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P911

[3930]-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 to attempt not more than five 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 a note on symmetry operations.

Q2) What is convergent light? How is it obtained? Explain the generation of biaxial interference figure.

Q3) What are accessory plates? Explain them in details. Also write about their use in optical mineralogy.

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

a) Paragenesis of amphibole minerals.
b) Isomorphism in calc-alkali felspars.
c) Paragenesis of clays.
d) Structure and compositions of various feldspathoid minerals.

Q5) Give an account of structure chemical composition physical and optical properties and paragenesis of olivine minerals.

Q6) Write about structure, chemical composition, alteration products and paragenes of mica minerals.

Q7) Give an account of structure, chemical composition and paragenesis of orthopyroxenes.

P.T.O.

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

a) Seven crystal systems.
b) Generation of interference colours.
c) Powder method of X-ray diffraction.
d) Proper point groups.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P912

[3930]-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) ***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) Explain the term 'stratigraphy'. Describe the equivalence of Litho, Bio and Chronostratigraphic units.

Q2) Discuss the concepts of event stratigraphy.

Q3) Explain marine transgression and regression and establish its relationship with sequence stratigraphy.

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

a) Uniformitarianism.
b) Standard stratigraphic scale.
c) Unconformty.
d) Facies concept.

Q5) What are microfossils? Describe the various types of microfossils. Add a note on their significance in stratigraphy.

Q6) Discuss the classification of brachiopoda. Add a note on different ways of attachment to substratum and types of the brachidium.

Q7) What are general field and laboratory procedures used in processing samples for micropaleontological studies.

P.T.O.

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

a) Comparison between ammonoids and nautiloids.
b) Extinction.
c) Dinosaurs.
d) Pollen and spores.

Total No. of Questions : 8] **[Total No. of Pages : 1**

P913

[3930]-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) ***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) Distinguish between chondrites and achondrites. Describe carbonaceous chondrites.

Q2) On what basis galaxies are classified? Explain various types of galaxies.

Q3) Explain in details the nature of P,S and L waves.

Q4) Write short notes on (any two) :

a) Meteor showers.
b) Proton-proton cycle in stars.
c) Asthenosphere.
d) Isotope.

Q5) Explain the determination of half life of the radioactive element with the help of mathematical equation.

Q6) Explain density distribution within the earth.

Q7) Explain variations in the magnetic field and factors that cause variations.

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

a) Fossil magnet.
b) Gravity anomalies.
c) Palaeomagnetism.
d) Archaen nuclei.

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Total No. of Questions : 8] **[Total No. of Pages : 1**

P914

[3930]-104
M.Sc.
GEOLOGY
GL - 104 : Sedimentology
(2008 Pattern) (Sem. - I)

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 in detail the field procedures in sedimentary petrology.

Q2) Describe the petrographic characteristics of sandstone.

Q3) Explain the characteristic and types of ripple marks with reference to its environment of deposition.

Q4) Explain the concept of paleocurrent and basin analysis.

Q5) Write notes on any two of the following :

a) Hydrologic Cycle.
b) Heavy mineral and their significance.
c) Evaporites.
d) Fluid Flow.

Q6) Write on the concept of sedimentary facies association models with special reference to Marine Environment.

Q7) Give an account on the petrography of volcanogenic sediments.

Q8) Write notes on any two of the following :

a) Facies of Glacial Deposits.
b) Significance of chests.
c) Insoluble residues.
d) Diagenetic structures.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P915

[3930]-201
M.Sc. - I
GEOLOGY
GL - 201 : Igneous Petrology
(New) (Sem. - II) (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) Explain the IUGS classification of Igneous Rocks.

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

Q3) Explain the theory and structure of mantle plume.

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

a) Heat source of the Earth.
b) MORB (Mid Oceanic Ridge Basalts).
c) Intergrowth texture.
d) Anatomy of the Earth.

Q5) Describe the different types of the carbonatites from the Amba Dongar area.

Q6) What is incongruent melting? Describe the crystallization of Leucite-Silica system with the help of the diagram.

Q7) Describe the stratigraphic sequence of Deccan Volcanic province and describe the structure of Deccan Traps.

P.T.O.

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

a) Mixing of magmas.
b) Magmatic differentiation.
c) Skaergaard Intrusion.
d) Origin and occurrence of Granites.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P916

[3930]-202
M.Sc. - I
GEOLOGY
GL - 202 : Metamorphic Petrology
(New) (Sem. - II) (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) Define metamorphism. Give petrographic classification of common metamorphic rocks.

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

Q3) Discuss the distinct zonal pattern of mineral assemblages in metapelitic rocks produced by intermediate pressure orogenic metamorphism.

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

a) Metamorphic reactions.
b) Retrograde metamorphism.
c) P-T conditions of isograds.
d) AFM diagram.

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

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

Q7) Write an account of recrystallisation textures and textures produced by deformation during metamorphism.

P.T.O.

