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ET-532(A)

B.Tech. Civil (Water Resources Engineering)

Term-End Examination

00117 **December, 2017**

ET-532(A) : HYDROLOGY

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any **five** questions. Each question carries equal marks. Use of only non-programmable calculators is allowed. The answers shall be in your own language.*

1. (a) What do you understand by Precipitation ? Explain as to how you would estimate it for any area. What is the importance of atmospheric pressure records ? 7

(b) How will you estimate missing precipitation data at a given rain gauge station ? What is double mass curve analysis as applied to rainfall data ? 7

2. (a) A lake with a surface area of 250 hectares had the following average value of parameters during a given week : Water temperature = 20°, relative humidity = 40% and wind velocity = 16 km/hour at 1·0 m above the ground. Estimate the average daily evaporation from the lake and the total volume of water evaporated from the lake during the last one week. 7

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

3. (a) Explain the difference between direct runoff and base flow, and point out the usefulness of base flow. 7

(b) List a few objects which may be used as floats for the measurement of velocity in a stream. The velocity of float in a stream was observed to be 3·0 m/s. Compute the average flow velocity corresponding to this observation. Adopt a reasonable value of the required coefficient and explain why this coefficient is needed. 7

4. (a) Define the Unit Hydrograph. How will you obtain the ordinates of unit hydrograph from complex storm events ? 7

(b) If a dam has a project life of 50 years, then what is the probability that a flood with a return period of 100 years will occur (i) once, and (ii) twice during the life of the dam ? 7

5. (a) Define and discuss the principles of flood routing. What are the elements of flood routing ? List the various techniques available to route flood waves through reservoirs. 7

(b) A well is drilled in an unconfined aquifer which has a radius of influence equal to 1500 m. It is proposed to pump the well so as to create 12 m drawdown at a distance of 5 m from the well. Calculate the discharge rate of the well if the original water table is 20 m above the impervious base of the aquifer. Hydraulic conductivity of the aquifer is 0·15 m/day. 7

6. (a) Determine 10-year peak flow over a drainage area of 3 hectares with the length of water course as 1·0 km and slope 0·5%, from the following data : 7

Duration (minutes)	10	20	30	40	50
Rainfall intensity (cm/hour)	5·5	4·1	3·3	2·75	2·3

(b) What is Flood Forecasting and how is it useful (i) in reservoir operation, and (ii) for municipal administration ? 7

7. (a) What do you mean by Hydrological Drought ? Explain different types of drought indices with significance. 7

(b) Write a note on Evaporation and Evapotranspiration. 7