

Total No. of Questions : 8]

SEAT No.:

P800

[Total No. of Pages : 2

[4137]-101

M.Sc.

GEOLOGY

GL - 101 : Mineralogy

(2008 Pattern) (Sem. - I)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

Q1) What are symmetry operations? Describe proper and improper symmetry operations.

Q2) Give an account of chemical composition, physical and optical properties and paragenesis of Amphibole mineral group.

Q3) What is convergent polarised light? Explain the formation of uniaxial interference figure.

Q4) Give an account of chemical composition, physical and optical properties and paragenesis of Alumino-Silicates.

Q5) Write notes on Any Two :

- a) Use of accessory plates.
- b) Paragenesis of olivine minerals.
- c) Bravais lattices.
- d) Clino pyroxenes.

Q6) What is understood by the terms isotropic minerals and anisotropic minerals? Explain their behaviour between cross polarised light.

Q7) Give an account of structure, chemical composition and paragenesis of calc-alkali feldspars.

P.T.O.

Q8) Write notes on Any Two :

- a) Biaxial indicatrix for a positive mineral.
- b) Aluminous garnets.
- c) Paragenesis and silicate structure of micas.
- d) Paragenesis and silicate structure of zeolite minerals.



Total No. of Questions : 8]

SEAT No.:

P801

[Total No. of Pages : 2

[4137]-102

M.Sc.

GEOLOGY

GL - 102 : Principles of Stratigraphy and Palaeontology

(2008 Pattern) (Sem. - I)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

Q1) What is stratigraphy? Enumerate your answer on the criteria used for lithostratigraphy.

Q2) Explain the term correlation. Enumerate your answer giving details on the stratigraphic correlation. Add a note on its significance.

Q3) Attempt Any Two :

- a) Marine Transgression.
- b) Dinosaurs.
- c) Magnetostratigraphy.
- d) Rotary Drilling.

Q4) Attempt Any Two :

- a) Sequence stratigraphy.
- b) Index fossil.
- c) Unconformity.
- d) Extinction.

Q5) Write on the morphology of the Bivalve shell.

Q6) Describe 'Fossil'. Enumerate your answer giving their significance in establishing biostratigraphy.

P.T.O.

Q7) Attempt Any Two :

- a) Aperture and chamber in foraminifera.
- b) Wet sieving in separation of calcareous microfossils.
- c) Pollen and spores.
- d) Uses of Microfossils.

Q8) Attempt Any Two :

- a) Hinges in Ostracods.
- b) Types of microfossils.
- c) Comparison between bivalve and brachiopod.
- d) Corals and their significance.



Total No. of Questions : 8]

SEAT No.:

P802

[Total No. of Pages : 1

[4137]-103

M.Sc.

GEOLOGY

**GL - 103 : Physics and Chemistry of the Earth
(2008 Pattern) (Sem. - I)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

Q1) Explain in detail the internal structure of the earth, with the help of diagram.

Q2) Give a detailed account of meteorites and their classification.

Q3) What is the principle of isotopic dating? Describe the decay schemes and derive the equation of age.

Q4) Write short notes on (Any Two) :

- a) Orbital dynamics of Earth-moon system.
- b) U-Th-Pb method of dating.
- c) Shape and mass of the Earth.
- d) Laws of Thermodynamics.

Q5) Discuss the nature and role of outer core in generating Earth's magnetic field.

Q6) What is meant by gravity anomalies? Explain their interpretation and significance at length.

Q7) Give a detailed account of nucleo-synthesis and stellar evolution.

Q8) Write short notes on (Any Two) :

- a) Globular clusters.
- b) Structure and atomic properties of elements.
- c) Density Vs Depth Profile.
- d) Synthesis of heavier elements in stars.



Total No. of Questions : 8]

SEAT No.:

P803

[Total No. of Pages : 1

[4137]-104

M.Sc.

GEOLOGY

**GL - 104 : Sedimentology
(2008 Pattern) (Sem. - I)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

Q1) What is Newton's Law of viscosity? Explain and define dynamic viscosity.

Q2) Define texture of a sedimentary rock. Comments on the granulometric analysis.

Q3) What are biogenic structures? Describe the types of feeding and dwelling structures. Add a note on its environmental significance.

Q4) Write notes on any three of the following :

- a) Extraformational conglomerates and breccias.
- b) Algoma type Iron formation.
- c) Shallow marine Evaporites.
- d) Geological signification of the sample statistic.

Q5) What do you mean by sedimentary facies? Describe the facies of transitional environment.

Q6) Explain the concept of sedimentation and tectonics.

Q7) Mention the structure predominant in limestones. Describe stromatolitic limestone. Add a note on its environmental significance.

