

End Semester Examinations - 2015-16 Even Semester - May 2016

14CE3028 Groundwater Hydrology

Set A

Time : 3 hrs
Total Marks: 100

1. Give short notes of the following terms:

- a. Confined and unconfined aquifer. (6)
- b. Laminar and Turbulent flow. (4)
- c. Darcy's equation with limitations. (4)
- d. Storativity and Homogeneity (6)

OR

2. a. What is the intrinsic permeability of a water-saturated medium that has a hydraulic conductivity of 15.42 m/day? Assume the groundwater is 20°C and 1 atm pressure. The density and the dynamic viscosity of water are 998.2 kg/m³ and 1.002 x 10⁻³ kg/(m.sec), respectively. (7)

b. Explain in detail about the storage properties of confined and unconfined aquifers (10)

c. What is the average flow velocity in pores? (3)

3. a. State and discuss the assumptions and limitations of Dupuit's theory. (5)

b. A well is located in a 30m thick confined aquifer of permeability 35m/day and storage coefficient of 0.004. If the well is pumped at the rate of 1500 lpm, calculate the drawdown at a distance of 400 m from the well after 20 hours of pumping. (10)

b. What are the assumptions of the Thiem's equation? (5)

OR

4. a.. How the aquifer constants S and T can be determined using Theis method? (12)

b. Define the following terms: (8)

i) Static Water Level ii) Pumping Water Level iii) Well Yield iv) Specific Capacity

5. a. When actual sea water intrusion takes place? (6)

b. What are the steps involved in locating the fresh water-seawater interface (6)

c. Indicate the practical methods to control sea water intrusion. (8)

OR

6. Write short notes on

a. Dug wells and bore wells (8)

b. Electrical sounding technique for measuring water level (6)

c. Intake structures (6)

7. a. An aquifer has a hydraulic conductivity of 2×10^{-5} m/s, a hydraulic gradient of 0.003 m/m and an effective porosity $n_e = 0.2$, and an effective diffusion coefficient $D^* = 0.5 \times 10^{-9}$ m²/s. A chloride solution with a concentration of 500 mg/l penetrates in the aquifer along a line source. Find the chloride concentration at a distance of 20 m from the point of entry, after a period of two years.

(20)

OR

8. a. Explain the following with reference to ground water quality.
a. advection b. dispersion c. degradation d. point and non-point source pollution.
(12)
- b. Write short notes on sorption Isotherms and Retardation Factor in groundwater (8)
9. a. Describe the hydrological cycle with salient features with neat sketch. (10)
- b. Explain the ground water budget with an example (10)

Wishing you All the Best
