No. of Printed Pages : 3

ET-532(B)

B.Tech. Civil (Water Resources Engineering)

Term-End Examination

00701

June, 2015

ET-532(B) : GROUND WATER DEVELOPMENT

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. Marks allotted to questions are written against them. Assume any missing data suitably. Use of calculator is permitted.*

1. (a) List various types of rain gauges. Explain the working of Siphon type rain-gauge with a neat sketch. *10*

(b) Write the assumptions involved in the development of a unit hydrograph. *4*

2. What are infiltration galleries and infiltration wells ? Explain these in detail giving neat sketches. *14*

3. (a) Derive a formula for calculating discharge of a well in a homogeneous unconfined aquifer assuming equilibrium flow condition. *10*

(b) What do you understand by "safe yield of an aquifer" ? *4*

4. What are the commonly used methods to assess the recharge of ground water in an area ? Explain any one method in detail. *14*

5. (a) What do you understand by well development ? Discuss briefly with the role of dispersing agents. 7

(b) Explain the following terms : 7

(i) Specific yield

(ii) Aquifer and Aquitard

6. (a) What are the different measurements to be made during a pumping test ? Discuss a method to calculate the aquifer characteristics. 7

(b) Explain any ***two*** of the following terms : 7

(i) Capillary fringe

(ii) Perched aquifer

(iii) Pellicular water

7. (a) Discuss the phenomenon and mechanism of landslides. Which type of areas are more susceptible to landsliding ? 7

(b) A 30 cm well completely penetrates an unconfined aquifer of saturated depth 40 m. After a long period of pumping at a steady rate of 1500 lpm, the drawdown in two observation wells, 25 m and 75 m distant from the pumping well, were found to be 3.5 m and 2.0 m respectively.

Determine the transmissivity of the aquifer. What is the drawdown at the pumping well ? 7

8. (a) A lake has an area of 15 km^2. Observation of hydrological variables during a certain year has given the following data :

Precipitation = 700 mm/year

Average inflow Q_{in} = 1·4 m^3/s

Average outflow Q_{out} = 1·6 m^3/s

Assume that there is no net water exchange between the lake and the ground water. Determine the evaporation during this year. 7

(b) Explain the natural factors that influence the composition of ground water. 7