives of National mineral Policy.
- b) Baryte deposits.
- c) Chromite deposits.
- d) Skarn mineralogy.



Total No. of Questions : 8]

[Total No. of Pages : 2

P898

[4037]-402

M.Sc. - II (Sem. - IV)

GEOLOGY

GL - 402 : Mining Geology, Gemmology and Industrial Mineralogy

(2008 Pattern) (New)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *You are advised to attempt not more than 5 questions.*
- 2) *All questions carry equal marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*

Q1) Enlist various types of 'guides'. Explain structural and Mineralogical guides in details with the help of suitable examples.

Q2) What are percussion drills? Explain them in details.

Q3) What are various methods of mining? Explain underground mining in details.

Q4) Write notes on. (any two)

- a) Ringed targets.
- b) Residual deposits.
- c) Gem treatments.
- d) Colour in gemstones.

Q5) What is a polariscope? Give its construction and use. Explain how following gem-pairs can be identified with the help of polariscope.

- a) Emerald & green fluorite.
- b) Diamond & rock crystal.
- c) Blue tourmaline & blue cubic zirconia.
- d) Sard & hessonite garnet.

P.T.O.

- Q6)** Describe the corundum gem species with respect to its varieties, chemical composition, crystal system, physical and optical properties, characteristic inclusions and occurrences.
- Q7)** Which minerals are used as raw material in construction Industry? Give detailed account of any two of them with respect to their characteristic properties, chemical composition and industrial specification.
- Q8)** Write notes on. (any two)
- a) Basic refractories.
 - b) Gypsum as an industrial mineral.
 - c) Abrasives.
 - d) Mineral pigment.



Total No. of Questions : 8]

[Total No. of Pages : 1

P899

[4037]-403

M.Sc. - II (Sem. - IV)

GEOLOGY

GL - 403 : Environmental Geology

(2008 Pattern) (New)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) You are advised to attempt not more than 5 questions.*
- 2) All questions carry equal marks.*
- 3) Neat diagrams must be drawn wherever necessary.*

Q1) Define biogeochemical cycle. Describe the carbon cycle.

Q2) Describe the classification of soil. Add a note on soil salinity and alkalinity.

Q3) What is groundwater? Explain the causes of groundwater pollution.

Q4) Write notes on. (any two)

- a) Lithosphere.
- b) Structure and composition of Atmosphere.
- c) Concepts of environmental science.
- d) Nitrogen cycle.

Q5) Explain the causes of landslides. Comment on the prediction and mitigation of landslides.

Q6) What are cyclones? Describe the types of cyclones. Add note on the causes of cyclones.

Q7) Describe the impacts of coal utilization comment on the impact of fly ash.

Q8) Write notes on. (any two)

- a) Volcanic Hazards.
- b) Types of mining activities.
- c) Effect of earthquakes.
- d) Recycling of resources.



Total No. of Questions : 8]

[Total No. of Pages : 1

P900

[4037]-404

M.Sc. - II (Sem. - IV)

GEOLOGY

**GL - 404 : Hydrogeology, Watershed Development and
Management**

(2008 Pattern) (New)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) You are advised to attempt not more than 5 questions.*
- 2) All questions carry equal marks.*
- 3) Neat diagrams must be drawn wherever necessary.*

- Q1)** What are different geological methods of groundwater exploration? Describe one geophysical method for groundwater exploration in detail.
- Q2)** Describe the factors controlling occurrence of groundwater.
- Q3)** State factors governing quality of groundwater. Explain the parameters used for agriculture water use.
- Q4)** Write notes on (any two).
- a) Zone of aeration.
 - b) Tracer techniques.
 - c) Role of Aerial photographs in groundwater investigations.
 - d) Porosity.
- Q5)** What is watershed? Explain the characteristics of the watersheds.
- Q6)** Describe the measures taken to develop the watershed at Ralegan Siddhi-a case study.
- Q7)** Describe the importance of conjunctive use of surface and groundwater resources.
- Q8)** Write notes on (any two)
- a) Subsurface dams.
 - b) Recharge structures.
 - c) Water balance equation.
 - d) Rain water harvesting in urban areas.

