B.Sc. Geology III Year
Semester – VI
Paper – VI - (A) Hydrogeology
(DSE-6- Elective- I)

(4 hrs/week) **Credits-4 (60 hours)**

Unit-I

Introduction: Definition of hydrology, hydrogeology, scope and application of hydrogeology.

Hydrological Cycle: Concept of hydrological cycle, evaporation, condensation, precipitation, infiltration, transpiration, evapotranspiration; groundwater and runoff, connate water, juvenile water, movement of subsurface water.

Ground Water: Origin, occurrence, vertical distribution of sub-surface water, zone of aeration soil water, vadose water, capillary fringe. zone of saturation – water table. perched water table.

Unit-II

Aquifers : Definition of aquifer, aquitard, aquiclude, aquifuge. types of aquifers, confined, semi-confined, unconfined. properties of aquifer – porosity, retention of water in rocks, yield of water from rocks (specific yield and specific retention), darcy's law, permeability, hydraulic conductivity. storage co-efficient .

Quality of Groundwater : Physical, chemical and bacteriological characteristics of groundwater. suitability of groundwater for drinking (with special reference to fluoride content).

Pollution of Groundwater: pollution in relation to water use urban, industrial and agricultural sources and causes of pollution.

Unit-III

Groundwater Investigations: Scope of investigations, methods of groundwater explorations, brief account of geologic, hydrogeologic, geo-botanical investigations, introduction to remote sensing techniques.

Unit-IV

Geophysical Exploration: Basic principles of geophysical exploration methods, electrical methods – schlumberger and wenner configuration, resistivity profiling and vertical electrical sounding.

B.Sc. Geology III Year
Semester – VI
Paper – VI – (A) Hydrogeology practicals
(DSE-6- Elective I)

(3 hrs/week) **Credits-3 (45 hours)**

1. Methods of water analyses for physical and chemical parameters.
2. pH Electrical conductivity and total dissolved solids estimation in water.
3. Electrical Resistivity - Schlumberger method and VES for groundwater exploration.

Text Books :

1. Groundwater hydrology, by Todd, D. K. 2006, 2nd Ed., John Wiley & Sons, N.Y.
2. Applied Hydrogeology by Fetter.

Reference books:

1. Hydrogeology by Davis and Dewiest.
2. Hydrogeology by Karanth.
3. Groundwater Assessment - Development and Management by Karanth, Tata McGrawHill Pub. Co.
4. Applied principles of Hydrogeology by Mannings.

Practical Model Paper

B.Sc. (CBCS) - III Year Practical Examination
GEOLOGY
Semester-VI : Paper VI (A)
Hydrogeology
(DSE-6-Elective-1) **Credits : 1**

Time: 2 Hours **Max.Marks:25**

1) Analyze the given water sample and estimate their chlorides, carbonates, Bi-carbonates and calcium. (5 M)
2) Find out the pH and Electrical conductivity of the given water sample. (5 M)
3) Conduct the geophysical survey in field for ground water exploration and suggest a suitable point for bore well / open well by interpreting the data. (10 M)
4) Record &Viva (5 M)

B.Sc. Geology III Year
Semester VI
Paper-VI- (B) Mineral Exploration

(4 hrs/week) **(DSE-6 - Elective-II)** **Credits-4 (60 hours)**

Unit-I

Definition and scope of mineral prospecting and exploration; prospecting criteria and detailed geological guides: physiographic, lithological, structural and stratigraphic.

Unit – II

Geochemical prospecting –anomaly, types of geochemical surveys and exploration tools, primary and secondary dispersion, pathfinder elements.

Unit-III

Geophysical exploration brief description and application of gravity, magnetic seismic electrical and radioactive methods.

Unit-IV

Estimation of ore reserves – classification – sampling: chip sampling, grab sampling, pitting, trenching and calculation of ore reserves and characterisation under UNFC.

B.Sc. Geology III Year
Semester VI
Paper-VI - (B) Mineral Exploration practicals
(DSE-6- Elective-II)

(3 hrs/week) **Credits-3 (45 hours)**

1. Sample preparation - Coning and quartering.
2. Estimation of ore reserves, Bedded type and vein type (included area and extended area method problems).
3. Calculation of tonnage by grid pattern.

Text books:

1. Courses in mining geology - R.N.P.Arogya Swamy.
2. Mining Geology - Mc.Kinstry

Reference books:

1. Geological Prospecting and exploration- V.M.Kneiter.
2. Mineral Economics - R. K.Sinha & N.L.Sharma.
3. Elements of Mining. Clark, G.B. 1967, 3rd Ed. John Wiley & Sons.
4. Introduction to Mineral Exploration, Blackwell Publishing.Moon, C.J., Whateley, M.K.G., Evans, A.M., 2006,

Practical Model Paper

B.Sc. (CBCS) - III Year Practical Examination
GEOLOGY
Semester-VI : Paper VI (B)
(Mineral Exploration)
(DSE-6-Elective –II)

Credits : 1
Max.Marks:25

Time: 2 Hours

1) Prepare the given sample by coning and quartering method . (5 M)

2) 25 bore holes were sunk in a grid pattern at an interval of 200 Mts. for the Exploration and Mining of Bauxite. All the eastern and western bore holes yielded 20 Mts. and 30 Mts. of Bauxite. Calculate the volume and the tonnage of Bauxite if the specific gravity is 1.8. (15 M)

3) Record &Viva (5 M)
