CBCS SCHEME

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15CV742

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024
Ground Water and Hydraulics

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Write a note on importance of ground water. **(08 Marks)**

b. Explain briefly occurrence of ground water in different rocks and soils. **(08 Marks)**

OR

2 a. With the help of neat sketches, explain i) Unconfined ii) Confined and iii) Perched aquifer. **(08 Marks)**

b. With the help of a neat sketch, explain Vertical distribution of ground water. **(08 Marks)**

Module-2

3 a. Describe the Darcy's law with neat sketches. **(10 Marks)**

b. An artesian aquifer 20 m thick has a porosity of 20% and bulk modulus of compression 10^8 N/m. Estimate the storage coefficient of the aquifer. What fraction of this is attributable to the expansibility of water? Unit weight of water is 9810 N/m^3. Bulk modulus of elasticity of water, $K_w = 2.1$ GN/m^2 $= 2.1 \times 10^9$ N/m^2. **(06 Marks)**

OR

4 a. Explain the following:
i) Porosity ii) Specific yield
iii) Specific retention iv) Transmissibility **(08 Marks)**

b. An aquifer has an average thickness of 60 m and an areal extent of 100 ha. Estimate the available ground water storage if
i) The aquifer is unconfined and the fluctuation in ground water table is observed as 15 m.
ii) The aquifer is confined and the piezometric head is lowered by 50 m which drains half the thickness of the aquifer. Assume a storage coefficient of 2×10^{-4} and a specific field of 16%. **(08 Marks)**

Module-3

5 a. Describe steady radial flow in unconfined aquifer. **(08 Marks)**

b. A 30 cm well fully penetrates a confined aquifer 30 m deep. After a long period of pumping at a rate of 1200 ℓpm, the draw down in the wells at 20 and 45 m from the pumping well are found to be 2.2 and 1.8 m respectively. Determine the transmissibility of the aquifer. What is the drawdown in the pumped well? **(08 Marks)**

OR

6 a. Explain Chow's method in un-steady radial flow into a well. **(08 Marks)**

b. A 30 cm well penetrates 50 m below the static water level. After a long period of pumping at a rate of 1800 ℓpm. The drawdown in the wells at 15 and 45 m from the pumped well were 1.7 and 0.8 m respectively. Determine the transmissibility of the aquifer. What is the drawdown in the pumped well? **(08 Marks)**

Module-4

7 a. List the various surface and subsurface methods of ground water exploration. (04 Marks)
b. Describe in detail, the exploration of groundwater by electrical resistivity method. (12 Marks)

OR

8 a. Enumerate the groundwater exploration by seisonic refraction method. (10 Marks)
b. Briefly explain any two methods of logging. (06 Marks)

Module-5

9 a. With the help of a neat sketch, explain Strainer type tube well. (08 Marks)
b. What are the objectives and benefits of artificial ground water recharge? (08 Marks)

OR

10 a. With the help of a neat sketch, explain working of a submersible pump. (08 Marks)
b. Explain ground water recharge using : i) Check dams and ii) Farm ponds. (08 Marks)

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