Total No. of Questions : 8]

SEAT No. :

P618

[Total No. of Pages : 2

[4237] - 101
M.Sc.
GEOLOGY
GL - 101 : Mineralogy
(2008 Pattern) (Semester - I)

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 unit cell? What is space lattice? Write about fourteen Bravais Lattices.

Q2) What is meant by Indicatrix? Explain the Biaxial Indicatrix at length.

Q3) Explain the use of X-ray diffraction in mineral identification. Explain Laue method in details.

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

a) Symmetry operators.

b) Proper point groups.

c) Accessory plates.

d) Uniaxial Interference figure.

Q5) Give an account of silicate structure chemical composition and paragenesis of Olivine mineral Group or Plagioclase felspars.

Q6) Give an account of silicate structure chemical composition, physical and optical properties and paragenesis of Garnet or Alumino-Silicate mineral group.

P.T.O.

Q7) Explain the generation of interference colours in anisotropic minerals between crossed nicols.

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

a) Chemical composition and paragenesis of Mica.

b) Silicate structure and paragenesis of clay.

c) Mg - Fe amphiboles.

d) Chemical composition of pyroxenes.

Total No. of Questions : 8]

SEAT No. :

P619

[Total No. of Pages : 2

[4237] - 102
M.Sc.
GEOLOGY
GL - 102 : Principles of Stratigraphy and Palaeontology
(2008 Pattern) (Semester - I)

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 sub-surface methods used in stratigraphy.

Q2) Discuss the methods of stratigraphic correlation.

Q3) Explain the categories and unit terms used in Standard Stratigraphic Code.

Q4) Answer any two of the following:

a) Marker beds.

b) Magnetostratigraphy.

c) Biostratigraphic units.

d) Index fossil.

Q5) Describe the class Echinoidea of phylum Echinodermata.

Q6) Differentiate between Brachiopods and Lamellibranchs.

Q7) *Discuss the evolutionary trends of horse.*

P.T.O.

Q8) Write notes on any two of the following:

a) Molecular Palaeontology.

b) Suture lines in ammonites.

c) Different types of microfossils.

d) Morphology of a gastropod shell.

Total No. of Questions : 8]

SEAT No. : ____

P620

[Total No. of Pages : 2

[4237] - 103

M.Sc.

GEOLOGY

GL - 103 : Physics & Chemistry of the Earth

(2008 Pattern) (Semester - I)

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 are Quasars? Describe the Quasar red shift.

Q2) Describe various theories of origin of solar system.

Q3) Write a note on discontinuities encountered within the earth. Comment on their significance.

Q4) Write short notes (any two) :

a) Atomic structure.
b) Density distribution within the earth.
c) Seismographs.
d) Tektites.

Q5) State law of Radioactivity. Explain U-Th-Pb method of dating.

Q6) Explain determination of the age of the mineral with the help of mathematical equation.

P.T.O.

Q7) Explain the genesis of earth's magnetic field. Add a note on palaeomagnetism.

Q8) Write short notes (any two) :

a) Fossil Magnet.

b) Age of earth.

c) ^{14}C dating technique.

d) Archaean Nuclei.

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Total No. of Questions : 8]

SEAT No. :

P621

[Total No. of Pages : 2

[4237] - 104
M.Sc. (Sem. - I)
GEOLOGY
GL - 104 : Sedimentology
(2008 Pattern)

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

Instructions to the candidates:

1) ***Your 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 are Volcanogenic Sedimentary rocks? Describe the types of Volcanogenic sediments.

Q2) Name the various types of sedimentary structures. Add a note on biogenic structures and their significance.

Q3) Describe the concept of sedimentary facies. Explain the facies association of a fluvial environment.

Q4) Write notes on any two of the following:

a) Granulometric analysis.

b) Froude Number.

c) Classification of sandstones.

d) Oligomict and Petromict Conglomerates.

Q5) Explain sedimentation with reference to plate tectonics.

Q6) Describe field procedures in sedimentary petrology.

P.T.O.

Q7) What are the factors involved in paleocurrent and basin analysis?

Q8) Write notes on any two of the following:

a) Geologic Cycle.

b) Heavy minerals and its significance.

c) Modes of transportation of sediments.

d) Manganese rich sediments.

