

PG DEPARTMENT OF GEOLOGY

ABSTRACT OF COURSE STRUCTURE

contact hrs

Adm

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FIRST SEMESTER					
Paper No.	Title of the course	Credit	Mid Sem	End Sem	FM
CC - 101	Igneous Petrology /	4 - 4	20	80	100
CC - 102	Sedimentary Petrology / /	4 - 5	20	80	100
CC - 103	Metamorphic Petrology /	4 - 5	20	80	100
CC - 104	Crystallography and Geochemistry /	4 - 5	20	80	100
CC - 105	Practical and Field Work	6 6	----	100	100

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26

SECOND SEMESTER					
Paper No.	Title of the course	Credit	Mid Sem	End Sem	FM
CC - 201	General Geology and Geomorphology and Marine Geology	4 5	20	80	100
CC - 202	Mineral Science	4 5	20	80	100
CC - 203	Structural Geology and Geotectonics	4 5	20	80	100
CC - 204	Engineering, Environmental Geology and Disaster Management	4 5	20	80	100
CC - 205	Practical and Field Work	6	----	100	100

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26

THIRD SEMESTER					
Paper No.	Title of the course	Credit	Mid Sem	End Sem	FM
CC - 301	Stratigraphy and Palaeontology	4 5	20	80	100
CC - 302	Economic Mineral Deposits	4 5	20	80	100
CC - 303	Practical covering CC - 301 and CC - 302 and Field Work	6 6	----	100	100
CC - 304	Research Methodology	4 5	20	80	100
OEC - 305	Envt Geology and Disaster Mgt	4 5	---- 20	100 80	100

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26

FOURTH SEMESTER					
Paper No.	Title of the course	Credit	Mid Sem	End Sem	FM
DEC - 401A or DEC - 401B	Ore Geology or Coal Geology	4 5	20	80	100
DEC - 402A or DEC - 402B	Hydrogeology or Petroleum Geology	4 5	20	80	100
DEC - 403A/403B	Practical covering DEC - 401 and DEC - 402	6 6	----	100	100
DC - 404	Dissertation, Seminar, Viva	8 6	----	200	200
		88 100	200	1740	2000

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Semester : I

CC - 101

Igneous Petrology

FM: 80

Unit –I : Concept of Magma; Forms of Igneous Rocks; Texture of Igneous Rocks; Textures as clue to magma behaviour; Structures of Igneous Rocks and their significance; Bowen's Reaction Principles and its significance

Unit –II : **Crystallization behaviour of Binary Magma:** Ab-An system; Forsterite – Silica System; Leucite-Silica system; Di – An System; System with limited solid solution (Or-Al System); **Crystallization behaviour of Ternary Magma:** Di-Ab-An system; Variation diagrams; Use of Trace Elements in Igneous Petrology

Unit- III: IUGS Classification of Igneous Rocks; Diversification of igneous Rocks; Plate Tectonics and Magmatism; Layered Mafic Intrusion; The Bushveld Complex; The Stillwater Complex; Lunar Geology; Brief idea about Geology of Antarctica

Unit- IV: Petrography of Alkaline Rocks, Ultramafic rocks, Anorthosite, Kimberlite, Carbonatite, Basalt, Lamprophyres and Lamproites. Petrography and Petrogenesis of Granite

N.B: MID SEMESTER EXAMINATION : 20 MARKS (Viva – Voce)

END SEMESTER EXAMINATION : 80 MARKS

Question Pattern for End Semester Examination:

Questions will be set from each unit. There will be four questions in a paper. Each unit will have one long answer type question carrying 20 marks or 3 short answer type carrying 10, 5, 5 marks.