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

a) Polymetamorphism.
b) Charnockites.
c) Controlling factors of metamorphism.
d) Metamorphic facies of dynamothermal metamorphism.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P917

[3930]-203
M.Sc. - I
GEOLOGY
GL - 203 : Structural Geology and Tectonics
(New) (Sem. - II) (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 are foliations? Describe types of foliations in rocks.

Q2) Explain and describe the mesoscopic structural analysis.

Q3) What are faults? Explain the genesis of faults and their classification.

Q4) Write notes on (any two) :

a) Fold system.
b) Lineations.
c) Stylolites.
d) Analysis of deformation.

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

Q6) Explain the classification of earth's surface on the basis of tensional and compressional tectonics.

Q7) Describe the Alpine-Himalayan orogenic belt.

P.T.O.

Q8) Write notes on (any two) :

a) Transform and Transcurrent faults.
b) Mid-oceanic ridges.
c) Evidences supporting the concept of continental drift.
d) Palaeomagnetism.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P918

[3930]-204
M.Sc. - I
GEOLOGY
GL - 204 : Geomorphology & Remote Sensing in Geology
(New) (Sem. - II) (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) Define the term "Geomorphology". Write an account of its development, with brief account of geomorphic concepts.

Q2) Describe the role of tectonics in rejuvenation of landforms.

Q3) Define "Weathering". Describe in brief physical and chemical weathering.

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

a) Duricrusts.
b) Modes of transportation by river.
c) Application of geomorphology in engineering geology.
d) Evidences of neotectonic movements.

Q5) What is "Electromagnetic radiation"? With the help of neat sketches explain its interaction with the matter. Write brief account of electromagnetic spectrum.

Q6) Explain different types of aerial photographs.

Q7) Describe the working of a thermal scanner. Explain how the following feature can be identified :

a) Hot springs.
b) Water at night and day.
c) Iceberg.
d) Limestone.

P.T.O.

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

a) Thematic mapper.
b) Application of microwave remote sensing.
c) Significance of drainage anomaly.
d) Plank's law.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P919

[3930]-301
M.Sc.
GEOLOGY
GL - 302 : Exploration Methods
(2008 Pattern) (Sem. - III) (New)

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 principles behind the gravity prospecting method. Discuss the use of gravity method in mineral prospecting.

Q2) Describe the salient features of seismic reflection method.

Q3) Describe the principles of electromagnetic method. Describe the verticle loop system-dip angle method of exploration.

Q4) Write short notes on (Any Two) :

a) Sonic logging.
b) Electrode arrangements in resistivity method.
c) Calibration of gravimeters.
d) Elevation correction.

Q5) What is geochemical prospecting? Describe the geochemical association of elements.

Q6) Describe the principles behind the magnetic method and explain the magnetic anomalies.

Q7) Describe the salient points of interpretation of resistivity data. Discuss the suitability of resistivity method for the groundwater prospecting.

P.T.O.

Q8) Write short notes on (Any Two) :

a) Geochemical surveying techniques.
b) Universal indcators.
c) Resistivity logging.
d) Processing of seismic data.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P920

[3930]-302
M.Sc.
GEOLOGY
GL - 303 : Petroleum Geology
(2008 Pattern) (Sem. - III) (New)

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 the terms 'oil pool', 'oil field' and 'oil province'. Discuss surface occurrence of petroleum.

Q2) What is kerogen? Describe in brief the composition and types of kerogen.

Q3) Explain the organic and inorganic origin of petroleum.

Q4) What are reservoir rocks? Explain the factors responsible for formation of reservoir rocks. Briefly describe the fragmental reservoir rocks.

Q5) Write notes on <u>any two</u> of the following :

a) Source rock composition.
b) Physical properties of petroleum.
c) Composition of biomass.
d) Combination traps.

Q6) What is drilling mud? Enlist the different functions performed by the drilling mud. Describe in brief the requisite properties that needs to be satisfied for performing the various functions.

Q7) Write a brief account of stratigraphy, tectonic framework and hydrocarbon potential Krishna-Godavari basin.

P.T.O.

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

a) Classification of off-shore rigs.
b) Secondary porosity.
c) Bright spots.
d) SP log.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P921

[3930]-303
M.Sc.
GEOLOGY
GL - 304 : Engineering Geology and Geotechniques
(2008 Pattern) (Sem. - III) (New)

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 soil? Give the classification of the soils in detail.

Q2) Give the different parts of the dams and describe in detail the types of dams.

Q3) Explain the engineering properties of the aggregates.

Q4) Write notes on (any two) :

a) Rock failure mechanism.
b) Types of bridges.
c) Stripping and drilling.
d) Types of foundations.

Q5) How does remote sensing play an important role in civil engineering projects?

Q6) Define tunnel. Describe the geological investigations carried out for the selection of tunnel site.

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

P.T.O.

