

FIFTH SEMESTER

PAPER 5. ORE GENESIS

PRACTICAL (PR V) ORE MINERALS

PAPER 6. ENVIRONMENTAL GEOLOGY AND ENGINEERING GEOLOGY

PRACTICAL (PR VI) ENGINEERING GEOLOGY

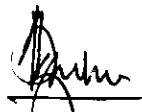
SIXTH SEMESTER

PAPER 7. HYDROGEOLOGY AND REMOTE SENSING

PRACTICAL (PR VII) HYDROGEOLOGY

PAPER 8. INDIAN MINERAL DEPOSITS

PRACTICAL (PR VIII) REMOTE SENSING


Chairman BUI in Geology
Davangere University

Dr. A. G. UGARKAR
Former Professor
Department of Studies in Geology
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Karnataka, INDIA


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FIFTH SEMESTER

PAPER 5. ORE GENESIS

Theory 4hr/week

UNIT-1

Introduction to ore genesis in relation of industry and national economy. Syngenetic and epigenetic deposits. Controls of ore deposition - Structural, stratigraphic, physical and chemical. Magmatic concentration: Early magmatic concentration deposits - dissemination, segregation, injection. Late magmatic concentration deposits - residual liquid segregation and injection, immiscible liquid segregation and injection.

13 hrs

UNIT-2

Metamorphism and metasomatism ore deposits: Chief agencies - heat, pressure, active fluids and time. Distinction between metamorphism and metasomatism. Metamorphism as a process of formation of ore deposits. Metasomatism as a process of formation of ore deposits.

13 hrs

UNIT-3

Hydrothermal ore deposits - Hydrothermal fluids and their migration and deposition. Meanings of epithermal, mesothermal and hypothermal hydrothermal deposits. Cavity filling and replacement type hydrothermal deposits.

Oxidation and supergene enrichment: Gossan, zone of oxidation, supergene enrichment zone and primary zone.

13 hrs

UNIT-4

~~Sedimentation deposits. Precipitation from solution and formation of ore deposits. Features of sedimentary ore deposits. Evaporites: salt deposits~~

Residual deposits: Process of residual concentration. Lateritisation and bauxitisation.

Mechanical concentration deposits: Process of mechanical concentration. Alluvial, eluvial, eolian and beach placers (detrital/heavy minerals).

Total 52 hrs

Books:

1. Economic Mineral Deposits – Mead Jensen and Bateman Allan M, New Edition
2. Economic Geology – Charles Richardson
3. Introduction to Ore-Forming Processes – Lawrence Robb
4. Ore Geology and Industrial Minerals – Anthony M Evans
5. Ore Deposits of India – G.K.Gokhale & Rao T.C.
6. Ore Deposits- Park Jr. C.F.
7. Economic Geology – Umeshwar Prasad

PRACTICAL (PR V) ORE MINERALS

Practical 3 hrs/week

Identification and physical properties of the following ore minerals:

Iron: Hematite, Magnetite, Lemonite and Pyrite

Copper: Native copper, Chalcopyrite, Malachite and Azurite

Manganese: Pyrolusite and Psilomelane

Lead and Zinc: Galena and Sphalerite

Bauxite, Chromite, Realgar, Orpiment, Magnesite, Limestone and Dolomite

Varieties of Coal: Peat, Lignite, Bituminous and Anthracite

Preparation of maps showing distribution of following ore/fuel deposits in India:

Iron, Copper, Gold, Lead-Zinc, Bauxite, Coal and Petroleum

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PAPER 6. ENVIRONMENTAL GEOLOGY AND ENGINEERING GEOLOGY

Environmental Geology

UNIT-1

Ecology and environmental geology, man and environment. Natural environmental Hazards: Introduction, global context, regional context and the Indian context. Earthquakes – Introduction, causes, characteristics and earthquake hazards. Floods – Introduction, causes, the nature of flood problem and types of floods. Landslides and avalanches – Introduction, causes.

13 hrs

UNIT-2

Environmental Pollution: Surface and groundwater pollution and their causes. Soil pollution. Mining Pollution: Effects of Mining on the Environment – Use of energy, air pollution, water pollution, generation of wastes, health and safety. Greenhouse effect – Global warming and their effect on the environment.

13 hrs

Engineering Geology

UNIT-3

Introduction. The role of geology in civil engineering. Engineering properties of rocks. Building stones and road materials: Granite, basalt, sandstone, slate, marble, charnockite, laterite and sand. Landslides, stable and unstable slopes.

13 hrs

UNIT-4

Building sites: Requirements, foundation problems, nature of bedrock and soil. Bridges, dams, reservoirs and tunnels: Types and foundation problems. Geological considerations like topography, structure, lithology and geotechnical solutions.