Example:

Q. Long answer type (20 Marks)

OR

- a) Explanatory note (10 marks)
- b) Short note (5 marks)
- c) Short note (5 marks)

Semester - I

CC - 102

Sedimentary Petrology

FM: 80

Unit -I : General Process of Formation of Sedimentary Rocks; Distinctive features of Sedimentary rocks, Importance of Sedimentary rocks, Texture of sedimentary rocks and their significance; Structure of sedimentary rocks and their significance, Diagenesis

Unit -II : Plate Tectonics and Sedimentary Basin; Techniques and Applications of Sedimentary Basin Analysis; Provenance; **Geosynclines:** Concept and Types; **Sedimentary Environment:** Fluvial Environment, Lacustrine Environment, Marine Environment, Deltaic Environment, Carbonate and Evaporite Environment, Tidal Flat Environment; Sedimentary Basins of India

Unit- III: Classification of Sedimentary Rocks; Paleocurrent Analysis; Elements of Hydraulics; Heavy Minerals Studies and their significance, Seismic Stratigraphy, Sequence Stratigraphy, Magneto-stratigraphy, Cyclic Sediments

Unit- IV: Petrography of Sandstone, Shale, Conglomerate, Breccia. Carbonate Rocks, Evaporites and Phosphates

N.B: MID SEMESTER EXAMINATION : 20 MARKS (Seminar)

Question Pattern:

Questions will be set from each unit. There will be four questions in a paper. Each unit will have one long answer type question carrying 20 marks or 3 short answer type carrying 10, 5, 5 marks.

Example:

Q. Long answer type (20 Marks)

OR

- Explanatory note (10 marks)
- Short note (5 marks)
- Short note (5 marks)

Semester - I

CC 103

Metamorphic Petrology

A.B.

FM: 80

Unit -I : The limits of Metamorphism, The Metamorphic Agents; Types of Metamorphism, Metamorphic Reactions, Metamorphic Zone, Grade of Metamorphism, Metamorphic Facies, ACF diagram; AKF diagram; AFM diagram; Gibb's Phase Rule; Texture and Structure of Metamorphic Rocks

Unit -II : Metamorphism of Pelitic Rocks, Metamorphism of Ultramafic Rocks, Metamorphism of Calcareous Rocks, Metamorphism and Global Tectonics, Time, Temperature and Deformational relationship

Unit- III: Nomenclature and Classification of Metamorphic Rocks; Granitisation; Granulite Terrain of India; Metamorphic Differentiation; Metasomatism; Paired Metamorphic Belt

Unit- IV: Petrography of Gneiss, Schist, Quartzite, Slate, Marble, Khondalite, Charnokite, Migmatites, Phyllite, Skarn

N.B: MID SEMESTER EXAMINATION : 20 MARKS (Written Examination)

Question Pattern for Mid Semester Examination: The pattern of question in the written test shall be long answer type question with an alternative carrying 12 marks and two short answer type question to be answered out of four alternatives each carrying 4 marks.

Question Pattern for End Semester Examination:

Questions will be set from each unit. There will be four questions in a paper. Each unit will have one long answer type question carrying 20 marks or 3 short answer type carrying 10, 5, 5 marks.

Example:

Q. Long answer type (20 Marks)

OR

- a) Explanatory note (10 marks)
- b) Short note (5 marks)
- c) Short note (5 marks)

Semester – I

CC 104 Geochemistry and Crystallography FM: 80

Unit –I : Symmetry Operation; Space Lattices; Crystal Imperfection; Twinning in Crystals; Stereographic Projections of Crystals; X-Ray Crystallography

Unit –II : Earth in relation to Solar System and Universe; Structure and Composition of Earth; Cosmic abundance of Elements, Types and Composition of Meteorites

Unit –III: Geochronology and Age of the Earth, Trace Elements, Geochemical Classification of Elements, Isomorphism, Polymorphism, Pseudomorphism, Atomic Substitution; Exsolutions

Unit- IV: Geochemistry of Atmosphere, Hydrosphere, Geochemical Cycle, Principles of Geochemical Prospecting

N.B: MID SEMESTER EXAMINATION : 20 MARKS (Written Examination)

Question Pattern for Mid Semester Examination: The pattern of question in the written test shall be long answer type question with an alternative carrying 12 marks and two short answer type question to be answered out of four alternatives each carrying 4 marks.

