

SEMESTER VI
MAJOR COURSE – MJ 13
HYDROGEOLOGY AND ENGINEERING GEOLOGY
Full Marks: 75 Time: 3 Hours

GROUP – A

Q1. Choose the correct answer:

1. The water table represents the upper surface of the:
(a) Unsaturated zone (b) Saturated zone (c) Soil zone (d) Capillary fringe only **(1 mark)**
2. Specific yield is the amount of water that a saturated material can:
(a) Store chemically (b) Release by gravity (c) Absorb from air (d) Lose by evaporation only **(1 mark)**
3. A confined aquifer is bounded by:
(a) Only permeable beds (b) Confining layers (c) The atmosphere (d) River water **(1 mark)**
4. Rainwater harvesting is mainly used to:
(a) Increase groundwater recharge (b) Increase erosion (c) Reduce infiltration (d) Increase salinity **(1 mark)**
5. R.Q.D. in engineering geology stands for:
(a) Rock Quality Designation (b) Rock Quantity Density (c) Rock Quarry Data (d) Rock Quality Depth **(1 mark)**

Q2. What is an aquifer? Describe confined, unconfined, perched and leaky aquifers. (5 marks)

Q3. Explain groundwater exploration by electrical resistivity methods and mention the importance of borehole logging. (5 marks)

GROUP – B

Answer any four questions. (4 × 15 = 60)

Q4. Discuss the scope and societal relevance of hydrogeology. Explain groundwater occurrence, aquifer parameters and groundwater exploration. (15 marks)

Q5. Explain groundwater flow and Darcy's law. Discuss hydraulic conductivity, transmissivity, storage coefficient and basic concepts of well hydraulics. (15 marks)

Q6. Describe groundwater management. Discuss surface and subsurface interaction, groundwater-level fluctuations, water-balance studies and rainwater harvesting. (15 marks)

Q7. Explain the physical and chemical properties of groundwater. Discuss water quality, graphical interpretation of groundwater chemistry and seawater intrusion. (15 marks)

Q8. Discuss the engineering properties and characteristics of soils and building stones. Explain R.Q.D., R.S.R., R.M.R. and Q-system of rock-mass classification. (15 marks)

Q9. Explain the geological considerations for dams and reservoirs. Discuss seepage, siltation, reservoir-site problems, tunnel geology and classification and stability of rock slopes. (15 marks)