CBCS SCHEME

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18CV734

Seventh Semester B.E. Degree Examination, July/August 2022
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 neat sketch, describe the vertical distribution of subsurface water. **(08 Marks)**

b. Define the terms:
(i) Aquifer
(ii) Aquitard
(iii) Aquifuge
(iv) Aquiclude **(08 Marks)**

c. Write a note on sources of groundwater. **(04 Marks)**

OR

2 a. Explain different types of aquifers, with a neat sketch. **(10 Marks)**

b. Explain the importance of groundwater and its occurrence in different types of rocks and soils. **(10 Marks)**

Module-2

3 a. Define Porosity, Specific yield and Specific retention. Derive a relationship between them. **(08 Marks)**

b. When 3.68 Mm^3 of water was pumped out from an unconfined aquifer of 6.20 km^2 aerial extent, the water table was observed to go down by 2.60 m. What is the specific yield of the aquifer? During monsoon season if the water table of same aquifer goes up by 10.8 m, what is the volume of recharge? **(08 Marks)**

c. In an area of 100 ha, the water table dropped by 4.5 m, the porosity is 30% and specific retention is 10%. Compute the change in groundwater storage. **(04 Marks)**

OR

4 a. With a neat sketch, explain Darcy's law. What are the limitations and assumptions made in Darcy's law? **(10 Marks)**

b. It was observed in a field test that 10 hrs was required for a tracer to travel from one well to another 50 m apart. The difference in the water surface elevation in them was found to be 0.5 m. The mean particle size of aquifer was 2 mm and porosity of medium is 0.3, if the kinematic viscosity of water = Vwater = 0.01 cm^2/sec. Estimate (i) Coefficient of permeability (ii) Intrensic permeability (iii) Renold's number of flow. **(10 Marks)**

Module-3

5 a. Derive an expression for steady radial flow into a well in an unconfined aquifer. What are its assumptions and limitations? **(10 Marks)**

b. An unconfined aquifer has a thickness of 30 m fully penetrating 20 cm diameter well. This aquifer is pumped at 35 lit/sec. The draw down measured in the two observation wells located at distance 10 m and 100 m from the well are 7.5 m and 0.5 m respectively. Determine the hydraulic conductivity of the aquifer. At what distance from well the drawdown is insignificant? **(10 Marks)**

OR

6 a. Explain Cooper Jacob method to determine S and T for unsteady radial flow. **(10 Marks)**

b. Explain Theis method to determine aquifer constants S and T for unsteady radial flow towards a well. **(10 Marks)**

Module-4

7 a. Describe in detail, groundwater exploration by electric resistivity method. **(10 Marks)**

b. Write short note on:
(i) Sonic logging (ii) Electrical logging **(10 Marks)**

OR

8 a. Explain seismic refraction method for groundwater exploration with a neat sketch. **(10 Marks)**

b. Describe with neat sketch types of Radioactive logging. **(10 Marks)**

Module-5

9 a. Describe any two types tube wells with a neat sketch. **(10 Marks)**

b. Explain the importance and various methods of artificial recharge of groundwater. **(10 Marks)**

OR

10 a. List the different types of pumps used to lift the water from a well. With a neat sketch explain working principle of centrifugal pump. **(10 Marks)**

b. What is conjuctive use of water? Explain its necessity, advantages and disadvantages. **(10 Marks)**

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