Total No. of Questions : 8]

SEAT No. : ____

P622

[Total No. of Pages : 2

[4237] - 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) Explain the theory and structure of mantle plumes.

Q2) Explain IUGS classification of igneous rocks.

Q3) Write in detail about magmatism that takes place at constructive plate margins.

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

a) Structure of oceani crust and upper mantle.

b) Minerals of mantle.

c) Textures of igneous rocks.

d) Processes of magma generation.

Q5) What is contamination of magma? Describe the processes involved in it.

Q6) Give geographical distribution of carbonatites in India. Explain their mode of emplacement, characteristics and composition.

P.T.O.

Q7) What is incongruent melting? Describe the crystallization of Leucite-Silica system with the help of diagram.

Q8) Write notes on (any two) :

a) Origin and occurrence of anorthosites.

b) Fenitization.

c) Binary system showing complete solid solution.

d) Crystal fractionation.

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Total No. of Questions : 8]

SEAT No. : ____

P623

[Total No. of Pages : 2

[4237] - 202

M.Sc. - I

GEOLOGY

GL - 202 : Metamorphic Petrology

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

Q2) Explain the concept of metamorphic facies with the help of diagram. Explain the characteristics of various facies of Eskola.

Q3) Write an account of recrystallisation textures and textures produced by deformation during metamorphism.

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

a) Metamorphic reactions.

b) A'KF diagram.

c) Retrograde metamorphism

d) Migmatites.

Q5) Give an account of regional metamorphism of pelitic rocks.

P.T.O.

Q6) Describe thermal metamorphism of fine grained sedimentary rocks.

Q7) Describe in detail element exchange and P-T conditions of isograds in metamorphic petrology.

Q8) Write notes on (any two) of the following :

a) Metamorphic facies series.

b) Polymetamorphism.

c) Metasomatism.

d) Paired metamorphic belts.

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Total No. of Questions : 8]

SEAT No. : ____

P624

[Total No. of Pages : 2

[4237] - 203

M.Sc. - I

GEOLOGY

GL - 203 : Structural Geology and Tectonics

(2008 Pattern) (Semester - 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) Write an account on microstructures and deformation mechanism.

Q2) What are Faults? Give their genetic classification.

Q3) Define and describe different types of foliations.

Q4) Write notes on (any two) of the following :

a) Flexure fold

b) Stress ellipsoid

c) Joints

d) Stylolites

Q5) Comment on the nature of convection current system.

Q6) Discuss magmatism in relation to plate margins.

P.T.O.

Q7) Describe characteristics of different plate boundaries.

Q8) Write notes on (any two) :

a) Structure of oceanic crust.

b) Magnetic strips.

c) Transform faults.

d) Neotectonics.

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Total No. of Questions : 8]

SEAT No. : ____

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[Total No. of Pages : 2

[4237] - 204

M.Sc. - I

GEOLOGY

GL - 204 : Geomorphology & Remote Sensing in Geology

(2008 Pattern) (Semester - 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) ***Draw neat labelled diagrams wherever necessary.***

Q1) Define neotectonism. Describe the geomorphic indicators for neotectonism. Add a note on its causes.

Q2) Describe the erosional and depositional landforms formed by the action of wind.

Q3) Define weathering. Explain with the help of equation the chemical weathering. Add a note on rates of weathering.

Q4) Write notes on (any two) :

a) Concepts and tools in geomorphology.

b) Development of valleys.

c) Erosional land forms of glaciers.

d) Types of drainage patterns.

Q5) What are the different photorecognition elements? Explain tone and texture as photorecognition elements with examples.

P.T.O.

Q6) Explain radiation principle and energy source in remote sensing.

Q7) Explain the working and instrumentations of LANDSAT-3 M.S.S. Draw a neat sketch.

Q8) Write notes on (any two) :

a) Relief displacement.

b) Photographic scale.

c) Stefans Boltzmon and Plancks Laws.

d) Atmospheric windows.

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Total No. of Questions : 8]

SEAT No. : ____

P626

[Total No. of Pages : 2

[4237] - 301

M.Sc.

GEOLOGY

GL - 302 : Exploration Methods

(2008 Pattern) (Semester - 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 field procedures adopted during a Gravity survey of an area and explain the different corrections applied to the data obtained.