Q8) Write notes on Any Two of the following :

- a) Heavy mineral and their significance.
- b) Significance of chert.
- c) Types of ripple marks.
- d) Hydrologic cycle.



Total No. of Questions : 8]

SEAT No.:

P804

[Total No. of Pages : 1

[4137]-201

M.Sc. - I

GEOLOGY

**GL - 201 : Igneous Petrology
(2008 Pattern) (Sem. - II)**

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 magma. Enlist the processes of magma formation. Give an account of any two physical properties of magma.

Q2) Explain the importance of trace elements in igneous petrogenesis.

Q3) Write on the Earth's interior with respect to seismic zonation and phase changes.

Q4) Write notes on any two :

- a) Hot spot.
- b) MORB
- c) Inequigranular textures.
- d) Igneous rocks at destructive continental margins.

Q5) What is magmatic differentiation? Describe the mechanisms of crystal fractionation along with gravitational settling process of crystal separation.

Q6) What are gabbroic layered intrusions? Explain any two of them in detail.

Q7) What is eutectic crystallization? Describe the crystallization of anorthite-silica binary system with the help of phase diagram.

Q8) Write notes on any two :

- a) Origin and occurrence of andesites.
- b) Structure of Deccan Traps.
- c) Mixing of magma.
- d) Crystallization in Albite-Anorthite-Silica ternary system.



Total No. of Questions : 8]

SEAT No.:

P805

[Total No. of Pages : 1

[4137]-202
M.Sc. I (Sem. - II)
GEOLOGY
GL - 202 : Metamorphic Petrology
(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) Define metamorphism. Explain types of metamorphism. Give a brief account of their controlling factors.

Q2) Explain the concept of metamorphic facies with the help of diagram. Explain the metamorphic facies of contact metamorphism.

Q3) What is prograde and retrograde metamorphism? Differentiate between them.

Q4) Write notes on Any Two of the following :

- a) Metamorphic phase diagram.
- b) ACF diagram.
- c) Metasomatism.
- d) Deformation textures.

Q5) Give an account of regional metamorphism of impure siliceous carbonate rocks.

Q6) Describe in brief the Barrovian metamorphism scheme of pelitic rocks.

Q7) What are paired metamorphic belts? Explain their significance and origin with the help of suitable examples.

Q8) Write notes on Any Two of the following :

- a) Impact/shock metamorphism.
- b) Charnockites.
- c) Metamorphic reactions.
- d) Metamorphism related to plate tectonics.



Total No. of Questions : 8]

SEAT No.:

P806

[Total No. of Pages : 1

[4137]-203

M.Sc. - I

GEOLOGY

**GL - 203 : Structural Geology and Tectonics
(2008 Pattern) (Sem. - II)**

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) Explain the behaviour of rock material under different stress conditions.

Q2) Give the elements and classification of folds.

Q3) What are lineations? Describe the linear structures in detail.

Q4) Write notes on (Any Two) :

- a) Joints.
- b) Concept of fabric domain.
- c) Foliations.
- d) Thrust faults.

Q5) Explain concept of sea-floor spreading on the basis of geophysical exploration.

Q6) Explain in detail the concept of continental drift.

Q7) Describe the tectonic framework of India.

Q8) Write notes on (Any Two) :

- a) Orogenic belts.
- b) Transform faults.
- c) Neotectonics and it's evidences.
- d) Benioff zone.



Total No. of Questions : 8]

SEAT No.:

P807

[Total No. of Pages : 2

[4137]-204

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

GEOLOGY

GL - 204 :Geomorphology and Remote sensing in Geology

(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) Draw neat labelled diagrams wherever necessary.*

Q1) Define weathering. Describe physical and chemical weathering.

Q2) What are glaciers? Describe the erosional and depositional landforms formed by the action of glaciers.

Q3) Explain the endogenetic and exogenetic forces responsible for landforms.

Q4) Write notes on Any Two :

- a) Neotectonic evidences.
- b) Concepts of geomorphology.
- c) Types of drainage patterns.
- d) Erosional landforms created by the action of sea.

Q5) Explain geometric characteristics of aerial photographs.

Q6) Explain parallax measurements to estimate object height and ground co-ordinate location in aerial photography.

Q7) What are different photorecognition elements? Describe tone and texture as photorecognition elements.

P.T.O.

Q8) Write notes on Any Two :

- a) Photographic scale.
- b) LANDSAT-3 M.S.S.
- c) Stefan Boltzoman and Planks Law.
- d) Classification of aerial photographs.



Total No. of Questions : 8]

SEAT No.:

P808

[Total No. of Pages : 2

[4137]-301

M.Sc.

GEOLOGY

**GL - 302 : Exploration Methods
(2008 Pattern) (Sem. - III)**

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) Describe the working principles of Astatic type of gravimeter and add a note on applications of gravity method.

