

B. Tech. (Civil) 7th Semester, (Elective-IV) (G-Scheme)
Examination, November-2023
GROUND WATER ENGINEERING
Paper-PCC-CEEL-413-G

Time allowed : 3 hours]

[Maximum marks : 75

Instructions :

- (i) Question No. 1 is compulsory.*
- (ii) Attempt one question from each section.*
- (iii) All questions carry equal marks.*
- (iv) Assume missing data, if any, suitably.*

1. Describe the following:

- (a) Groundwater column
- (b) Gravel packing
- (c) Optimum capacity of well
- (d) Induced infiltration
- (e) Leaky confined aquifer
- (f) Collector well and infiltration gallery
- (g) Aquifer storage

Section-A

- 2. (a) What is groundwater balance? Describe in detail the groundwater fluctuation and its interpretation.**

- (b) What do you mean by global distribution of water? Describe in detail the groundwater development and potential in India.
3. (a) What is the necessity of ground water exploration? Describe in detail the different methods of investigations.
- (b) What is Darcy's law? Describe different types of aquifers with their properties.

Section-B

4. (a) What are Dupuit's assumptions? Derive an equation for steady flow in confined and unconfined aquifer.
- (b) A 45 cm diameter well penetrates a unconfined aquifer of saturated thickness 30 m . Under a steady pumping rate for a long time, the drawdown at two observation wells 15 m and 30 m from the well are 5.0 m and 4.2 m respectively. If the permeability of the aquifer is 20 m/day, Calculate the discharge and drawdown at the pumping well.
5. What is unsteady flow? Describe in detail the different methods of determining the aquifer parameters for unsteady flow.

Section-C

6. What are the different types of strainers used in tube well? Describe the design of tube wells in different aquifers.
7. (a) Describe the different components of a tube well with neat diagram.
- (b) Write short note on the following:
- (i) Sanitary protection of open wells
 - (ii) Water withdrawal for different purposes

Section-D

8. (a) What do you mean by seawater intrusion? Describe the conjunctive use of groundwater.
- (b) What do you mean by reclaimed watershed recharge? Explain in detail the aquifer storage and recovery.
9. Write short note on the following:
- (a) Seawater intrusion and remediation
 - (b) Recharge pits and shafts
 - (c) Induced infiltration and water spreading
 - (d) Ditching and basins