Total No. of Questions : 8]

SEAT No. :

P538

[Total No. of Pages : 2

[4337] - 101
M.Sc. (Semester - 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) Define a crystal. Explain the three important laws of crystallography. Write in details about classification of crystals into 7 crystal systems.

Q2) Explain the term 'Interference figure'. How is it obtained? Explain its use in determining the optic sign of uniaxial and biaxial minerals.

Q3) What is 'Bragg's law' ? Explain application of X-ray diffraction in mineralogy in details.

Q4) Write notes on <u>any two</u>:

a) Isotropic and anisotropic minerals.

b) Biaxial indicatrix.

c) Bravais Lattices.

d) Point groups in Orthorhombic and monoclinic systems.

Q5) Give an account of silicate structure, chemical composition, properties and paragenesis of Amphiboles or Clinopyroxenes.

Q6) Give an account of silicate structure, chemical composition, properties and paragenesis of clay minerals or zeolite mineral group.

P.T.O.

Q7) What is meant by indicatrix ? Explain the indicatrices in uniaxial minerals.

Q8) Write notes on <u>any two</u>:

a) Isomorphous series of Olivine.

b) Calcium garnets.

c) Al_2SiO_5 polymorphs.

d) Paragenesis of felspars.

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Total No. of Questions : 8]

SEAT No. :

P539

[Total No. of Pages : 2

[4337] - 102
M.Sc. (Semester - 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 the surface methods used in stratigraphy.

Q2) Explain the concept of lithofacies and biofacies with their significance in stratigraphy.

Q3) Define correlation and describe briefly the litho stratigraphic, biostratigraphic and time stratigraphic correlation.

Q4) Write notes on <u>any two</u> of the following :

a) Geological Time Units.

b) Magneto stratigraphy.

c) Sequence stratigraphy.

d) Principles of stratigraphy.

Q5) Describe the palaeontology of Phylum Mollusca with brief description of characteristics of class bivalvia, gastropoda and cephalopoda.

Q6) Describe the morphology of hard parts and distribution of class-Echinoidea.

P.T.O.

Q7) Discuss the evolution of Man through geological time.

Q8) Write notes on <u>any two</u> of the following :

a) Palynalogy.

b) Index fossil.

c) Mass Extinction.

d) Foraminifera.

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Total No. of Questions : 8]

SEAT No. :

P540

[Total No. of Pages : 2

[4337] - 103
M.Sc. (Semester - I)
GEOLOGY
GL - 103 : Physics and Chemistry of the Earth
(2008 Pattern)

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 the classification of meteorites.

Q2) Describe how nuclear synthesis takes place in stars.

Q3) Explain in detail the internal structure of the earth.

Q4) Write short notes (any two) :

a) Atomic Number & Mass Number.

b) H-R Diagram.

c) Bode's Law.

d) Asthenosphere.

Q5) What are Radioactive elements? Discuss radioactive behaviour of each element.

Q6) What is isotopic dating? Give the principles of atomic dating. Explain Rb-Sr method of dating of rocks.

Q7) Discuss the need of correcting magnetic declination during surveying? Explain the way in which it is corrected.

P.T.O.

Q8) Write short notes (any two) :

a) Gravity anomalies.

b) Curie temperature.

c) Carbon cycle.

d) Crustal type.

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Total No. of Questions : 8]

SEAT No. :

P541

[Total No. of Pages : 2

[4337] - 104
M.Sc. (Semester - 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) Describe the classification of primary sedimentary structures. Add a note on the significance of the primary sedimentary structures.

Q2) Define sedimentary facies. Explain the sedimentary facies of a marine environment.

Q3) Explain the concept of paleocurrent and basin analysis.

Q4) Write notes on any two of the following :

a) Evaporites.

b) Insoluble residue analysis.

c) Reynold's Number.

d) Petrography of sandstones.

Q5) Describe the procedure of heavy mineral analysis. Add a note on the significance of heavy minerals with suitable examples.

Q6) Explain the field character, petrographic characteristics of Precambrian Ironstones. Comment on the source of Iron.

P.T.O.

Q7) Describe the field procedures in sedimentary petrology.

Q8) Write notes on any two of the following :

a) Phosphorites.

b) Terms associated with sedimentation and tectonics.

c) Geologic cycle.

d) Classification of Limestones.

