

CBGS SCHEME



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Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025 Ground Water Hydraulics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. With a labelled neat sketch, explain the vertical distribution of groundwater. (10 Marks)
- b. Define the following : (10 Marks)
- i) Aquifers
 - ii) Aquifuge
 - iii) Aquitard
 - iv) Aquiclude
 - v) Confined aquifer

OR

- 2 a. Explain confined and unconfined aquifers with a neat sketch. (10 Marks)
- b. Explain the importance of ground water and its occurrence in different types of Rocks and Soils. (10 Marks)

Module-2

- 3 a. State Darcy's Law. Derive an expression for Darcy's law. (10 Marks)
- b. Define the following : with mathematical expression. (10 Marks)
- i) Specific yield
 - ii) Specific Relation
 - iii) Storage co-efficient
 - iv) Co-efficient of permeability

OR

- 4 a. Compare hydraulic conductivity and intrinsic permeability, with relevant expression. (10 Marks)
- b. It is observed in a field test that 3 hours 20 minutes was required for a tracer to travel from one well to another well 20m apart and difference in their water surface elevations was 0.5m. The aquifer has a porosity of 15%. Compute the permeability of the aquifer, seepage velocity and the Reynold's Number for the flow assuming an average grain size of 1mm and $\gamma_{\text{water}} = 0.008$ stoke at 27° C. (10 Marks)

Module-3

- 5 a. Derive an expression for steady Radial Flow in confined aquifer what are its assumptions and limitation? (12 Marks)
- b. A 30 cm well fully penetrates a confined aquifer 30m deep. After a long period of pumping at a rate of 1200 lpm the draw downs in the well at 20 and 45m from the pumping well are found to be 2.2 and 1.8m respectively. Determine the transmissibility of the aquifer what is the drawdown in the pumped well? (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 6 a. Explain Theis method to determine aquifer constant S and T for unsteady radial flow towards well. (12 Marks)
b. Describe Image well theory. (08 Marks)

Module-4

- 7 a. Enumerate the ground water exploration by seismic Refraction method, with sketch. (10 Marks)
b. Describe in detail ground water exploration by electrical resistivity method. (10 Marks)

OR

- 8 a. Describe the following:
i) Electrical logging
ii) Induction logging (10 Marks)
b. Broadly classify the open wells, explain the construction of open well. (10 Marks)

Module-5

- 9 a. Comment on the objectives of monitoring ground water quality. List out the parameters to be considered in evaluating the ground water quality. (12 Marks)
b. Explain saline water intrusion into aquifers. (08 Marks)

OR

- 10 a. Describe the following :
i) Electric Analog models. (12 Marks)
ii) Digital computer models
b. Explain remedial measures of the ground water contamination. (08 Marks)