Question Pattern:

Questions will be set from each unit. There will be four questions in a paper. Each unit will have one long answer type question carrying 20 marks or 3 short answer type carrying 10, 5, 5 marks.

Example:

Q. Long answer type (20 Marks)

OR

- Explanatory note (10 marks)
- Short note (5 marks)
- Short note (5 marks)

Semester – I

CC 105

Practical

FM: 100

Time : 6 hrs

1. Stereographic Projection of Crystal Model
2. Megascopic and Microscopic Identification of Igneous, Sedimentary and Metamorphic rocks
3. Norm calculation, Niggli value calculation.
4. Calculation of formulae of mineral from chemical analysis.
5. Sedimentary grain size analysis and interpretation.
6. Palaeocurrent Analysis
7. ACF diagram and AKF diagram.
8. Lab record and viva-voce and Field Study

CC 201

Semester – II

General Geology, Geomorphology

FM: 80

and Marine Geology

Unit –I : Seismology and Interior of the Earth; **Volcanos** : Types, Products, Topography, Distribution and Effects; **Earthquake** : Causes, Effects, Seismic Belts and Prediction of Earthquake; Types of Weathering and Significance

Unit –II : Basic Principles in Geomorphology; Aeolian Landforms, Glacial Landforms, Coastal Landforms, Karst Topography

Unit –III: Fluvial landforms; Drainage Pattern, Davis Geomorphic Cycle; Rejuvenated Landforms; Application of Geomorphology in Different Fields; Physiographic divisions of India

Unit- IV: Ocean Bottom Relief; **Coral Reefs**: Types, Distribution and Origin; Marine Sediments and their Classification; Marine Mineral Resources; Marine Pollution; Law of Sea; **Sea Level Changes**: Mechanism, Evidences and Impact; Man and Ocean

N.B: MID SEMESTER EXAMINATION : 20 MARKS (Quiz)

Question Pattern:

Questions will be set from each unit. There will be four questions in a paper. Each unit will have one long answer type question carrying 20 marks or 3 short answer type carrying 10, 5, 5 marks.

Example:

Q. Long answer type (20 Marks)

OR

- a) Explanatory note (10 marks)
- b) Short note (5 marks)
- c) Short note (5 marks)

Semester – II

CC 202

Mineral Science

FM: 80

Unit –I : Physical Properties of Minerals; Silicate Structure, Study of Structure, Chemical Composition, Physical and Optical Properties of Olivine, Garnet, Pyroxene, Amphibole Group of Minerals

Unit –II : Study of Structure, Chemical Composition, Physical and Optical Properties of Feldspars, Felspathoids, Silica, Alumino-silicates, Carbonates, Mica Group

Unit- III: Polarisation; Double Refraction and Nicol Prism, Preparation of Thin Section; Parts and Function of Microscope; Behaviour of light in thin section; Accessory Plates; Birefringences, Pleochroism, Interference Colour, Extinction

Unit- IV: Uniaxial Interference Figure; Biaxial Interference Figure; Dispersion; An Outline Study of Optical Properties of Minerals Studied under Microscope; Elementary idea on universal stage

N.B: MID SEMESTER EXAMINATION : 20 MARKS (Written Examination)

Question Pattern for Mid Semester Examination: The pattern of question in the written test shall be long answer type question with an alternative carrying 12 marks and two short answer type question to be answered out of four alternatives each carrying 4 marks.

Question Pattern:

Questions will be set from each unit. There will be four questions in a paper. Each unit will have one long answer type question carrying 20 marks or 3 short answer type carrying 10, 5, 5 marks.