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Total No. of Questions : 8]

SEAT No. :

P542

[Total No. of Pages : 2

[4337] - 201
M.Sc. - I (Semester - II)
GEOLOGY
GL - 201 : Igneous 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) Explain the Physical Properties of magma.

Q2) Explain the role of trace elements in characterization of mantle domain.

Q3) Explain with suitable diagrams and examples the relation between plate tectonics and magmatism.

Q4) Write notes on any TWO :

a) Hot spot.

b) Depleted mantle.

c) Inequigranular textures.

d) Anatomy of the earth.

Q5) Describe Alkaline rock Complexes of India.

Q6) Explain the ternary crystallization of Diopside - Albite - Anorthite.

Q7) What is contamination of magma? Describe the process involved in the contamination of magma.

P.T.O.

Q8) Write notes on any TWO :

a) Any two processes of magmatic differentiation.

b) Bushweld Complex.

c) Granite.

d) Flood basalts.

Total No. of Questions : 8]

SEAT No. :

P543

[Total No. of Pages : 2

[4337] - 202
M.Sc. - I (Semester - II)
GEOLOGY
GL - 202 : Metamorphic Petrology
(2008 Pattern)

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) Define metamorphism. Enlist the minerals commonly found in metamorphic rocks. Also comment on their genesis & occurrence.

Q2) Write an account of recrystallisation textures and textures produced by deformation during metamorphism.

Q3) Explain the phase rule with the help of diagram and examples.

Q4) Write short notes on <u>any two</u> :

a) Metamorphic reactions.

b) Metamorphic facies of regional metamorphism.

c) Pressure-Temperature conditions of isograds.

d) Role of fluids in Metamorphism.

Q5) Explain in details the prograde and retrograde metamorphism.

Q6) Give an account of thermal metamorphism of impure, siliceous carbonate rocks.

Q7) Give an account of regional metamorphism of basic & ultrabasic rocks.

P.T.O.

Q8) Write short notes on <u>any two</u> :

a) A'KF Diagram.

b) Paired metamorphic belts.

c) Plate tectonics & metamorphic processes.

d) Shock metamorphism.

Total No. of Questions : 8]

SEAT No. :

P544

[Total No. of Pages : 2

[4337] - 203
M.Sc. - I (Semester - II)
GEOLOGY
GL - 203 : Structural Geology & Tectonics
(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) Discuss the concept of fabric domain.

Q2) Give the elements of folds and discuss genetic aspects of folds.

Q3) Write an account of jointing and fracturing in rocks.

Q4) Write notes on Any Two :

a) Stress ellipsoid.

b) Stylolites.

c) Foliations.

d) Thrust faults.

Q5) Discuss the concept of plate tectonics in details.

Q6) What is palaeomagnetism? Discuss.

Q7) Discuss the tectonic framework of India.

P.T.O.

Q8) Write notes on <u>Any Two</u> :

a) Divergent plate margin.

b) Heat flow.

c) Green House effect.

d) Evidences of Neotectonics.

Total No. of Questions : 8]

SEAT No. :

P545

[Total No. of Pages : 2

[4337] - 204
M.Sc. - I (Semester - II)
GEOLOGY
GL - 204 : Geomorphology and Remote Sensing in Geology
(2008 Pattern)

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 characteristics and development of hillslopes. Add a note on fluvial processes on hillslopes.

Q2) Explain various methods of remote sensing based on atmospheric windows.

Q3) Describe the application of geomorphology in engineering geology and environmental studies.

Q4) Write notes on (any two) :

a) Relief displacement.

b) Types of deltas.

c) Electromagnetic radiation.

d) Deflation armour and deflation armour.

Q5) Explain the working of a thermal scanner. Add a note on the application of thermal scanner in geology.

Q6) Describe the working of LANDSAT-3 M.S.S. Draw a neat labelled diagram for the same.

P.T.O.

Q7) Define geomorphology. Describe the concepts and scope of geomorphology.

Q8) Write notes on (any two) :

a) Plancks and Stefan Bottzmon Laws.

b) Erosional Landforms formed by the action of sea.

c) Space Research in India.

d) A typical soil profile.

Total No. of Questions : 8]

SEAT No. :

P546

[Total No. of Pages : 2

[4337] - 301
M.Sc. (Semester - III)
GEOLOGY
GL - 302 : Exploration Methods
(2008 Pattern)

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 Gravity field of the earth and discuss applications of Gravity Method with suitable examples.

