

**B. Tech. 7th Semester F. Scheme  
(Civil Engineering–XI) Examination, May–2014**

**GROUND WATER ENGINEERING**

**Paper–CE-453-F**

*Time allowed : 3 hours ] [Maximum marks : 100*

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

1. (a) What are the assumptions in Theiem's equation ?  
(b) Differentiate between confined and unconfined aquifer.  
(c) Describe the methods of drill operations.  
(d) Briefly describe radius of influence in well.  
(e) Define optimum capacity of well.  $5 \times 4 = 20$

**Section – A**

2. Define the following terms :

- (i) porosity (ii) specific yield  
(iii) compressibility (iv) hydraulic diffusivity.

20

3. (a) Explain ground water exploration. Describe various methods of investigations. 15  
(b) Describe Dupit's assumption. 5

**Section-B**

4. (a) Derive Thiem's equilibrium formula for confined aquifer. 10  
(b) What do you understand by interference of wells? 10
5. (a) Explain leaky aquifer with neat diagram. 10  
(b) Define spherical flow in a well. 10

**Section-C**

6. (a) Define tube well. What are the different types of tube wells ? Explain different components of a tube well with neat diagram. 10  
(b) Briefly describe development of well. 10
7. (a) Describe construction and working of tube wells. 10  
(b) Describe hydraulic testing of pumps. 5  
(c) What are different types of strain ? 5

**Section-D**

8. Write short notes on :  
(a) Recharge pits  
(b) Induced infiltration  
(c) Modification of natural channel  
(d) Ditching  
(e) Recharge wells 20
9. Define artificial ground water recharge. Explain different methods used for ground water recharge. 20