No. of Printed Pages : 3

ET-532(A)

B.Tech. Civil (Water Resources Engineering)

Term-End Examination

00591

June, 2015

ET-532(A) : HYDROLOGY

Time : 3 hours *Maximum Marks : 70*

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

1. State whether the following statements are *true* or *false* : *7×2=14*

(a) About 3% of the total quantity of the water in the world is fresh water.

(b) The standard Symon's type rain gauge has a collecting area corresponding to diameter of 20 cms.

(c) Wind speed is measured with anemometer.

(d) Interception losses consist of only stream-flow.

(e) The water year in India starts from 1st April.

(f) A unit hydrograph has one unit of direct run-off.

(g) A stream that provides water to the water table is ephemeral.

2. (a) Explain the hydrological cycle with the help of a neat labelled sketch. 7

(b) Discuss in brief various types of rain gauges. 7

3. (a) What are the factors affecting run-off from a catchment area ? Explain in brief. 6

(b) List the methods of direct and indirect determination of discharge in river. Draw the stilling well set-up of the discharge measurement. 8

4. (a) What assumptions are made in the theory of unit hydrograph ? Give the steps involved in derivation of unit hydrograph from an observed hydrograph. 8

(b) Given the ordinates of a 4-hr unit hydrograph as below. Derive the ordinates of an 8-hr unit hydrograph for the same catchment. 6

Time (hr)	Ordinate of 4-hr UH m^3/s
0	0
4	20
8	60
12	110
16	90
20	70
24	55
28	35
32	15
36	5
40	0

5. (a) Define the following terms : *4×2=8*

(i) Direct run-off

(ii) Effective rainfall

(iii) Unit duration

(iv) Infiltration capacity

(b) Discuss the steps involved in the estimation of 75% dependable flow from a series of 80 years flow data. *6*

6. (a) Discuss the principles of flood routing and differentiate between hydrologic routing and hydraulic routing. *10*

(b) Define any four types of Aquifer. *4*

7. (a) Discuss the distribution of sub-surface water with the help of a neat diagram. *6*

(b) Derive the equation used for steady flow in an unconfined aquifer lying between two water bodies having vertical boundaries. *8*