Q2) Describe the field procedures adopted during a Magnetic survey of an area and explain different corrections applied to the data obtained before preparing anomaly maps.

Q3) Explain the principle of seiomic Refraction Method. Describe the salient features of refraction from a three horizontally layered model.

Q4) Write notes on : (Any Two)

a) La Coste-Romberg Gravimeter.

b) Rubidium Vapour Magnetometer.

c) Principal methods in logging.

d) Geophones.

Q5) Describe the salient points of interpretation of Resistivity data. Discuss the suitability of Resistivity method for the groundwater exploration.

Q6) What is "Induced Potential"? Describe the concept of Electrode Polarization. How is induced potential data represented ?

P.T.O.

Q7) What is geochemical prospecting? Describe the different types of sampling procedures.

Q8) Write notes on : (Any Two)

a) Geobotanical indicators.

b) Geochemical dispersion.

c) Principles of Electromagnetic Method.

d) Principles of self potential Method.

Total No. of Questions : 8]

SEAT No. :

P547

[Total No. of Pages : 2

[4337] - 302
M.Sc. (Semester - III)
GEOLOGY
GL - 303 : Petroleum Geology
(2008 Pattern)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

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

Q1) What is Geophysics? Name different methods of geophysical prospecting for hydrocarbons exploration. Describe seismic method of hydrocarbon prospecting.

Q2) Name the Oil and Gas bearing basins of India. Describe the stratigraphy, tectonic framework and hydrocarbon potential of Bombay High.

Q3) What are reservoir rocks? Describe the conditions responsible to form a reservoir rock. Add a note on reservoir fluids.

Q4) Write notes on any two of the following :

a) Composition of biomass.

b) Mud logging.

c) Nature of source rock.

d) Primary porosity.

Q5) Describe the classification and composition of petroleum.

Q6) Explain the Inorganic and organic origin of petroleum.

Q7) Describe the primary and secondary migration of hydrocarbons.

P.T.O.

Q8) Write notes on any two of the following :

a) Properties of drilling mud.

b) Surface occurrences of petroleum.

c) Types of drilling.

d) Composition of kerogen.

Total No. of Questions : 8]

SEAT No. :

P548

[Total No. of Pages : 2

[4337] - 303
M.Sc. (Semester - 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) Describe the factors controlling the engineering properties of rocks.

Q2) What are dams? State the geological criteria for selection of Dam sites.

Q3) Describe the application of remote sensing in engineering geology.

Q4) Write notes on any **Two** :

a) Triangular classification of soils.

b) High and runway aggregates.

c) Mass movements.

d) Soil profile.

Q5) Define and explain the mechanism of rock failure.

Q6) What are tunnels? Classify and describe them. Add a note on tunnel linings.

Q7) Define bridge and describe the types of bridges. Comment on the geological considerations for the selection of bridge sites.

P.T.O.

Q8) Write notes on any **Two** :

a) Preparation of engineering geological report.

b) Rock quality designation.

c) Types of synthetic material used as remedial measures.

d) Slope stability analysis.

Total No. of Questions : 8]

SEAT No. :

P549

[Total No. of Pages : 2

[4337] - 304
M.Sc. (Semester - III)
GEOLOGY
GL - 305 : Computer Applications in Geology & Geographical Information Systems
(2008 Pattern)

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 term GIS. Discuss its hardware and software requirements. Give applications of GIS.

Q2) What is data encoding? Explain the data encoding methods and also discuss the problems faced when encoding the analogue data.

Q3) Explain in details the concepts and uses of :

a) Adjacency b) Containment and c) Connectivity

Q4) Write notes on <u>any two</u> :

a) Querry Analysis.

b) Relational database.

c) Primary Geographic data capture Methods.

d) Map projections.

Q5) What is a programming language? Give different programming languages with their specific use / applications.

Q6) What are NAND and NOR gates? Why are they called universal gates?

P.T.O.

Q7) What is DEM? What is its use? Explain the construction of DEM in details.

Q8) Write notes on <u>any two</u> :

a) Algorithm.

b) Principle of duality in Boolean Algebra.

c) Binary number system.

d) Floppy disk.

