CBCS SCHEME

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18CV734

Seventh Semester B.E. Degree Examination, June/July 2023
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. Write the importance of ground water. **(06 Marks)**

b. With a neat sketch, explain the vertical distribution of ground water. **(10 Marks)**

c. Explain (i) Aquitard (ii) Perched aquifer. **(04 Marks)**

OR

2 a. Explain the confined and unconfined aquifers with neat sketches. **(10 Marks)**

b. Explain in brief occurrence of ground water in different types of rocks and soils. **(10 Marks)**

Module-2

3 a. Describe Darcy's law with a neat sketch and discuss it validity and limitations. **(10 Marks)**

b. A soil sample has a volume of 180 cm^3. Volume of voids in the sample is estimated equal to 67 cm^3. Out of the volume of voids the water can move through only 45 cm^3. Determine the porosity, specific porosity, specific retention and specific yield of the soil. What is the area of the aquifer, which the sample was taken from if the pumping at rate of 6 m^3/day causes 1 m head drop in the aquifer in 5 yrs. **(10 Marks)**

OR

4 a. Define Permeability. Explain the method of determining permeability by constant head permeameter with a neat sketch. **(10 Marks)**

b. The thickness of unsaturated layer in a field is 8.2 m. The porosity of soil was measured equal to 0.28. The soil type is clay with the elasticity module of 5.3×10^7 N/m^2. Determine the corresponding storage coefficient for this layer. Assume temperatures as 20 ° C. **(10 Marks)**

Module-3

5 a. Derive the discharge equation for steady radial flow into a well in a confined aquifer. List out the assumptions. **(10 Marks)**

b. A well penetrates fully a 10 m thick water bearing stratum of medium sand having coefficient of permeability of 0.005 m/s. The well radius is 10 cm and is to be worked under a drawdown of 4 m at the well face. Calculate the discharge from the well. What will be the percentage increase in the discharge if the radius of the well is doubled? Take radius of influence as 300 m in each case. **(10 Marks)**

OR

6 a. Explain Thei's method to determine aquifer constants S and T for unsteady radial flow towards well. **(10 Marks)**

b. Explain Chow's method of determining aquifer constants in a unsteady confined well. **(10 Marks)**

Module-4

7 a. Enumerate the groundwater exploration by seismic refraction method. (10 Marks)

b. Explain the sonic logging and induction logging. (10 Marks)

OR

8 a. Enumerate the ground water exploration by electrical resistivity method. (10 Marks)

b. What is well logging? List out the types of well logging and the purpose of each. (10 Marks)

Module-5

9 a. Describe the type of tube wells with neat sketches. (10 Marks)

b. Explain the advantages and disadvantages of open wells and tube wells. (10 Marks)

OR

10 a. With the help of a neat sketch, explain the working of a centrifugal pump. (10 Marks)

b. What is the importance of artificial recharge? Explain various methods of ground water recharge. (10 Marks)

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