

Code No: 136BZ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, May - 2019

GROUND WATER DEVELOPMENT AND MANAGEMENT

(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

- a) Explain the terms Specific yield and Specific retention [2]
- b) At certain point in an unconfined aquifer of 3 km^2 area, the water table was at an elevation of 102.00 m. Due to natural recharge in a wet season, its level rose to 103.20 m. A volume of 1.5 Mm^3 of water was then pumped out of the aquifer causing the water table to reach a level of 101.20 m. Assuming the water table in the entire aquifer to respond in a similar way, estimate (i) the specific yield of the aquifer and (ii) the volume of recharge during the wet season. [3]
- c) Write a short note on transmissivity. [2]
- d) What are the assumptions involved in differential equation governing ground water flow in three dimensions using Darcy's law. [3]
- e) List the practices that are widely applied using Theim's equation. [2]
- f) List out assumptions involved in Dupit's equation. [3]
- g) Discuss in brief about caliper logging. [2]
- h) What is the purpose of artificial recharge of ground water? [3]
- i) List out advantages of conjunctive use of surface and ground water resources. [2]
- j) Write a short note on upconing of saline water. [3]

PART - B

(50 Marks)

2. With a neat sketch describe the various types of aquifers. [10]
- OR**
- 3.a) Explain how the rock properties affect the Ground water. [6+4]
 - b) How would you classify saturated formations?
 4. How would you explain flow in relation to Ground water contours? [10]
- OR**
5. A field test for permeability consists in observing the time required for a tracer to travel between two observation wells. A tracer was found to take 12 h to travel between two wells 60-m apart when the difference in the water-surface elevation in them was 0.6 m. The mean particle size of the aquifer was 2 mm and the porosity of the medium 0.3. If $\gamma = 0.01 \text{ cm}^2/\text{s}$. Estimate (a) the coefficient of permeability and intrinsic permeability of the aquifer, and (b) the Reynolds number of the flow. [10]

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6. Describe a procedure by using Jacob's method to calculate the aquifer parameters of a confined aquifer by using the well pumping test data. [10]

OR

7. During the recuperation test of a 4.0 m open well a recuperation of the depression head from 2.5 m to 1.25 m was found to take place in 90 minutes. Determine the (a) Specific capacity per unit well area, and (b) yield of the well for a safe drawdown of 2.5 m (c) What would be the yield from a well of 5.0m diameter for a drawdown of 2.25 m? [10]

8. Describe in detail the exploration of ground water by electrical resistivity method. [10]

OR

9. Explain artificial recharge of ground water through stream-channel method and Ditch – and – Furrow method. [10]

10. Elaborate various methods used in constructing shallow wells? Explain in brief one of the method. [10]

OR

11. What are the commonly used methods to control saline water intrusion? Explain them briefly. [10]

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