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ET-535(A)

B.Tech. Civil (Construction Management)
Term-End Examination
December, 2014

00665

ET-535(A) : ELEMENTARY HYDROLOGY

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any* ***five*** *questions. All questions carry equal marks. Draw neat sketches wherever required. Assume missing data suitably.*

1. (a) Explain with the help of neat sketches the hydrologic cycle. What are the various processes responsible for it ? 7

(b) What do you understand by precipitable water ? Explain as to how would you estimate it for an area. 7

2. (a) Describe the isohyetal method of estimation of average depth of precipitation over a catchment. How will you estimate the missing precipitation data at a given rain-gauge station ? 7

(b) What is the usefulness of various methods of computing the average depth of rainfall over a given area ? Discuss any one method of analysis of rainfall data. 7

3. (a) Explain the process of evaporation and evapotranspiration. What do you understand by consumptive use of water ? 7

(b) Distinguish between potential evapotranspiration and actual evapotranspiration. Derive the relationship between these two parameters. 7

4. (a) Explain the following processes : 7

(i) Interception

(ii) Depression storage

(iii) Infiltration

What are the factors that influence these processes ?

(b) What is the importance of infiltration in hydrologic cycle ? Explain the typical shape of an infiltration capacity curve. 7

5. (a) Draw a neat sketch to explain the different routes followed by run-off generated in a basin. Explain the difference between direct run-off and base-flow. 7

(b) Draw typical irregulated and regulated flow-duration curves and describe its salient characteristics of our interest. 7

6. (a) State the criterion for selection of a site for stream gauging. What are the various methods of stage measurement ? Distinguish between direct and indirect methods of discharge estimation. 7

(b) What is the main difficulty in using the slope area method of discharge estimation ? In a rectangular channel 15 m wide and depth of flow 3·5 m and cross-sectional area 52·5 m^2 at one section and that at other section at 2500 m apart are 3·4 m and 51·0 m^2 respectively. The drop in water surface is 0·11 m. Using Manning's coefficient to be 0·015, estimate discharge through the channel. 7

7. (a) Define Unit Hydrograph and state its basic theory. List the assumptions made in the theory of the Unit Hydrograph. 7

(b) Following are the ordinates of storm hydrograph of a river, draining a catchment area of 423 km^2 due to 6-h isolated storm. Derive the ordinates of a 6-h unit hydrograph for the catchment. 7

Time (Hour)	Discharge (m^3/s)
0	10
6	30
12	87·5
18	111·5
24	102·5
30	85·0
36	71·0
42	50·0
48	47·5