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ET-532(B)

B.Tech. Civil (Water Resources Engineering)

Term-End Examination

00525

December, 2014

ET-532(B) : GROUND WATER DEVELOPMENT

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any **five** questions. All questions carry marks written against them. Assume any missing data suitably. Use of calculator is permitted.*

1. (a) What is "potential evapotranspiration" ? How does it affect the water balance ? *5*

(b) What is meant by precipitation ? Write a short note describing its importance. *5*

(c) What is an unconfined aquifer ? Describe with a neat sketch. *4*

2. (a) Define transmissibility.

Ground water flows through an aquifer with a cross-sectional area of $1{\cdot}0 \times 10^4$ m^2 and a length of 1500 m. Hydraulic heads are 300 m and 250 m at the ground water entry and exit points of the aquifer, respectively. Ground water discharges into a stream at the rate of 1500 m^3/day. What is the hydraulic conductivity of the aquifer ? *5*

(b) Describe the salient characteristics of precipitation in India. *5*

(c) Discuss the factors that affect the evaporation from a water body. *4*

3. Derive equation for steady flow of ground water in a confined aquifer giving a neat sketch. Write any assumption taken for the derivation. *14*

4. Give stepwise procedure for the determination of average rainfall over a basin by Thiessen Polygon method. *14*

5. (a) What do you understand by specific yield and specific retention ? Explain with the help of a neat diagram. *7*

(b) Explain the following : *7*

(i) Water application and Water conveyance efficiencies.

(ii) Sprinkler and Drip irrigation method

6. Write short notes on any ***two*** of the following topics : *2×7=14*

(a) Evaporation and Transpiration

(b) Sodium absorption ratio

(c) Ground water balance

7. (a) In a field test, a tracer took 8 hours to travel between two observation wells which are 56 m apart. The difference in water table elevations in these wells was 0·7 m. The volume of the voids of the aquifer is 30% of the total volume of the aquifer. Calculate the hydraulic conductivity and intrinsic permeability of the aquifer. Viscosity of water is $0{\cdot}995 \times 10^{-3}$ NS/m^2. 7

(b) Discuss the use of flow nets and their importance briefly. 7

8. (a) Discuss the interference among wells with the help of a neat sketch. 7

(b) Describe the factors governing composition of ground water. 7