

**III B. Tech II Semester Supplementary Examinations, November/December – 2016**

**WATER RESOURCES ENGINEERING-I**

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. Answering the question in **Part-A** is compulsory

3. Answer any **THREE** Questions from **Part-B**

\*\*\*\*\*

**PART -A**

- 1 a) Draw a neat diagram of IS standard non-recording rain gauge. Write the differences between recording and non-recording rain gauges. [4M]
- b) How do you measure infiltration by using infiltrometers? [4M]
- c) Write a brief note on components of runoff. [4M]
- d) What is Maximum probable flood and Standard project flood? [3M]
- e) Define transmissivity, storage coefficient and hydraulic conductivity of an aquifer. [3M]
- f) Define Instantaneous Unit Hydrograph. How does it differ from Unit Hydrograph of finite duration? [4M]

**PART -B**

- 2 a) Describe briefly the sources of hydrological data in India. [4M]
- b) What is meant by Probable Maximum Precipitation over a basin? Explain how PMP is estimated. [4M]
- c) Explain various methods of determining average rainfall over a basin and discuss the merits and demerits of each method. [8M]
- 3 a) Explain evaporation process. Describe various factors that affect rate of evaporation. [7M]
- b) How do you measure evapotranspiration using a Lysimeter? [4M]
- c) The following are the rates of rainfall in cm/hr for successive 30 minutes period of a 4-hour storm: 2.5, 3.8, 7.0, 10.5, 6.3, 4.7, 3.0, and 2.8. Taking the value of  $\Phi$ -index as 3.5 cm/hr, find the net runoff in mm, the total rainfall and the value of W-index. [5M]
- 4 a) What is flow duration curve and how is it constructed? What are the uses of flow duration curve. [8M]
- b) The direct runoff hydrograph resulting from a 5 cm of effective rainfall of 6 hours duration is given below. Determine the area of the catchment and the ordinates of 6-h unit hydrograph, [8M]

Time, hr	0	6	12	18	24	30	36	42	48	54	60	66	72
Direct runoff, m <sup>3</sup> /s	0	25	175	320	360	310	230	165	105	60	30	10	0

- 5 a) Describe the method of estimating a T-year flood using Log-Pearson type-III distribution. [8M]
- b) Explain various methods for the control of floods. [8M]



- 6 a) Explain recuperation test and derive the equation used in the test. [8M]  
b) A well penetrates fully on 10m thick water bearing stratum of medium sand having coefficient of permeability of 0.005m/s. the well radius is 10cm and is to be worked under a drawdown of 4m at the well face. Calculate the discharge from the well. What will be the % increase in the discharge if the radius of the well is doubled? [8M]
- 7 a) How do you derive Instantaneous Unit Hydrograph from S-curve? [4M]  
b) Describe any one hydrological model. [6M]  
c) Explain Clark's conceptual model. [6M]

\*\*\*\*\*