Example:

Q. Long answer type (20 Marks)

OR

- a) Explanatory note (10 marks)
- b) Short note (5 marks)
- c) Short note (5 marks)

Semester - II

CC 203 Structural Geology and Geotectonics **FM: 80**

Unit -I : Concept of stress and Strain, Attitude of Beds, Deformation mechanism, Relation between Deformation and Metamorphism, ~~Relation between Deformation and Plate tectonics~~, Determination of Strain in Rocks, Elastic, Viscous and Plastic Models of Rock behaviour; Top and Bottom Criteria

Unit -II : Ramsay Classification of Folds; Mechanism of Folding; Classification of Faults; Mechanism of Faulting; Ramp-Flat Geometry; Recognition of Fault; Joints : Types and Significance

Unit- III: Unconformity: Types and Recognition in the field; **Foliation :** Types and their relation with major Structures, **Lineation:** Types and their relation with major Structures, **Shear Zone :** Concept and Types; Salt Dome; Granite Tectonics; Tectonites

Unit- IV: Concept of Plate tectonics; Continental Drift; Sea Floor spreading; Geodynamics of Indian Plate; Neotectonic Movements; Tectonic Design and Evolution of Himalayas; Tectonic Control on Genesis and Locations of Ores

N.B: MID SEMESTER EXAMINATION : 20 MARKS (Written Examination)

Question Pattern for Mid Semester Examination: The pattern of question in the written test shall be long answer type question with an alternative carrying 12 marks and two short answer type question to be answered out of four alternatives each carrying 4 marks.

Question Pattern:

Questions will be set from each unit. There will be four questions in a paper. Each unit will have one long answer type question carrying 20 marks or 3 short answer type carrying 10, 5, 5 marks.

Example:

Q. Long answer type (20 Marks)

OR

- a) Explanatory note (10 marks)
- b) Short note (5 marks)
- c) Short note (5 marks)

Semester -IV

CC 204

**Engineering , Environmental
Geology and Disaster Management**

FM: 80

Unit -I : Engineering Properties of Rocks; Engineering Properties of Soils; **Dam and Reservoir** : Geological Consideration and Environmental Impact; **Tunnel** : Geological Consideration. Improvement of Site conditions, Alkali-Aggregate Reactions;

Unit -II : Impact of Mining Activities on Environment, Acid Mine Drainage; Waste Disposal : Alternate Source of Energy; Conservation of Mineral Resources; Utilization of Fly ash; Sustainable development; Role of Geologist in Environmental Planning and Management; Environmental Protection and Legislative Measure

Unit- III: Earthquake and its management, landslides and its managements; Coastal Hazards : Cyclone and Tsunami; Desertification: Causes and Measures to Combat Desertification

Unit- IV: Disaster Management: Concept, Objectives, Approaches to Disaster Management; Importance of Disaster Management; Disaster management Cycle; Disaster Risk; Disaster Preparedness; Disaster Recovery; Disaster Response Plan; Search, Rescue and Evacuation; Role of Different Organization in Rehabilitation; Role of Science and Technology in Disaster Risk Reduction

N.B: MID SEMESTER EXAMINATION : 20 MARKS (Assignment)

Question Pattern:

Questions will be set from each unit. There will be four questions in a paper. Each unit will have one long answer type question carrying 20 marks or 3 short answer type carrying 10, 5, 5 marks.

Example:

Q. Long answer type (20 Marks)

OR

- a) Explanatory note (10 marks)
- b) Short note (5 marks)
- c) Short note (5 marks)

Semester - II

CC - 205

Practical

FM: 100
Time : 6 hrs

1. Interpretation of Toposheets, Drawing of Topographic Profile
2. Drainage Basin Analysis, Study and Interpretation of Geomorphic Models
3. Megascopic and Microscopic Identification of Minerals, Measurement of Extinction angle
4. Completion of Outcrops
5. Drawing of Geological Section and Interpretation
6. Use of Stereonet in Solving Structural problem
7. Thickness of Beds, Three Point Problem, Rule of Vs
8. Drawing of Tectonic Elements in Map of India and World
9. Seismic Belts, Volcanic Belts of the World
10. Feasibility Study of Dam, Reservoir and Tunnel Sites
11. Geological Field Report
12. Lab Record and Viva-voce

