

Roll No. ....

**24516**

**B. Tech. 7th Semester (Civil Engineering) Examination – May, 2019**

**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. Question No **1** is *compulsory*. Attempt *one* question from each Section. All questions carry equal marks.

1. Define briefly the following : 8 × 2.5 = 20
- (a) Well Sickness
  - (b) Permeability
  - (c) Leaky Artesian
  - (d) Conductivity

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- (e) Porosity
- (f) Transmissibility
- (g) Specific Storage
- (h) Recharge pits

**SECTION – A**

- 2. (a) Describe formation constants of aquifer. Explain groundwater exploration. 10
- (b) Describe the various methods of investigation. 10
- 3. Derive the ground water flow equation for steady flow in isotropic homogenous aquifer. 20

**SECTION – B**

- 4. (a) Explain the effect of partial penetration on the drawdown in the well. 10
- (b) What do you understand by spherical flow ? 10
- 5. (a) What is mutual interference of well ? How can this be avoided ? 10

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**SECTION – D**

(b) Calculate the specific gravity of an open well from the following data : 10

Initial depression head = 5 m

Final depression head = 2 m

Time of recuperation = 2 Hours

Dia of the well = 3 m

Calculate also the specific yield and yield of the well under head 3 m.

**SECTION – C**

6. Explain different methods used in drilling operations. 20

7. (a) Describe the various methods commonly used for lifting water. Explain each with neat sketch. 10

(b) What do you mean by Tubewells ? How they are classified ? 10

8. (a) What factors lead to diminishing opportunity for natural recharge of ground water ? List favorable conditions for artificial recharge. 10

(b) What is the purpose of designing artificial recharge projects, explain. 10

9. Write short notes on : 10 × 2 = 20

(a) Induced infiltration

(b) Recharge shafts