

Roll No.

OLE-24516
B. Tech. 7th Sem. (Civil)
Examination – April, 2021
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 total. Question No. **1** is *compulsory*. Attempt rest *four* questions, selecting *one* question from each Section.

1. Define the following hydrological parameters :

$10 \times 2 = 20$

- (a) Different water bearing formations
- (b) Perched water table
- (c) Drawdown curve
- (d) Hydraulic conductivity of aquifer

- (e) Development of tube wells
- (f) Types of tube well
- (g) Well sickness
- (h) Types of Strainers
- (i) Interference of wells
- (j) Application of gravel packing

SECTION – A

- 2.** (a) Derive an equation for steady and unsteady ground water flow in isotropic homogeneous aquifer. 10
- (b) Describe the following : 10
- (i) Specific retention, specific yield and porosity
 - (ii) Partial penetration of an aquifer by a well
- 3.** (a) Describe formation constants of aquifer. Explain the properties of an aquifer in detail. 10
- (b) Explain ground water exploration. Describe various method of investigations. 10

SECTION – B

- 4.** (a) What are the hydraulic properties of aquifer ? Describe in detail the determination of these properties. 10

- (b) Define spherical flow in a well an partial penetration of an aquifer. 10
5. (a) Describe non equilibrium formula for aquifer of unsteady radial flows. 10
- (b) Derive Thiem's equilibrium formula for confined and unconfined aquifer. 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) What do you mean by "verticality and alignment of tube well" and "corrosion and failure of tube well" ? Explain in detail. 10
7. (a) Explain the construction and working of tube wells. What are the different methods used for drilling operation. Explain in detail. 10
- (b) Describe : 10
- (i) Optimum capacity of tube well and
- (ii) Silting of tube well

SECTION – D

8. (a) What do you mean by artificial ground water recharge ? Describe the applications of ground water recharge. 10
- (b) Briefly describe recharge pits, shafts and recharge wells. 10
9. Write short notes on : 20
- (a) Induced infiltration
- (b) Modification of natural channel
- (c) Ditching and flooding
- (d) Rain water harvesting
- (e) Methods of water spreading in artificial recharge
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