Semester - III

CC - 301 Stratigraphy and Palaeontology FM: 80

Unit -I : Principles of Stratigraphy; Stratigraphic Correlation; Code of Stratigraphic Classification and Nomenclature; Stratigraphy of Aravalli Supergroup; Dharwar Supergroup; Singhbhum - Odisha Province; Easternghat group; Cuddapah Supergroup; Vindhyan Supergroup

Unit -II : Stratigraphy of Gondwana Supergroup, Triassic of Spiti, Jurassic of Kutch, Cretaceous of Trichinopoly, Siwalik Group, Tertiary of Assam, Deccan Traps, Quaternary Deposits; Stratigraphy of Odisha

Unit- III: Modes of Preservation of Fossils; use of Fossils; Morphology; Geological History and Evolution of Brachiopoda; Pelecypoda, Gastropoda, Cephalopoda, Trilobites and Echinoidea

Unit- IV: Organic Evolution: Concept, Theories and Evidences; Evolution of Horse, Evolution of Man, Extinction of Dinosaurs; Morphology of Foraminifera and their Significance; Record of Vertebrate Fossils of India; Record of Plant fossils of India

N.B: MID SEMESTER EXAMINATION : 20 MARKS (Written Examination)

Question Pattern for Mid Semester Examination: The pattern of question in the written test shall be long answer type question with an alternative carrying 12 marks and two short answer type question to be answered out of four alternatives each carrying 4 marks.

Question Pattern:

Questions will be set from each unit. There will be four questions in a paper. Each unit will have one long answer type question carrying 20 marks or 3 short answer type carrying 10, 5, 5 marks.

Example:

Q. Long answer type (20 Marks)

OR

- a) Explanatory note (10 marks)
- b) Short note (5 marks)
- c) Short note (5 marks)

Semester - III

CC - 302

Economic Mineral Deposit

FM: 80

Unit -I : Mineralogy, Mode of Occurrence, Distribution, Uses of Ores of Iron, Manganese, Copper, Lead and Zinc and Gold

Unit -II : Mineralogy, Mode of Occurrence, Distribution and Uses of Chromite, Bauxite, Mica, Graphite, Asbestos, Kyanite, Sillimanite, Limestone and Magnesite

Unit- III : An Outline of Mineral Resources of Odisha, East Coast Bauxite, Sukinda Chromite Belt, Heavy Minerals of Ganjam District, Mn-deposits of Jamda-Koira valley, Talchir Coal field, Ib-valley Coal field; Gemstone resources of Odisha

Unit- IV : Coal : Origin of Coal; Coal Petrography; Indian Distribution of Coal and Lignite; Coal and Environment; Petroleum : Petroleum Exploration, Origin of Petroleum; Oil Traps; Indian Distribution of Oil and Gas; Petroleum and Environment; Uranium and Thorium Deposits in India

N.B: MID SEMESTER EXAMINATION : 20 MARKS (Written Examination)

Question Pattern for Mid Semester Examination: The pattern of question in the written test shall be long answer type question with an alternative carrying 12 marks and two short answer type question to be answered out of four alternatives each carrying 4 marks.

Question Pattern:

Questions will be set from each unit. There will be four questions in a paper. Each unit will have one long answer type question carrying 20 marks or 3 short answer type carrying 10, 5, 5 marks.

