CBCS SCHEME

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15CV742

Seventh Semester B.E. Degree Examination, June/July 2019
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. Explain the significance of ground water compare to surface water. **(04 Marks)**

b. Explain the perched aquifer with neat sketches. **(04 Marks)**

c. Define the vertical distribution of ground water with neat sketches. **(08 Marks)**

OR

2 a. Describe confined and unconfined aquifers with neat sketches. **(12 Marks)**

b. Define the following:
i) Aquifer ii) Aquifuge
iii) Aquiclude iv) Aquitard **(04 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. Describe ground water exploration using seismic method. (10 Marks)
b. Write short notes on:
i) Electrical logging
ii) Sonic logging (06 Marks)

OR

8 a. Describe ground water exploration using electrical resistivity method. (10 Marks)
b. Write short notes on:
i) Radioactive logging
ii) Induction logging (06 Marks)

Module-5

9 a. Describe the construction of Dug well with neat sketches. (08 Marks)
b. Describe the different types of shallow based wells. (08 Marks)

OR

10 a. Write short notes on:
i) Cable tool method
ii) Diamond drilling (04 Marks)
b. Describe the different methods for water harvesting recharge structures. (12 Marks)

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