

A 1085

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Eighth Semester

Civil Engineering

CE 045 — GROUNDWATER ENGINEERING

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by Groundwater table fluctuation?
2. What are the different methods used to determine the specific yield?
3. Define the terms (a) 'Specific capacity' and (b) 'Safe yield'.
4. What is Transmissibility co-efficient?
5. From Piezometric surface map of a non - leaky artesian aquifer with an average coefficient of transmissibility of 6×10^{-5} lpd/m in the vicinity of a pumping centre the following data are noted: Number of flow channels = 12 and Head drop b/w successive piezometric contours = 3m. What is the quantity of water moving through the aquifer into the pumping centre?
6. What are the assumptions of Theiss equation?
7. What are the uses of Electrical Resistivity Method?
8. What are collector wells?
9. What is the specific resistance in ohms of a water sample having a conductivity of 4000 units?
10. Define Total Dissolved Solids.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Write briefly about the different zones of subsurface water column. (8)
- (ii) Explain briefly about the Groundwater development in India. (8)

Or

- (b) (i) Write short notes on permeability and transmissibility. (6)
- (ii) What are the factors affecting permeability? Explain it. (10)
12. (a) Determine the storage coefficient of an aquifer from the following data, Porosity = 30%, thickness of aquifer = 25 m, bulk modulus of water is 2.1 GN/m² and modulus of elasticity of soil skeleton = $E_s = 3 \times 10^8$ N/m². (16)

Or

- (b) Explain about the Flow nets and derive the expression for Flownets for Isotropic aquifers and anisotropic aquifers. (16)
13. (a) A pump test was conducted on a fully penetrating well in a non-leaky artesian aquifer. Determine the draw down in an observation well at 10, 50 and 200 minutes from the time of starting the pump, given the following data,
- Constant Discharge = 2800 lpm,
- Distance of observation well from the pumping well = 20 m,
- Storage coefficient of aquifer = 7.24×10^{-4} , and
- Transmissibility of aquifer = 1500 lpm/m. (16)

Or

- (b) Explain detail about the Image Well theory. (16)
14. (a) Explain and obtain expressions for yield of an Open well. (16)

Or

- (b) Define the term conjunctive use? What are the benefits you get by conjunctive use of water? (16)

15. (a) (i) Explain detail about Environmental influences on groundwater and its variations. (10)
- (ii) Write short notes on Sodium Absorption Ratio in Irrigation water quality. (6)

Or

- (b) What are the methods suggested for controlling the seawater intrusion into the coastal aquifers. (16)
-