Q2) Describe the Earth's Magnetic field and discuss the applications of magnetic method giving suitable examples.

Q3) Describe the general scheme of seismic operation.

Q4) Write short notes on : (Any two)

a) Electromagnetic and Piezo-electric geophones.

b) Worden gravimeter

c) Working principles of vertical force magnetometer.

d) Caliper logging.

Q5) Explain the factors controlling the resistivity of rocks. Describe the field procedures involved in the Resistivity Method. Explain the problems associated with interpretation of resistivity data.

P.T.O.

Q6) Describe the principles of Electromagnetic method. Describe the parallel line dip angle method of exploration in detail.

Q7) What is geochemical dispersion? Distinguish between Primary and Secondary dispersion.

Q8) Write notes on : (Any two)

a) Geobotanical indicators.

b) Principles of self potential method.

c) Field procedures in I.P. method.

d) Geochemical provinces.

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Total No. of Questions : 8]

SEAT No. : ____

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[Total No. of Pages : 2

[4237] - 302

M.Sc.

GEOLOGY

GL - 303 : Petroleum Geology

(2008 Pattern) (Semester - III)

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) Describe the surface and subsurface occurrence of petroleum.

Q2) Explain important logging methods for the exploration of hydrocarbons.

Q3) Explain India's position as regards to oil and gas as future prospects.

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

a) Physical properties of petroleum.
b) Borehole environment.
c) Mud logging.
d) Geophysical surveys for hydrocarbon prospecting.

Q5) Describe the stratigraphy, tectonic setting and hydrocarbon potentials of cambay basin.

Q6) What are reservoir traps? Name the types of traps. Describe structural traps.

Q7) What do you mean by migration of petroleum? Explain primary and secondary migrations.

P.T.O.

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

a) Kerogen

b) Types of drilling operations

c) Reservoir rock

d) Biomass

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Total No. of Questions : 8]

SEAT No. : ____

P628

[Total No. of Pages : 2

[4237] - 303

M.Sc.

GEOLOGY

GL - 304 : Engineering Geology and Geotechniques

(2008 Pattern) (Semester - III)

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) Define and explain the types of landslides and causes of landslides.

Q2) What are tunnels? Classify and explain criteria for selection for tunnel sites.

Q3) Define soil and explain the classification of soils. Give engineering properties of soil.

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

a) Estimation of ore burden thickness.
b) Buttress dam
c) Types of foundation
d) Normal spillways

Q5) Explain the role of remote sensing in geotechnical projects.

Q6) Explain the geotechnical selection of dam sites.

Q7) What is the significance of different branches of geology in civil engineering projects?

P.T.O.

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

a) Preparation of geological report.

b) Piers and abutments in bridges.

c) Scope of engineering geology.

d) Estimation of compressive strength.

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Total No. of Questions : 8]

SEAT No. : ____

P629

[Total No. of Pages : 2

[4237] - 304

M.Sc.

GEOLOGY

GL - 305 : Computer Applications in Geology and Geographical Information Systems

(2008 Pattern) (Semester - III)

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? Discuss the major events in the development of GIS during 1960s, 1970s, and 1990s.

Q2) What is database in GIS? Mention functions of DBMS. Explain basic data structures in GIS.

Q3) Why is data editing important? What methods are available for detecting and rectifying errors in GIS.

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

a) Buffer analysis.

b) Topology.

c) Decision support system.

d) Any two types of map projections.

Q5) Define Operating system. Explain multiprogramming operating system with examples.

P.T.O.

Q6) Explain the principle of Boolean Algebra. How is it useful?

Q7) What is TIN? How are TINs constructed? Discuss its use.

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

a) Secondary storage.

b) NAND gate.

c) Flow chart.

d) Hexadecimal number system.

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Total No. of Questions : 8]

SEAT No. :

P630

[Total No. of Pages : 2

[4237] - 401
M.Sc. - II
GEOLOGY
GL - 401 : Economic Geology
(2008 Pattern) (Semester - 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) Explain the term 'Ore'. Write on the mineralogy, use, mode of occurrence and distribution of gold. Add a note on its Reserves in India.

Q2) Write on the mode of occurrence, Origin and Geological and Geographic Distribution of Chromium.

