EPCET LIBRARY BANGALORE-49

CBCS SCHEME

USN | | | | | | | | | | |

21CV645

Sixth Semester B.E./B.Tech. Degree Examination, June / July 2026
Ground Water Hydraulics

Time: 3 hrs. Max. Marks: 100

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

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-1

1 a. Quantify the world's total water resources and explain the Quantity Ground water available on the planet earth. **(08 Marks)**

b. Briefly explain the importance of ground water. **(06 Marks)**

c. With a neat sketch explain the vertical distribution of sub surface water. **(06 Marks)**

OR

2 a. Describe briefly the occurrence of Ground water in different types of rocks and soils. **(06 Marks)**

b. With a neat sketch explain the different types of Aquifers. **(08 Marks)**

c. Define the porosity, specific yield, specific retention and storage co-efficient. Show the relationship between them. **(06Marks)**

Module-2

3 a. Explain the Darcy's law. What are the assumptions made? Also explain the range of validity of Darcy's law. **(10 Marks)**

b. In a Phreatic aquifer extending over 1 km^2 the water table was initially at 25 m below ground level. Some time after irrigation with a depth of 20 cm of water, the water table rose to a depth of 24 m below ground level later 3×10^5 m^3 of water was pumped out and the depth of water table dropped to 26.2 m BGL.
Determine :
i) Specific yield of the aquifer ii) deficit in soil moisture (Below field capacity) before irrigation. **(10 Marks)**

OR

4 a. Define Permeability, explain the determination of permeability by constant head method. **(06 Marks)**

b. With a neat sketch derive the equation for steady unidirectional flow in confined aquifer. **(08 Marks)**

c. Define Hydraulic conductivity, Intransic permeability. **(06Marks)**

Module-3

5 a. Derive an equation for discharge for the case of steady radial flow in to an unconfined aquifer, also list the limitations. **(10 Marks)**

b. A 29.9 cm well fully penetrates a confined aquifer 30.02 m deep. After a long period of pumping at a rate of 1200 LPM the drawdowns 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. With an equation express Theis method of solution for unsteady radial flow in confined Aquifer, also list out the assumptions made. **(08 Marks)**

b. Describe the unsteady radial flow into a well in unconfined aquifer. **(06 Marks)**

c. With an equation enumerate the solution for Cooper. Jacob method for unsteady radial flow. **(06 Marks)**

Module-4

7 a. With a neat sketch discuss the electrical resistivity method of ground water exploration. **(10 Marks)**

b. Explain types of radioactive logging adopted in ground water exploration with simple sketches. **(10 Marks)**

OR

8 a. Discuss the seismic refraction method of ground water exploration with time – travel graph. Enumerate the applications of this method. **(10 Marks)**

b. Explain the temperature logging adopted in ground water exploration. Also explain the fluid resistivity logging with the help of simple sketches. **(10 Marks)**

Module-5

9 a. Explain how the eater quality measures in a basin for the ground water. **(10 Marks)**

b. Write a note on :
i) Sources of salinity
ii) Chemical Analysis of ground water
iii) Techniques used for Ground Water Quality Assessment. **(10 Marks)**

OR

10 a. With a neat sketch, explain the physical analysis of Ground water samples. **(10 Marks)**

b. Write a note on:
i) Porous Media Models
ii) Electric Analog Models
iii) Digital Computer Models. **(10 Marks)**