Q2) Explain the principles of magnetic method and describe working principles of Rufidium Vapour Magnetometer.

Q3) Describe the salient features of refraction from a two layer dipping case and comment on response when angle of dip is greater than critical angle of refraction.

Q4) Write notes on (Any Two) :

- a) Calibration of gravimeter.
- b) Principles of EM method.
- c) Resistivity logging.
- d) Seismic instruments.

Q5) Explain the principle of Induced Polarization method and add a note on concept of electrode and electrolytic polarization.

Q6) What is Geochemical dispersion? Describe the path finder elements and geochemical distribution pattern.

Q7) Discuss the resistivity method with reference to principles, electrode arrangement and field procedures.

P.T.O.

Q8) Write notes on (Any Two) :

- a) Equipment and field procedures in S.P.Method.
- b) Principles of sampling.
- c) Caliper logging.
- d) Geobotanical survey technique.



Total No. of Questions : 8]

SEAT No.:

P809

[Total No. of Pages : 2

[4137]-302
M.Sc. (Sem. - III)
GEOLOGY
GL - 303 : Petroleum Geology
(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) All questions carry equal marks.*
- 2) You are advised to attempt not more than 5 questions.*
- 3) Draw neat labelled diagrams wherever necessary.*

Q1) Explain the organic and Inorganic origin of petroleum.

Q2) What are reservoir traps? Name different kinds of traps. Explain structural traps.

Q3) Mention the methods of Geophysical prospecting in hydrocarbon exploration. Describe the 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) Primary porosity.
- d) Reservoir fluids.

Q5) What do you mean by migration of petroleum? Discuss the primary and secondary migration.

Q6) Explain the various modes of the occurrence of petroleum.

Q7) What do you mean by well logs? Enlist different methods of well logging. Explain the borehole environment.

P.T.O.

Q8) Write notes on Any Two :

- a) Krishna-Godavari Basin.
- b) Drilling procedures.
- c) Composition of Biomass.
- d) India's position as regards to the future prospects of petroleum and natural gas.



Total No. of Questions : 8]

SEAT No.:

P810

[Total No. of Pages : 2

[4137]-303

M.Sc. (Sem. - III)

GEOLOGY

**GL - 304 : Engineering geology and Geotechniques
(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 an account on the significance of various branches of Geology in Civil Engineering.

Q2) Describe the types of Bridges. Comment on the geological consideration for the selection of bridge sites.

Q3) Write notes on Any Two :

- a) Embankment Foundations.
- b) Silting of Reservoir.
- c) Tunnel alignment in folded and faulted strata.
- d) Types of spillways.

Q4) Write on the significance of Rock as a construction material : Enumerate your answer with special reference to factors affecting engineering service of Rock.

Q5) Write notes on Any Two :

- a) Exploration for Quarries with reference to quality and supply.
- b) Aggregate Resources.
- c) Factors influencing the Crushing Strength of a rock.
- d) Selection of Dam Sites.

Q6) Explain the term “Aerial Photography” and discuss the importance of aerial photographs in engineering geology.

P.T.O.

Q7) Write on the stability of slopes and discuss the prevention of land slides.

Q8) Explain the term 'Loess'. Discuss the various engineering problems in Loess Areas.



Total No. of Questions : 8]

SEAT No.:

P811

[Total No. of Pages : 2

[4137]-304

M.Sc.

GEOLOGY

GL - 305 : Computer Applications in Geology and GIS

(2008 Pattern) (Sem. - III)

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) What is GIS? What is database in GIS? Mention functions of DBMS. Explain basic data structures in GIS.

Q2) What is Boolean Algebra? Explain the principle of duality in Boolean Algebra. How is it useful?

Q3) What are map projections? Classify map projections according to projection surface.

Q4) Write notes on Any Two :

- a) Applications of GIS.
- b) Topology.
- c) Decision Support System.
- d) Spatial Data.

Q5) What is computer graphics? Explain in details a Raster Scan Display Processing Unit.

Q6) Enlist different advanced data models used in surface representation. Write a detailed note on TIN with respect to its construction and use.

Q7) What is data editing in GIS? Why is it important? What methods are available for detecting and rectifying errors in GIS?

P.T.O.

Q8) Write notes on Any Two :

- a) Programming Languages.
- b) Input devices.
- c) NAND and NOR Gates.
- d) Octal and Binary number systems.



Total No. of Questions : 8]

SEAT No.:

P812

[Total No. of Pages : 2

[4137]-401

M.Sc. - II

GEOLOGY

GL - 401 : Economic Geology

(2008 Pattern) (Sem. - IV)

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) Write an essay on the principal types of ore deposits.

