



CBCS SCHEME

17CV742

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Ground Water and Hydraulics

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Write a note on the importance of ground water. (08 Marks)
- b. Explain the vertical distribution of ground water with neat sketch. (06 Marks)
- c. Explain in brief the occurrence of groundwater in different types of rocks and soils. (06 Marks)

OR

- 2 a. What is Aquifer? Explain different types of aquifers, with a neat sketch. (10 Marks)
- b. Define the terms : i) Aquifuge ii) Aquitard iii) Aquiclude (10 Marks)

Module-2

- 3 a. With a neat sketch, explain Darcy's Law and discuss its validity and limitations. (10 Marks)
- b. Determine the storage coefficient of an aquifer from the following data ;
Porosity = 30%, Thickness of aquifer = 25m, Bulk modulus of water, $K_w = 2.1 \text{GN/m}^2$,
Modulus of elasticity of the soil skeleton $E_s = 3 \times 10^8 \text{N/m}^2$. (10 Marks)

OR

- 4 a. Explain the following:
i) Porosity ii) Specific yield iii) Hydraulic conductivity iv) Transmissibility. (10 Marks)
- b. An unconfined aquifer consists of three horizontal layers, each individually isotropic. The top layer has a thickness of 10m and a hydraulic conductivity of 11.6m/day. The middle layer has a thickness of 4.4m and hydraulic conductivity of 4.5m/day. The bottom layer has a thickness of 6.2m and a hydraulic conductivity of 2.2m/day. Compute the equivalent horizontal and vertical hydraulic conductivities. (10 Marks)

Module-3

- 5 a. Describe steady radial flow in unconfined and confined aquifer. (10 Marks)
- b. A 30cm well fully penetrates a confined aquifer 30m deep. After a long period of pumping at a rate of 1200 lpm, the drawdown in the wells 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? (10 Marks)

OR

- 6 a. Write short notes on :
i) Leaky aquifer ii) Image well. (10 Marks)
- b. Explain this method and also assumption. (10 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.

Module-4

- 7 a. Explain with neat sketch, seismic refraction method for ground water exploration. (10 Marks)
b. Write short notes on :
i) Radioactive logging ii) Sonic logging. (10 Marks)

OR

- 8 a. Explain with neat sketch the electrical resistivity method for ground water exploration. (10 Marks)
b. Write short notes on :
i) Electrical logging ii) Induction logging. (10 Marks)

Module-5

- 9 a. Explain the different types of wells also give the method of construction for any one of the well. (10 Marks)
b. Explain the advantages and disadvantages of open wells and tube wells. (05 Marks)
c. What are the factors considered for the selection for pump set for shallow and deep wells? (05 Marks)

OR

- 10 a. Write short notes on :
i) Core drilling ii) Cable tool percussion drilling. (10 Marks)
b. List out the various methods of ground water recharge and explain any two with neat sketch. (10 Marks)