Example:

Q. Long answer type (20 Marks)

OR

- a) Explanatory note (10 marks)
- b) Short note (5 marks)
- c) Short note (5 marks)

Semester - III

CC - 303

Practical

FM: 100

Time : 6 hrs

1. Identification of Important Fossils.
2. Drawing and labelling of Fossils.
3. Drawing of Stratigraphic Units in outline map of Odisha and India.
4. Identification and Interpretation of stratigraphic assemblage.
5. Identification of ore minerals (Megascopic and Microscopic).
6. Identification of Industrial Minerals and their uses
7. Plotting of Places of Mineral Deposits in the outline map of Odisha and India
8. Field report, lab record and viva-voce.

Semester – III

CC - 304

Research Methodology

FM: 80

Unit –I : Meaning, Objectives, Types and Significance of Research; Research Methods; Research Problem; Criteria for Good Research; Problems Encountered by Researchers in India; Defining the Research Problem

Unit –II : Research Design: Design of Sample Surveys; Measurements, Scaling; Data Collection; Data Preparation; Statistical Parameters in Geology; Interpretation and Report Writing; Ethics in Research

Unit- III: Fundamentals of Geological Mapping; Qualitative Analysis of Groundwater, Electrical Resistivity Survey, Grain Size Analysis and Interpretation; Morphometric Analysis of Drainage basin

Unit- IV: Basics of Aerial Photography, Basics of Remote Sensing, Applications of Aerial Photography and Remote Sensing in Geological Mapping, Groundwater Studies and Mineral Exploration; Elementary Idea on GPS; Elementary Idea on GIS

N.B: MID SEMESTER EXAMINATION : 20 MARKS (Viva-Voce)

Question Pattern:

Questions will be set from each unit. There will be four questions in a paper. Each unit will have one long answer type question carrying 20 marks or 3 short answer type carrying 10, 5, 5 marks.

Example:

Q. Long answer type (20 Marks)

OR

- a) Explanatory note (10 marks)
- b) Short note (5 marks)
- c) Short note (5 marks)

UNIT – I : ENVIRONMENTAL GEOLOGY (A)

Dimension of Environmental Stress; Spectrum of Environmental Geology; Soil Erosion, Methods of Soil Conservation; Desertification: Causes and Measures to Combat Desertification

UNIT – II : ENVIRONMENTAL GEOLOGY (B)

Impact of Mining activities on Environment; Effects of Excessive withdrawal of Groundwater; Environmental Effect of River Valley Project; Rain Water harvesting; Waste Disposal; Conservation of Mineral Resources, Alternative Source of Energy

UNIT – III : DISASTER MANAGEMENT (A)

Hazards and Disasters : Meaning and Concept, Elements of Disaster Management, Methods and approaches of Disaster Management, Role of Science and Technology in Disaster Risk Reduction

UNIT – IV : DISASTER MANAGEMENT (B)

Earthquake and its Management; Landslides and its Management; Tsunami and its Management; Floods and its Management; Anthropogenic Disasters

Question Pattern:

Questions will be set from each unit. There will be four questions in a paper. In each unit two short answer type questions to be answered out of four alternatives, each carrying 15 marks.

Example:

Q. Write notes on (any two) (12.5 + 12.5)

- a) Short note
- b) Short note
- c) Short note
- d) Short note

Semester – IV

CC – 401A

Ore Geology (Special Paper)

FM: 80

Unit –I : Magmatic Concentration Process, Hydrothermal Process, Oxidation and Supergene Sulphide Enrichment, Residual and Mechanical Concentration, Controls of Ore Localization, Geothermometry, Wall rock alteration; Paragenesis; Fluid Inclusion Studies

Unit –II : Porphyry Deposits; Skarn Deposits; Volcanic–Associated Massive Sulphides (VMS) Deposits; Sediment – Hosted Massive Pb–Zn Sulphide (SMS) Deposit, Sediment Hosted Stratiform (SHS) Cu–Deposits; Precambrian Iron Formations; Uranium Deposits; Gold Deposits

Unit- III: Geological Method of Mineral Exploration, Geochemical Methods of Mineral Exploration and Geophysical Methods of Mineral Exploration, Methods of Sampling, Ore Reserve Estimation, National Mineral Policy; Elementary idea on Mining Methods

