CBCS SCHEME

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15CV742

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022
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. With neat sketch, explain the vertical distribution of ground water. **(08 Marks)**

b. What is an Aquifer? Explain types of aquifers, with neat sketches. **(08 Marks)**

OR

2 a. Define: (i) Aquifers (ii) Aquifuge (iii) Aquitard (iv) Aquiclude, with examples explain. **(08 Marks)**

b. Define ground water hydrology. Explain the scope of groundwater hydrology. State the advantages and disadvantages of ground water over surface water. **(08 Marks)**

Module-2

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

b. When 4.32 million cubic meter of water was pumped out from an unconfined aquifer of 6.30 km^2 areal extent the water table was observed to go down by 2.6 m. What is the specific yield of the aquifer? During monsoon season if the water table of the aquifer goes up by 11.0 m. What is the volume of recharge? **(08 Marks)**

OR

4 a. Define storage coefficient and derive an expression for storage coefficient of a confined aquifer in terms of compressibility of water and of the aquifer structures. **(08 Marks)**

b. State Darcy's law. Also explain the terms: (i) Permeability (ii) Transmissibility (iii) Apparent velocity (iv) Actual velocity **(08 Marks)**

Module-3

5 a. Derive an equation for discharge for the case of steady radial flow into an unconfined aquifer using Dupuits theory. **(08 Marks)**

b. A well penetrates fully in a confined aquifer of 10 m thick having coefficient of permeability of 0.0005 m/sec. The radius of well is 10 cm. There is a drawdown of 4m at the well face and radius of influence to 300m.

(i) Calculate the steady state discharge of the well.

(ii) What will be the percentage of increase in the discharge if the radius of well is doubled? **(08 Marks)**

OR

6 a. Explain Theis method to determine aquifer constants S and T for unsteady radial flow towards well. **(08 Marks)**

b. A well of 0.5 m diameter penetrates fully into confined aquifer of thickness 20m and hydraulic conductivity 8.2×10^{-4} m/s. What is the maximum yield expected from this well if the drawdown in the well is not exceeds 3m. The radius of influence may be taken as 260 m. **(08 Marks)**

Module-4

7 a. Describe in detail, the exploration of groundwater by seismic refraction method. **(08 Marks)**

b. Briefly explain any two methods of logging. **(08 Marks)**

OR

8 a. Explain in detail resistivity method of ground water exploration. **(08 Marks)**

b. Explain in detail the Wenner's resistivity method of ground water exploration. **(08 Marks)**

Module-5

9 a. Describe various types of tube wells with neat sketches. **(08 Marks)**

b. What is artificial recharge of groundwater? Explain various methods of groundwater recharge. **(08 Marks)**

OR

10 a. List the different types of pumps used in well water pumping. Also state their relative advantages and disadvantages. **(08 Marks)**

b. Explain classification of open wells and how the yield of an open well is determined by constant level pumping test. **(08 Marks)**

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