

Roll No.

24516

B. Tech. 7th Semester (Civil Engg.)

Examination – December, 2014

GROUND WATER ENGINEERING

Paper : CE-453-F

Time : Three Hours]

[Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. **1** is *compulsory*. All questions carry equal marks. Assume missing data, if any, suitably.

1. Define the following hydrological parameters :

8 × 2.5 = 20

- (i) Dupit's assumptions and its importance
- (ii) Well sickness
- (iii) Difference between confined and unconfined aquifer

- (iv) Types of tube well
- (v) Enumerate recharge techniques
- (vi) Perched water table
- (vii) Compressibility of aquifer
- (viii) Necessity of strainer in tube well

SECTION – A

- 2. (a) Describe formation constants of aquifer. Explain the properties of an aquifer in detail. 10
- (b) Explain ground water exploration. Describe various methods of investigations. 10
- 3. Derive an equation for steady and unsteady ground water flow in isotropic homogeneous aquifer. 20

SECTION – B

- 4. (a) Describe the effect of boundaries and interference of water. 10
- (b) Describe non equilibrium formula for aquifer of unsteady radial flows. 10

5. (a) Derive Thiem's equilibrium formula for confined and unconfined aquifer. 10
- (b) Define spherical flow in a well and partial penetration of an aquifer. 10

SECTION - C

6. Explain the construction and working of tube wells. What are the different methods used for drilling operation ? Explain in detail. 20
7. (a) Explain different types of tube wells in detail. Also describe different types of strainer used in constructing tube well. 10
- (b) What do you mean by "verticality and alignment of tube well" and "corrosion and failure of tube well"? Explain in detail. 10

SECTION - D

8. (a) Define artificial recharge of ground water and its importance. Describe different recharge techniques in detail. 10
- (b) Explain in detail the induced infiltration method of artificial ground water recharge. 10

9. (a) Briefly describe recharge pits, shafts and recharge wells. 10
- (b) What are the various methods of water spreading in artificial recharge? 10
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