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ET-532(A)

B.Tech. Civil (Water Resources Engineering)

Term-End Examination

December, 2014

00185

ET-532(A) : HYDROLOGY

Time : 3 hours *Maximum Marks : 70*

Note : *Question No. **1** is **compulsory**. Answer any **four** from the remaining questions. All questions carry equal marks. Use of non-programmable scientific calculator is permitted.*

1. State the following sentences as *true* or *false* : *7×2=14*

(a) Evaporation in a lake is less than that of a pan.

(b) When rainfall begins, the infiltration rate is low and it increases with time.

(c) W-index and ϕ-index vary from storm to storm.

(d) Current meter is used in electromagnetic method of stream flow measurement.

(e) Aquicludes are permeable porous media which transmit water freely.

(f) Unit hydrograph is used estimate flood peak.

(g) Most of the dug-wells are in unconfined aquifers.

2. (a) Draw a labelled self-explanatory block diagram representing the hydrologic system. *7*

(b) Discuss the various forms of precipitation. *7*

3. (a) Differentiate between evaporation and evapotranspiration. List the factors affecting evapotranspiration. *5*

(b) Discuss the Horton infiltration equation with the help of a typical infiltration curve. *5*

(c) Define ϕ-index and W-index. *4*

4. (a) Describe the functioning of recording and non-recording types of rain gauges. *6*

(b) For a drainage basin of 600 km^2, isohyetals drawn for a storm gave the following data :

Isohyetals (Interval) cm	Inter-Isohyetal area km^2
15 – 12	92
12 – 9	128
9 – 6	120
6 – 3	175
3 – 1	85

Estimate the average depth of precipitation over the catchment. *8*

5. Define any ***seven*** of the following terms in brief : *7×2=14*

(a) Direct precipitation

(b) Base Flow

(c) Interflow

(d) Infiltration

(e) Evapotranspiration

(f) Unit hydrograph

(g) Channel routing

(h) Aquitard

(i) Confined aquifer

(j) Backwater effect

6. (a) Draw a labelled sketch showing the elements of a typical flood hydrograph. *4*

(b) What are the assumptions made in the theory of Unit Hydrograph ? Describe the steps involved in derivation of unit hydrograph. *10*

7. (a) Explain briefly the following terms used in groundwater flow : *4×2=8*

(i) Specific yield

(ii) Storage coefficient

(iii) Specific capacity

(iv) Drawdown

(b) A well is drilled at the centre of the unconfined aquifer which has radius of influence equal to 2500 m. It is proposed to pump the well so as to create 15 m drawdown at a distance of 15 m from the well. Calculate the discharge rate of the well if the original water table is 25 m above the impervious base of the aquifer. Hydraulic conductivity of the aquifer is 0·15 m per day. *6*