Unit- IV: Components of Ore Microscope, Preparation of Polished section, Physical and Optical Character of Ore Minerals Studied Under Microscope, Ore Texture and Structures, Ore Minerals studied under microscope : Chalcopyrite, Galena, Pyrite, Pyrolusite, Psilomelane, Magnetite, Hematite, Chromite, Sphalerite

N.B: MID SEMESTER EXAMINATION : 20 MARKS (Written Examination)

Question Pattern for Mid Semester Examination: The pattern of question in the written test shall be long answer type question with an alternative carrying 12 marks and two short answer type question to be answered out of four alternatives each carrying 4 marks.

Question Pattern:

Questions will be set from each unit. There will be four questions in a paper. Each unit will have one long answer type question carrying 20 marks or 3 short answer type carrying 10, 5, 5 marks.

Example:

Q. Long answer type (20 Marks)

OR

- Explanatory note (10 marks)
- Short note (5 marks)
- Short note (5 marks)

Semester – IV

CC – 402A Applied Hydrogeology (Special Paper) FM: 80

Unit –I: Hydrological Cycle; Vertical Distribution of Sub-Surface Water; Properties of water bearing Formations; Types of Aquifers, Darcy's Law, Geomorphic and Geologic Controls on Groundwater; Water Level Fluctuation

Unit –II : Quality of Groundwater and its uses in Domestic and Irrigational Field, Groundwater Pollution and Legislation, Sea Water Intrusion; Consequences of Excessive withdrawal of Groundwater; Fluoride Problem in Groundwater; Arsenic Problem in Groundwater; Hydrochemical Provinces of India; **Groundwater Exploration:** Objectives and Methods

Unit –III : Rain water Harvesting, Artificial Recharge of Groundwater, Watershed Management, Failures of Tube Wells, Types of Wells, Drilling Methods; Groundwater Development and Management; Brief idea on Thermal Springs of Odisha

Unit- IV: Hydrogeological Research in India, Hydrogeological Setting of India, Groundwater Occurrences, Movement, Aquifer characteristics in Consolidated Formation, Groundwater Provinces of India; Groundwater Provinces of Odisha

N.B: MID SEMESTER EXAMINATION : 20 MARKS (Viva-voce)

Question Pattern:

Questions will be set from each unit. There will be four questions in a paper. Each unit will have one long answer type question carrying 20 marks or 3 short answer type carrying 10, 5, 5 marks.

Example:

Q. Long answer type (20 Marks)

OR

- d) Explanatory note (10 marks)
- e) Short note (5 marks)
- f) Short note (5 marks)

Semester – IV

OR

CC – 401B Coal Geology (Special Paper) FM: 80

Unit –I: Introduction, Ranks of Coal, Classification, Chemical Properties, Mode of Occurrence

Unit –II : Origin of Coal, Geological Formation of Coal Deposit, Coal Sampling and Analysis

Unit –III : Fundamentals of Coal Petrography, Macroscopic and Microscopic Constituents of Coal, Coal and Environment, Geology and Coal Mining

Unit –IV : Coal and Lignite Resources of India, Hydrogeology of Coal, Coal as an alternative Source of Energy, Coal Marketing

N.B: MID SEMESTER EXAMINATION : 20 MARKS (Viva-voce)

Question Pattern:

Questions will be set from each unit. There will be four questions in a paper. Each unit will have one long answer type question carrying 20 marks or 3 short answer type carrying 10, 5, 5 marks.

