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जय नारायण व्यासविश्वविद्यालय
JAI NARAIN VYAS UNIVERSITY, JODHPUR
FACULTY OF SCIENCE
NEW CAMPUS

B.Sc III Year Geology – Annual-System-2023-24

B. Sc. III year Geology 2023-2024

Theory

Paper I	Economic Geology	50 Marks
Paper II	Structural Geology	50 Marks
Paper III	Applied Geology	50 Marks
Practicals	: Practical Examination	75 Marks

Total 225 Marks

Duration of each theory paper Examination 3 Hrs.

Duration of Practical Examination 3 Hrs.

PAPER I :ECONOMIC GEOLOGY

UnitI:

Ore forming process and deposits: Magmatic Concentration, Pegmatite, Contact metasomatism (including Skarns), Hydrothermal process and deposits.

UnitII:

Ore forming process and deposits: Sedimentation (Chemical Precipitation and Evaporation), Weathering (Residual and Mechanical Concentration), Oxidation and Supergene sulphide enrichment. Volcanogenic, Metamorphic and Biogenic Process and deposits.

Unit III:

Geological setup and economic aspects of (a) Gold deposits of India (including Kolar Gold Field), (b) Lead Zinc and Copper deposits of India (including Zawar, Rajpura-Dariba,

Malanjkhand, Khetri and Singhbhum deposits) (c) Iron and manganese deposits of India
(d) Aluminium, Chromium, Tin and Tungsten deposits of India.

Physical properties, mode of occurrence and genesis, Indian location and economic use of following Ore minerals: Native Gold, Galena, Sphalerite, Chalcopyrite, Limonite (Gossan), Magnetite, Hematite, Pyrolusite, Psilomelane, Wed Ore, Bauxite, Chromite, Wolframite and Casseterite.

Unit VI:

Description of minerals used and the industries including, Cement, Fertilizer, Refractory, Abrasive, and Gem Stones.

Introduction of mineral used and industries including, Glass and Ceramics, Paint and Pigments, Insulator, Electronic and Building Stones.

Physical properties, mode of occurrence and genesis, economic use and Indian location of following industrial minerals and rocks: Apatite, Phosphorite, Pyrite, Gypsum, Diamond, Zircon, Kyanite, Magnesite, Garnet, Corundum, Quartz, Feldspar, Asbestos, Wollastonite, Talc, Fluorite, Barite, Muscovite, Ochur, Malachite, Azurite, Graphite. Limestone, Marble and Granite.

Unit V:

Energy Minerals: (A) Coal: Proximate and ultimate analysis of coal, classification of coals, ranks of coal, Origin of coal. Indian coal fields (B) Petroleum: Origin of Petroleum. Petroleum Geology of Bombay High, Cambey basin, Northeastern India and Barmer-Sanchor basin, (C) Nuclear Minerals: Types and Origin of various Uranium and Thorium deposits. Geology of Jaduguda Uranium deposit. Coastal Thorium Sand deposits.

PAPER II: STRUCTURAL GEOLOGY

Unit I:

Concept of Bed, Dip and Strike, True and Apparent dips. Toposheet, Clinometer, Brunton Compass. Geological Map: Definition and its Components. Methods of geological mapping in the field. Determination of thickness of bed, dip and strike in the Geological map. Preparation of cross section of Geological maps.

Unit II:

Determination of top and bottom of Sedimentary beds.Outlier, Inlier, Overlap and Offlapstructures.Stereographic projection and its use in Structural analysis.

Unit III:

Fold: Definition and morphology. Geometric and genetic classifications.Elementary idea about mechanism of folding.Recognition of folds in map and field.

Unit IV:

Faults: Definition and Terminology of its parts. Classifications.Effect of Faulting on outcrops.Recognition of faults in map and field.

Unit V:

Unconformities: types and recognition. Joints: Characteristics and Types. Cleavage, Schistosity and Lamination: types and their significance to recognize the major structures.

PAPER III: APPLIED GEOLOGY

Unit I:

Environmental Geology: Concept of natural ecosystem, Interaction and inter-relation of Atmosphere, Hydrosphere, Lithosphere and Biosphere. Soils. Hydrological cycle.

Remote Sensing: Fundamentals of Remote Sensing. Preparation and study of areal photographs for Geomorphology, Structural Geology and Lithology. Preparation of Geological map using Remote Sensing. Applications of Remote sensing.

Unit II:

Groundwater hydrology: Groundwater and Surface water reservoirs. Aquifer, Aquiclude and Aquifuge.Darcy's law and its validity.Groundwater provinces of Rajasthan and India.Watershed management and linking of rivers.Quality of groundwater.

Unit III:

Engineering Geology:Types and terminology of Dams and Tunnels.Geological considerations to locate dams and tunnels including (a) Structural Geology (b) Lithology and (c) Groundwater.

Geological disasters : Earthquakes and Tsunami, Volcano, Flood and Landslide.

Unit VI:

Mineral exploration: Surface and subsurface exploration methods.Remote sensing and exploratory mapping. Geophysical exploration: Gravity, Electrical, Magnetic, and Seismic methods of exploration. Geobotanical and geochemical methods of exploration.

Drilling: Types, logging and problems.

Unit V:

Principles of mineral economics: National policy. Strategic, critical and essential minerals.Mineral production in India.Changing pattern of mineral consumption.Mineral concession rules.Marine mineral resources and Law of sea.

PRACTICALS

1. Physical properties, mode of occurrence and genesis, Indian location and economic use of Metallic minerals (ores).
2. Physical properties, mode of occurrence and genesis, Indian location and economic use of Non Metallic (industrial Minerals) and Coals.
3. Preparation of map showing distribution of important economic deposits.
4. Preparation of Cross section of Geological maps and/or completion of outcrop maps.
5. Use of Stereographic projections for Structural Geology.
6. Sessional Marks.

SUGGESTED READING

1. Jenson M and Bateman A M.: 'Economic Mineral Deposits'. John Wiley and Sons Newyork.
2. GokhleKVand GK Rao: 'Ore Deposits of India, Thomson Press

3. Vyas GK: 'ArthikBhuVigyan'. Madhya Pradesh Hindi Granth Academy
4. Manjrekar RP: 'ArthikevamVyavharikBhuVigyan'. Madhya Pradesh Hindi Granth Academy
5. Rakshpal R. 'Bharat kiKhanizSampdaevamUdyog'. Rajasthan Hindi GranthAcademy.
6. Billings M. P.: 'Structural Geology'
7. Shrivastava D.K. SanrachnatmakBhuVigyan Madhya Pradesh Hindi Granth Academy
8. Arogyaswami RNP 'Mining Geology' CBS publishers
9. Todd 'Groundwater Hydrology'
10. Todd D. K. 'BhaumJalVigyan' Madhya Pradesh Hindi Granth Academy
11. Satyanarayan Swami B. S. 2000 : 'Engineering Geology' DhanpatRai and Cop Delhi
12. Pandey SN 1987 'Principles and Applications of Photogeology' Wiley Eastern New Delhi
13. Guha P.K., 2013. Remote Sensing for Beginners. East-west Press Pvt. Ltd. ISBN 9788176710961