Q3) Write on the use, mineralogy, mode of occurrence and Origin of Iron.

Q4) What are Non-Metallic Minerals? Enumerate your answer with special reference to coal and its mode of Occurrence, Origin and Distribution.

Q5) Write notes on Any Two :

a) Mineral deposits with Gaseous Emanations.
b) Metamorphism-A process of mineral formation.
c) Role of structures in Ore localizations.
d) Purpose of Economic geology.

Q6) Write an Essay on Ore-genesis and Mineral deposition.

Q7) Write on the processes of formation of minerals deposits with special references to Supergene Enrichment.

P.T.O.

Q8) Write notes on Any Two :

a) Magmas and Mineral Deposits.

b) Significance of Plato Tectonics and Mineralization.

c) Ore Shoots

d) Role of sedimentation in Mineralization.

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Total No. of Questions : 8]

SEAT No. : ____

P631

[Total No. of Pages : 2

[4237] - 402

M.Sc. - II

GEOLOGY

GL - 402 : Mining Geology, Gemmology and Industrial Mineralogy

(2008 Pattern) (Semester - 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) What are structural guides? Explain them in details with the help of suitable examples.

Q2) What is meant by the term 'ore dressing'? Explain various methods of ore dressing.

Q3) Give classification of drills. Describe any three miscellaneous drills.

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

a) Mineralogical guides.
b) Underground Glory hole mining.
c) Use of polariscope in gem identification.
d) Inclusions in gem varieties of corundum.

Q5) Explain in detail the cause of colour in gemstones with the help of suitable examples. Explain terminology used in characterizing type of colour in gemstones.

P.T.O.

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

Q7) What are clays? Explain in detail various uses of clays as industrial mineral alongwith industrial specifications.

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

a) Abrasives

b) Mineral pigments

c) Asbestos as industrial mineral

d) Graphite as industrial mineral

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Total No. of Questions : 8]

SEAT No. : [ ]

P632

[Total No. of Pages : 2

[4237] - 403

M.Sc. - II

GEOLOGY

GL - 403 : Environmental Geology

(2008 Pattern) (Semester - 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 are compulsory.***
3) ***Draw neat labelled diagrams wherever necessary.***

Q1) Define Biogeochemical cycle. Describe phosphorous and nitrogen cycles.

Q2) Explain the effects of mining on environment. Add a note on the importance of recycling of resources and management.

Q3) Describe the sources of water pollution and its effects. Add a note on arsenic poisoning.

Q4) Write notes on (any two) :

a) Structure and composition of Lithosphere.
b) Scope of Environmental geology.
c) Types of hazards.
d) Fly ash and its related problems.

Q5) Define landslides. Enumerate the types of landslides. Describe the mitigation measures of landslides.

Q6) Define soil. Describe a typical soil profile. Comment on the sources of soil pollution and soil degradation.

P.T.O.

Q7) Define volcano. Describe the types of volcanic eruption. Add a note on volcanic hazards.

Q8) Write notes on (any two) :

a) Concepts of environmental geoscience.

b) Earthquake prediction and prevention.

c) Acid mine drainage.

d) Causes of floods.

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Total No. of Questions : 8]

SEAT No. : ____

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[Total No. of Pages : 2

[4237] - 404

M.Sc. - II

GEOLOGY

GL - 404 : Hydrogeology, Watershed Development and Management

(Semester - 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) ***Neat diagrams must be drawn wherever necessary.***

Q1) Give an account of various subsurface zones in relation with the groundwater accumulation.

Q2) What are the hydrologic properties of rocks? Describe the hydrologic property of the rock related to the storage of water.

Q3) Explain the ground water scenario in Maharashtra with reference to fluoride content and its adverse effects.

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

a) Validity of Darcy's Law.
b) Aquifer performance test.
c) Flow nets.
d) Electrical Resistivity interpretation.

Q5) Discuss the role of NGO's and state government in watershed management.

Q6) Describe the measures taken to develop the watershed at Hiwre Bazar-a case study.

P.T.O.

Q7) Discuss the need and benefits of watershed development.

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

a) Water conservation structures.

b) Recharging of dug wells.

c) Water budget.

d) Groundwater provinces of India.

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