Q2) Explain the term 'Plate Tectonics'. Write on the Global Distribution of ore deposits with special reference to Plate Tectonics.

Q3) Write notes on Any Two :

- a) Factors affecting ore formation.
- b) Residual liquid segregation and injection.
- c) Meta somatic replacement - mode of interchange and stage of replacement.
- d) Controls of mineral localisation.

Q4) Write on the mode of occurrence, geological and geographic distribution and genesis of bauxite.

Q5) Explain the term 'Industrial Mineral'. Write on the uses, mode of occurrence and origin and distribution of barytes.

Q6) What do you understand by the term "Metallic Mineral Deposit"? Write on the mode of Occurrence, genesis and distribution of Manganese.

Q7) Write on the mode of occurrence, origin and distribution of copper. Add a note on its uses.

P.T.O.

Q8) Write notes on Any Two :

- a) Oxidation and supergene Enrichment.
- b) Sublimation - A process of formation of minerals.
- c) Gangue minerals and tenor of ores.
- d) Purpose and scope of Economic Geology.



Total No. of Questions : 8]

SEAT No.:

P813

[Total No. of Pages : 2

[4137]-402

M.Sc. - II

GEOLOGY

**GL - 402 : Mining Geology, Gemmology and Industrial Mineralogy
(2008 Pattern) (Sem. - IV)**

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) Explain rein pattern as guide to ore deposition.

Q2) Explain any three methods in underground mining.

Q3) Give classification of drills. Explain percussion drills in details.

Q4) Write notes on Any Two :

- a) Significance of gangue minerals.
- b) Gossans as guide to hidden deposits.
- c) Colour in gemstones.
- d) Opaque gemstones.

Q5) Enlist various gem instruments used in gem identification. Explain the use of microscope in gem identification. Give examples.

Q6) Describe corundum gem species with respect to its coloured varieties, chemical composition, crystal system, physical and optical properties, characteristic inclusions and occurrences.

Q7) Explain the term abrasive. Give a detailed account of various material used as abrasives with their characteristic properties chemical composition and industrial specifications.

P.T.O.

Q8) Write notes on Any Two :

- a) Clays as refractory material.
- b) Mica as an industrial mineral.
- c) Raw material used in construction industry.
- d) Talc in paint industry.



Total No. of Questions : 8]

SEAT No.:

P814

[Total No. of Pages : 2

[4137]-403

M.Sc. - II

GEOLOGY

GL - 403 : Environmental Geology

(Sem. - IV) (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) Draw neat labelled diagrams wherever necessary.*

Q1) Describe the causes and effects of an earthquake. Add a note on magnitude and intensity of earthquake.

Q2) Define Biogeochemical cycle. Describe carbon and sulfur cycle.

Q3) Enumerate the kinds of drinking water sources. Explain the causes of pollution of groundwater. Add a note on fluoride pollution and its effects.

Q4) Write notes on (Any Two) :

- a) Causes of droughts.
- b) Hydrosphere and Biosphere.
- c) Fundamental concepts of Environmental geosciences.
- d) Importance of recycling of resources and management.

Q5) Enumerate the kinds of mining. Explain the effects of mining activity on environment.

Q6) Define flood. Describe the causes of flood. Add a note on mitigation measures of floods.

Q7) How is soil formed? Describe a typical soil profile. Write a note on the causes of soil salinity and alkalinity.

P.T.O.

Q8) Write notes on (Any Two) :

- a) Effects and causes of cyclones.
- b) Types of volcanic hazards.
- c) Strategies for hazard management.
- d) Types of Landslides.



Total No. of Questions : 8]

SEAT No.:

P815

[Total No. of Pages : 1

[4137]-404

M.Sc. - II

GEOLOGY

**GL - 404 : Hydrogeology, Watershed Development and Management
(2008 Pattern) (Sem. - IV)**

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) Enumerate the different components of runoff cycle and explain their role in fluctuation of groundwater levels.

Q2) Explain the different aquifer properties with appropriate examples.

Q3) What is “Flow net”? Explain the construction of flownet for isotopic conditions and it’s use to calculate total quantity of water flowing through the section of an aquifer shown in the flow net.

Q4) Write notes on (Any Two) :

- a) Unconfined aquifer.
- b) Hydrological cycle.
- c) Tracer technique
- d) Field procedure of electrical resistivity method.

Q5) Discuss the need of people’s participation in watershed development activities. How people can be motivated to join these activities?

Q6) Discuss the different components of watershed development.

Q7) State factors governing quality of groundwater. Explain qualitative standards of water for industrial use.

Q8) Write notes on (Any Two) :

- a) Horton’s law of stream order.
- b) Water Balance equation.
- c) Subsurface Dams.
- d) Recharge structure.