Example:

Q. Long answer type (20 Marks)

OR

- a) Explanatory note (10 marks)
- b) Short note (5 marks)
- c) Short note (5 marks)

Semester – IV

OR

CC – 402B Petroleum Geology (Special Paper) FM: 80

Unit –I : Introduction, Uses of Petroleum, Reservoir Rocks

Unit –II : Origin of Petroleum, Oil Traps

Unit –III : Petroleum Exploration, Petroleum and Environment, Composition of Crude Oil, Natural Gas

Unit –IV : Distribution of Oil and Gas in India, Sources of Mineral Oil: Oil Shales, Black Shale, CBM, Oil from Plants

N.B: MID SEMESTER EXAMINATION : 20 MARKS (Viva-voce)

Question Pattern:

Questions will be set from each unit. There will be four questions in a paper. Each unit will have one long answer type question carrying 20 marks or 3 short answer type carrying 10, 5, 5 marks.

Example:

Q. Long answer type (20 Marks)

OR

- a) Explanatory note (10 marks)
- b) Short note (5 marks)
- c) Short note (5 marks)

Semester – IV

CC - 403A

Practical

FM: 100

1. Simple numerical problem related to Hydrogeology.
2. Problem related to groundwater Quality.
3. Electrical resistivity survey and data interpretation.
4. Groundwater resources estimation and budgeting.
5. Groundwater maps, water table contour maps.
6. Hydrogeological Interpretation by Remote Sensing Methods.
7. Numerical relating to Ore Reserve Estimation, Evaluation of Grade.
8. Problems related to Mineral Exploration.
9. Study of Ore Minerals under Ore Microscope.
10. Lab Record and Viva - voce

OR

CC – 403B

Practical

FM: 100

1. Plotting of availability of coal.
2. Distribution of Coal in World.
3. Distribution of Coal in India.
4. Distribution of Coal in Odisha.
5. Identification of microscopic and macroscopic component of coal.
6. Identification of different ranks in coal.
7. Petroleum distribution map of World.
8. Petroleum distribution map of India.
9. Petroleum distribution map of Odisha.
10. Lab. Record and Viva.

Semester - IV

CC - 404

Dissertation, Seminar and Viva FM: 200

Dissertation : 150

Seminar and Viva : 50

Dissertation Topic related to :

- 1. Geological Mapping**
- 2. Remote Sensing and GIS**
- 3. Groundwater Studies**
- 4. Engineering Geology**
- 5. Economic Geology**
- 6. Fossil Studies**
- 7. Environmental Geology**
- 8. Applied Geology**
- 9. Mining Geology**
- 10. Geological Resource Management**
- 11. Any other topic related to Geology**
- 12. Geomorphology**

Sl. No.	Name of the Book	Name of the Author
1	Text Book of Geology	G. B. Mahapatra
2	Text Book of Geology	P. K. Mukherjee
3	Principles of Engineering Geology	K. M. Bangar
4	Text Book of Physical Geology	G. B. Mahapatra
5	Geomorphology	S. Singh
6	General Geology	V. Radhakrishnan
7	Fundamental of Historical Geology and Stratigraphy of India	Ravindra Kumar
8	Principles & Application of Photogeology	S. N. Pandey
9	Oceanography	K. Siddhartha
10	Global Tectonics	P. Kearey & F. J. Vine
11	The Unstable Earth	J. A. Steers
12	Mineralogy	Dexter Perkins
13	Mineral Optics	W. R. Phillips
14	Mineralogy	William D. Nesse
15	Mineral Optics	S. Roy
16	Petrology	J. P. Tiwary
17	Principles of Geochemistry	Moore & Mason
18	Rutley's Elements of Mineralogy	H. H. Read
19	Igneous Petrology	M. K. Bose
20	Principle of Petrology	G. W. Tyrrel
21	Principles of Igneous and Metamorphic Petrology	J. D. Winter
22	Igneous & Metamorphic Petrology	E. Blatt
23	Introduction to Sedimentology	S. M. Sengupta
24	Sedimentology and Stratigraphy	Sam Bogs
25	Textbook of Sedimentary Petrology	V. K. Verma & C. Prasad
26	Sedimentology	Tucker
27	Sedimentary Rocks	F. J. Pettijohn
28	Metamorphic Geology	B. Bhaskar Rao
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