Printed Pages—3 ECE063

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2856 Roll No. | | | | | | | | | | |

B. Tech.

(SEM. VIII) THEORY EXAMINATION 2011-12

GROUND WATER MANAGEMENT

Time : 3 Hours *Total Marks : 100*

Note : (1) Attempt ***all*** questions.

(2) Each question carries equal marks.

(3) Assume any missing data suitably.

1. Attempt any ***four*** parts of the following : **(5×4=20)**

(a) Explain with the help of a diagram the hydrologic cycle.

(b) Explain the following :

(i) Aquifer

(ii) Aquiclude

(iii) Aquifuge.

(c) A tube-well penetrates fully an unconfined aquifer. Calculate the discharge from the tubewell under the following conditions :

Diameter of the well = 30 cm

Draw-down = 2 m

Effective length of strainer under the above draw-down = 10 m

Coefficient of permeability of aquifer = 0.05 cm/sec

Radius of zero draw-down = 300 m.

(d) Derive an expression for discharge from a well fully penetrating a confined aquifer.

(e) Explain the method of determining the coefficient of transmissibility, of a confined aquifer by pumping out test. What do you mean by storage coefficient ?

(f) Write short notes on :

(i) Well losses

(ii) Specific capacity of well

(iii) Interference among wells.

2. Attempt any ***four*** parts of the following : **(5×4=20)**

(a) Write the assumptions for steady flow condition for confined and unconfined aquifer with the help of neat sketches and expressions.

(b) State and discuss assumptions and limitations of Dupit's Theory.

(c) Describe in brief various methods of developing a tube-well. What do you mean by recuperation test ?

(d) Design a tube-well for the following data :

(i) Yield required = 0.08 cumec

(ii) Thickness of the confined aquifer = 30 m

(iii) Radius of circle of influence = 300 m

(iv) Permeability coefficient = 60 m/day

(v) Draw-down = 5 m.

(e) Distinguish between fully and partially penetrating artesian gravity wells with expressions and sketches.

(f) Explain with suitable sketches the collector wells and infiltration galleries.

3. Attempt any ***two*** parts of the following : **(10×2=20)**

(a) Design an open well in fine sand to give a discharge of 0.005 cumec when worked under a depression head of 3 m. Take the value of the specific yield for fine sand as 0.05 m^3/hour per sq-m of area, under unit depression head.

(b) Explain the salient features of advantages and disadvantages of well irrigation over canal irrigation.

(c) Write a short note on maintenance of wells. What are the factors important for maintenance of wells ?

4. Attempt any *two* parts of the following : **(10×2=20)**

(a) What are various constituents present in ground water ? Explain why turbidity of water is an important consideration in public water supply. Define SAR.

(b) Explain the salient features of modelling of ground water resource projects. Describe the optimization and simulation models.

(c) What do you mean by artificial discharge and recharge of ground water ? Explain the term ground water drainage.

5. Attempt any *two* parts of the following : **(10×2=20)**

(a) Write short notes on :

(i) Ground Water Budgeting

(ii) Surface and sub-surface investigation of ground water.

(b) How the GIS and remote-sensing techniques are applied in ground water management ?

(c) Explain the roof-top rain water harvesting and recharge system. How they are useful in conservation of water ?