

2026

Geology (Core)

Paper Code : GL-CE-6334

Paper Name : Hydrogeology

Time : 2 hours

Full Marks : 50

The figures in the margin indicate full marks for the questions.

1. Choose the correct option : 1×4=4
- a) Which water type is most likely trapped in sedimentary rocks during diagenesis ?
- i) Meteoric ii) Juvenile
iii) Connate iv) Magmatic
- b) Darcy's Law fails when flow becomes :
- i) Laminar ii) Turbulent
iii) Anisotropic iv) Heterogeneous
- c) In non-equilibrium well flow, which method accounts for unsteady drawdown ?
- i) Thiem ii) Theis
iii) Dupuit iv) Darcy
- d) Artificial recharge is least effective in aquifers with :
- i) High porosity ii) Low permeability
iii) Good connectivity iv) Shallow depth
2. Answer the following questions : 2×3=6
- a) How does clay content affect aquifer anisotropy ?
- b) Differentiate water table and piezometric surface.
- c) What is "specific retention" vs "specific yield" ?

Contd.

3. Write briefly on *any two* of the following : 5×2=10
- a) Infiltration rates in fractured basalt vs sandstone aquifers.
 - b) Steady-state vs transient well flow.
 - c) Wenner vs Schlumberger Array Configurations in Resistivity Surveys.
 - d) Artificial recharge of ground water.
4. Answer *any three* of the following : 10×3=30
- a) Describe with the help of a sketch the groundwater flow path from recharge area to discharge spring, showing equipotential lines and flow direction. 10
 - b) Write a comparative analysis on surface geophysical methods - electrical resistivity and seismic refraction for groundwater exploration. 10
 - c) “During pumping test in unconfined aquifer, drawdown increases over time” - explain the reason with the help of well hydraulics concepts. Compare with confined aquifer behaviour. 7+3=10
 - d) Describe groundwater flow rates using Darcy’s Law, intrinsic permeability, and hydraulic conductivity. 4+3+3=10
 - e) Explain with relevant diagram about physical and chemical qualities of groundwater. 5+5=10
 - f) Explain groundwater contamination sources and the remedial steps to cope up with such situations. 5+5=10