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

a) Types of synthetic materials used as remedian measures.
b) Preparation of engineering geological reports.
c) Buttress Dam.
d) Aggregate resources.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P922

[3930]-304
M.Sc.
GEOLOGY
GL - 305 : Computer Applications in Geology & Geographical Information System
(2008 Pattern) (Sem. - III) (New)

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 an algorithm? What is a flow chart? Describe the functions of various flow charting symbols.

Q2) Define GIS. What is buffer analysis in GIS? Explain any ten examples of applications where buffer analysis is very useful.

Q3) Explain the term Map Projections. State different types of map projections. Explain the importance of map projections for users of GIS.

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

a) Data Structures in GIS.
b) Topology.
c) Digital Terraine Modelling (DTM).
d) Components of GIS.

Q5) What is Boolean Algebra? Explain the principles of duality in Boolean Algebra. How is it useful?

Q6) What is data encoding? What methods of data encoding are available? Explain the problems faced when encoding the analogue data.

Q7) Describe the main characteristics of the Relational Database Model. Why have they dominated GIS?

P.T.O.

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

a) Universal gates.
b) Secondary storage.
c) Basic organization of a computer system.
d) Hexadecimal and Octal number system.

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Total No. of Questions : 8] **[Total No. of Pages : 1**

P923

[3930]-401
M.Sc. - II
GEOLOGY
GL - 401 : Economic Geology
(Sem. - IV) (New) (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) Give genetic classification of ore-deposits.

Q2) Explain in detail secondary ore forming processes.

Q3) Write classification and genesis of copper deposits and give their geological and geographical distribution.

Q4) Write classification and genesis of manganese deposits and give their geological and geographical distribution.

Q5) Write notes on <u>any two</u> :

a) Geological and geographical classification of Fe-deposits.
b) Gold deposits.
c) Skarn deposits.
d) Objectives of National Mineral Policy.

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

Q7) What are pegmatitic deposits? Explain their types in details.

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

a) Types of ore-forming fluids.
b) Placer deposits.
c) Gangue, grade and Tenor of ore.
d) Sublimation deposits.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P924

[3930]-402
M.Sc. - II (Sem. - IV)
GEOLOGY
GL - 402 : Mining, Geology, Gemmology and Industrial Mineralogy (New) (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 are 'topographical guides' and 'mineralogical guides'? Explain both of them in details with the help of suitable examples.

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

Q3) What are placer deposits? Explain the methods used in excavation of placer deposits.

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

a) Glory hole mining.
b) Syngenetic hydrothermal zoning.
c) Gem varieties of garnet and their chemical composition and physical properties.
d) Gem formation.

Q5) Mention various gem instruments used in gem identification. Explain with example, use of any two of them.

Q6) What do you understand by the term 'synthetic gemstone'? Explain the methods of gem synthesis by which cubic zirconia and verneuil ruby are synthesized.

Q7) Which minerals are used as raw material in Cement Industry? Give detailed account of any two of them with respect to their characteristic properties, chemical composition and industrial specification.

P.T.O.

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

a) Clays as refractory material.
b) Phosphate bearing rocks.
c) Utilisation and specification of mica.
d) Industrial minerals used in paint industry.

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Total No. of Questions : 8] **[Total No. of Pages : 1**

P925

[3930]-403
M.Sc. - II
GEOLOGY
GL - 403 : Environmental Geology
(Sem. - IV) (New) (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) Describe the structure, composition and general characteristics of Atmosphere.

Q2) Explain the process of soil formation. Comment on the sources of soil pollution and soil degradation.

Q3) Comment on the importance of drinking water sources. Describe the types of water pollution.

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

a) Nitrogen cycle.
b) Phosphorous cycle.
c) Biosphere.
d) Concepts of environmental science.

Q5) What do you mean by Hazards and Disasters? Comment on catastrophic geologic hazards.

Q6) Describe the classification of volcanic eruptions. Comment on prediction and mitigation measures of volcanism.

Q7) Describe the wastes from mining industry. Comment on heavy metal pollution due to mining.

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

a) Recycling of resources.
b) Acid mine drainage.
c) Effects of tsunamis.
d) Causes of cyclones.

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Total No. of Questions : 8] **[Total No. of Pages : 1**

P926

[3930]-404
M.Sc. - II
GEOLOGY
GL - 404 : Hydrogeology, Watershed Development and Management (Sem. - IV) (New) (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) Give an account of various subsurface zones in relation with the groundwater accumulation.

Q2) State and explain the law governing the movement of groundwater in porous medium. Describe the evolution of hydraulic conductivity.

Q3) What is salt water intrusion? Explain Ghyben-Hertzberg relationship.

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

a) Well inventory.
b) Tracer techniques.
c) Electrical resistivity interpretation.
d) Role of Aerial photographs in groundwater investigations.

Q5) Describe the significance of geology in watershed development.

Q6) Describe the measures taken to develope the watershed at Hiware Bajar/Bazar - a case study.

Q7) Describe the water balance equation for watershed.

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

a) Contour bunding.
b) Horton's Law of stream.
c) Role of NGO's in watershed management.
d) Gully plugs.

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