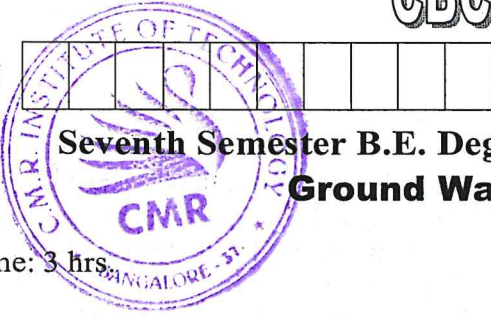


CBCS SCHEME

USN



17CV742

Seventh Semester B.E. Degree Examination, July/August 2021 Ground Water and Hydraulics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions.

- 1 a. What is an Aquifer? Explain the confined and unconfined aquifer, with neat sketch. (10 Marks)
b. Define the terms : i) Juvenile water ii) Vadose water iii) Connate water
iv) Fossile water v) Meteroic water. (10 Marks)
- 2 a. Explain the significance of ground water and enumerate the occurrence of ground water in different types of Rocks. (10 Marks)
b. Define the term with example : i) Aquitard ii) Acquifuge iii) Aquiclude
iv) Acquifer v) Extrusive Igneous water. (10 Marks)
- 3 a. What are the assumptions made in Darcy's law? Derive Darcy's law for Laminar flow conditions for the velocity. (10 Marks)
b. It was observed in a field test that 4 hr 30min was required for a tracer to travel from one well to another 30m apart and the difference in their water surface elevation was 0.5m. Samples of the aquifer between the wells indicated a porosity of 15%. Determine the Permeability of aquifer, Seepage velocity and Reynolds Number for the flow. Assume an average grain size of 1mm and γ_{water} at $27^{\circ}\text{C} = 0.008$ stokes. (10 Marks)
- 4 a. Define Permeability. Explain the determination of permeability by Constant head method. (10 Marks)
b. A 30cm well penetrate 50m below the static water table. After a long period of pumping at a rate of 1800 ℓpm , the drawdown in the wells at 15 and 45m from the pumped well were 1.7 and 0.8m respectively. Determine the transmissibility of the aquifer. What is the drawdown in the pumped well? (10 Marks)
- 5 a. Derive an equation for discharge for the case of steady radial flow into an unconfined aquifer. List the limitations. (10 Marks)
b. A well 0.5m in diameter penetrates 33m below the static water table. After a long period of pumping at a rate of $80\text{m}^3/\text{hr}$. The drawdown in wells 18 and 45m from the pumped well were found to be 1.8 and 1.1m respectively.
i) Determine the transmissivity of the acquifer.
ii) What is the approximate drawdown in the pumped well?
iii) Determine the radius of influence of the pumping well. (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.

- 6 a. What are the assumptions made in Thiem's equation? Explain Thiem's method to determine steady radial flow to well in confined aquifer. (10 Marks)
- b. A 1m diameter well penetrates vertically through a confined aquifer 30m thick, when the well is pumped at $113\text{m}^3/\text{hr}$. The drawdown in a well 15m away is 1.8m in another well 50m away it is 0.5m. What is the approximate head in the pumped well for steady – state conditions and what is the approximate drawdown in the well? Also compute the transmissibility of the aquifer and the radius of the influence of the pumping well. Take the initial Piezo metric level as 40m above the datum. (10 Marks)
- 7 a. Enumerate the ground water exploration by Seismic Refraction method, with neat sketch. (10 Marks)
- b. With neat sketch, explain electric logging for ground water exploration. (10 Marks)
- 8 a. Explain with a neat sketch, the Electrical Resistivity (Surface) method for ground water exploration. (10 Marks)
- b. List the various Surface and Subsurface methods of ground water exploration. Also explain any one type of logging. (10 Marks)
- 9 a. Broadly classify the open wells with the aid of neat sketch. Explain the construction of open well. (10 Marks)
- b. Explain the different types of pumps used to lift water from deep well. Explain any one type of pump, with neat sketch. (10 Marks)
- 10 a. Enumerate factors considered for artificial recharge of wells. Explain any two methods, with neat sketch. (10 Marks)
- b. Enumerate the beneficial occurring from conjunctive use of water. (10 Marks)