13 hrs

Total 52 hrs

Books:

1. Environmental Geology – Indian Context - by K.S.Valdia
2. Geology, Environment and Society - by K S Valdia
3. Coping with natural hazards – Indian Context – by K.S.Valdia
4. Environmental Geology – By Keller
5. Engineering and Environmental Geology - by Árpád Dávid
6. Engineering Geology- Parbin Singh
7. Engineering Geology- F.C.Bell
8. Principles of Engineering Geology - Bangar

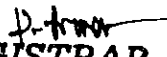
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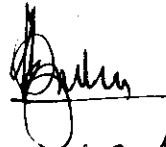
PRACTICAL (PR VI) ENGINEERING GEOLOGY

Engineering Geology related problems:

Practical 3 hrs/week

1. Solving of dip and strike problems.
2. Solving of Borehole problems (3 point).
3. Identification of suitable site for dam and tunnel construction using the given geological maps.


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SIXTH SEMESTER

PAPER 7. HYDROGEOLOGY AND REMOTE SENSING

Hydrogeology

UNIT-1

Hydrological cycle: Evaporation, transpiration, evapotranspiration, precipitation, sublimation, infiltration, runoff, groundwater flow.

Water Resources: Surface water and its types. Groundwater and its sources.

UNIT-2

13 hrs

Hydrological properties of water bearing materials: Specific yield, specific retention, porosity, permeability, types of openings in rocks.

Subsurface distribution of water: Zone of aeration, zone of saturation, groundwater table, perched water table.

UNIT-3

13 hrs

Aquifers: Definition, Classification- Confined and unconfined aquifers, aquiclude, aquifuge, aquitard and Darcy's Law.

Seepage: Definition, factors controlling seepage, influent and effluent seepage.

Springs: Definition, classification- gravity and non gravity; types of springs- bedding plane, contact, thermal and artesian.

Wells: Types of wells and groundwater recharge structures.

Water Harvesting: Rainwater harvesting and its importance.

13 hrs

Remote Sensing

UNIT-4

Introduction to aerial photography and remote sensing. Applications of aerial photographs and satellite imageries in earth science studies. Types of aerial photographs and their interpretation techniques. Types of images like, Panchromatic image, True Color and False color composite and Thematic images and their interpretation.

13 hrs

Total 52 hrs

Books:

1. Groundwater - By Todd D. K., John Wiley and Sons.
2. Groundwater - By K. V. Karanth,
3. Hydrogeology - By Stanley N. Davis, Roger J. M. De Wiest, John Wiley
4. Ground water, Wiley Eastern. Rangunath, H.M. 1983
5. Ground water Assessment Development & Management.. Karanath, K.R. 1987.
6. Aerial Photographic interpretation and applications- D.R.Leudar
7. Manual of photogrammetry - M.Thomson,Ed
8. Manual of Remote Sensing - R.G.Reeves, Ed

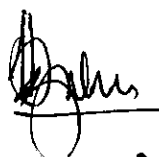
9. Remote Sensing in Geology- P.S.Siegal & A.R.Gillespie
10. Text book of Remote Sensing and Geographical information systems - M.Anji Reddy
11. Principles and Applications of Photogeology - By S. N. Pandey.
12. Remote Sensing- Principles and Interpretation - By F. F. Sabins,

PRACTICAL (PR VII) HYDROGEOLOGY

Practical. 3 hrs/week

1. Water Quality Interpretation: Based on given data calculate-Na/RSC/SAR and draw Pie, Bar, Stiff, Gibbs and Piper diagrams. Comment on the suitability/quality of the water.
2. Basin Analysis, morphometric analysis using Drainage patterns.
3. Determination of pH, EC, TDS and TH


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PAPER 8. INDIAN MINERAL DEPOSITS

UNIT 1 Definitions of ore minerals, gangue minerals and tenor of ore. Essential, strategic and critical minerals. Study of the following deposits with reference to mode of occurrence, mineralogy, genesis, uses and their distribution in India: Iron, Manganese, Aluminium and Chromium.

UNIT 2 13 hrs
Study of the following deposits with reference to mode of occurrence, mineralogy, genesis, uses and their distribution in India: Copper, Lead, Zinc, Gold and Mica.

UNIT 3 13 hrs
Study of the following materials with reference to mode of occurrence, mineralogy, genesis, uses and their distribution in India: Ceramics, Abrasives, Refractories, Cement Ornamental stones.

UNIT 4 13 hrs
Study of fossil fuels: Coal- stages and periods of coal formation, Lower Gondwana coalfields, Peat and lignite deposits. Petroleum - origin, migration and accumulation of oil traps, On-shore and Off-shore oil fields of India.

13 hrs

Total 52 hrs

Books:

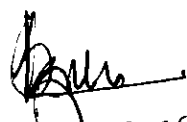
8. Ore Deposits of India - G.K.Gokhale & Rao T.C.
9. Indian Mineral Resources - S.Krishnaswamy
10. Minerals of Karnataka - B.P.Radhakrishna
11. Treatise of Minerals of India - R.K.Sinha
12. Ore Deposits of India - G.K.Gokhale & Rao T.C.
13. Economic Geology - Umeshwar Prasad

PRACTICAL (PR VIII) REMOTE SENSING

Practical 3 hrs/week

Interpretation of Geo-coded Satellite Imageries (False Colour Composite) to identify litho contacts, water bodies, vegetation, land use, land cover systems, structures like lineaments, faults, folds and drainage patterns.


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