Total No. of Questions : 8]

SEAT No. :

P550

[Total No. of Pages : 2

[4337] - 401
M.Sc. - II(Semester - IV)
GEOLOGY
GL - 401 : Economic 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) ***Neat diagrams must be drawn wherever necessary.***

Q1) Describe the genetic classification of Ore deposits.

Q2) Explain in detail different types of placer deposits.

Q3) Explain in detail secondary Ore forming processes.

Q4) Write notes on <u>any two</u> :

a) Scope and application of economic geology.

b) Sublimation deposits.

c) Early magmatic deposits.

d) Baryte deposits.

Q5) Discuss Indian occurrences of chromite deposits giving their classification.

Q6) Name the Ore minerals of Uranium and Thorium. Add a note on geographical and geological distribution uranium deposits in India.

P.T.O.

Q7) Write notes on <u>any two</u> :

a) Ores of Fe.

b) Geological distribution of Cu-Ore in India.

c) Mineralogy and uses of Gold.

d) Geographical and Geological distribution of Bauxite deposits in India.

Q8) Explain in detail types of Coal. Give geographic and geological distribution of coal deposits in India.

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Total No. of Questions : 8]

SEAT No. :

P551

[Total No. of Pages : 2

[4337] - 402
M.Sc. - II (Semester - IV)
GEOLOGY
GL - 402 : Mining Geology, Gemmology & Industrial 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) Define 'mineral association'. Explain how mineral association is used as a guide to ore search.

Q2) What are different types of drills? Explain any one of them in details.

Q3) Explain various methods of ore-dressing.

Q4) Write notes on Any Two :

a) Stratigraphic guides.

b) Gophering mining method.

c) Gem varieties of corundum.

d) Gem Formation.

Q5) Explain the construction of microscope. Explain with suitable examples, its use in gem identification.

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

P.T.O.

Q7) Give detailed account of minerals used in Paint Industry with respect to their characteristic properties, chemical composition and industrial specifications.

Q8) Write notes on Any Two :

a) Industrial minerals used in Cement Industry.

b) Basic Refractories.

c) Abrasive minerals.

d) Mica as an industrial mineral.

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Total No. of Questions : 8]

SEAT No. :

P552

[Total No. of Pages : 2

[4337] - 403
M.Sc. - II (Semester - IV)
GEOLOGY
GL - 403 : Environmental 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) ***Neat diagrams must be drawn wherever necessary.***

Q1) Describe the impact of mining on environment. Add a note on recycling of resources and its management.

Q2) Define flood. Explain the causes of floods. Add a note on strategies for flood management.

Q3) How are soil formed? Explain the sources of soil pollution. Add a note on the effects of soil pollution.

Q4) Write notes on (any two) :

a) Phosphorus cycle.

b) Soil salinity and alkalinity.

c) Biosphere.

d) Types of landslides.

Q5) Describe the environmental impacts of coal utilization. Add a note on fly ash.

Q6) Define earthquake. Explain the causes of earthquakes. Add a note on earthquake hazard management.

P.T.O.

Q7) Explain the causes of ground water pollution. Describe the case history of arsenic poisoning.

Q8) Write notes on (any two) :

a) Concepts of Environmental geoscience.

b) Cyclones.

c) Hydrosphere.

d) Subsidence of ground.

Total No. of Questions : 8]

SEAT No. :

P553

[Total No. of Pages : 2

[4337] - 404
M.Sc. - II (Semester - IV)
GEOLOGY
GL - 404 : Hydrogeology, Watershed Development & Management
(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) What is hydrological cycle? Explain the processes involved in the hydrological cycle.

Q2) Give an account of various subsurface zones in relation with the groundwater accumulation.

Q3) Explain the Electrical Resistivity Method for groundwater prospecting.

Q4) Write notes on any two :

a) Tracer techniques.

b) Phreatophytes.

c) Role of toposheet in hydrogeological investigations.

d) Confined aquifer.

Q5) Describe the measures taken to develop the watershed at Ralegan Shiddhi - a case study.

Q6) Discuss the need of rainwater harvesting in Urban Scenario.

P.T.O.

Q7) Write notes on any two :

a) Water Conservation Structures.

b) Water Budget.

c) Horton's law of streams.

d) Drinking water quality.

Q8) Discuss the role of NGO's and state government in watershed management.

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