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B.Tech. 7th Semester (F) Scheme (Civil)

Examination, December-2018

GROUND WATER ENGINEERING

Paper- CE-453-F

Time allowed : 3 hours]

[Maximum marks : 100

Note: Attempt five questions in total. Question No. 1 is compulsory. Attempt one question from each section. All questions carry equal marks.

1. (a) What are the drawbacks of equilibrium formula given by Thiem?
- (b) Define
 - (i) Formation constants
 - (ii) Specific yield
- (c) Write the assumptions of Dupit theory.
- (d) Differentiate between steady and unsteady radial flow.
- (e) What are different types of aquifer?
- (f) Write down different types of tubewell.
- (g) Write down main objectives of development of well.
- (h) What do you mean by spherical flow?
- (i) Write short note on basin type recharge method.
- (j) Define Artificial recharge of groundwater.

2×10=20

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Section-A

2. (a) Derive equation of motion for steady ground water flow in isotropic homogeneous aquifer. 10
(b) Explain the various aquifer properties. 10
3. (a) A 30 cm well penetrates through a horizontal stratum upto 50m below Water table. Two observation wells were sunk at horizontal distances of 16m and 45m respectively from the pumping well. At a steady-state pumping rate of 1850 litres/min, the drawdowns found to be 1.7 m and 0.8m respectively. Calculate the transmissibility of the aquifer. What is the drawdown in the pumping well? 10
(b) Explain various surface methods of investigation of ground water. 10

Section-B

4. (a) What is non-equilibrium formula for unconfined and confined aquifers in case of unsteady radial flow? 10
(b) Define leaky aquifer with the help of a neat sketch. 10
5. (a) Explain with neat sketch Partial penetration of an aquifer by a well. 10
(b) Explain the factors affecting discharge ratio. 10

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Section-C

6. (a) Name and explain different methods used for drilling tubewell. 10
(b) Write a short note on silting of tubewell. 10
7. (a) Explain installation of well screen by 12
(i) Pull back method
(ii) Open hole method.
(b) What are the main reasons of tubewell failure. 8

Section-D

8. Write short notes on: 4×5=20
(a) Induced infiltration
(b) Recharge well.
(c) Recharge pits
(d) Modification of natural channel.
9. (a) What are the various methods of water spreading in artificial recharge? 10
(b) Explain image well theory with the help of a neat sketch. 10