



(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 100755

Roll No.

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B. Tech.

(SEM. VII) (ODD SEM.) THEORY
EXAMINATION, 2014-15
ENGINEERING HYDROLOGY

Time : 3 Hours]

[Total Marks : 100

- Note :**
- (1) Attempt **all** the questions.
 - (2) All question carry **equal** marks.
 - (3) If required any missing data; then choose suitably.

1 Attempt any **FOUR** parts of the following : **5×4=20**

- a) What is meant by Probable Maximum Precipitation (PMP) over a basin ? Also explain, how PMP is estimated ?
- b) Discuss the current practice and status of the rainfall recording in India.
- c) Discuss briefly the various abstractions that take place from the precipitation.
- d) Consider the statement : The 50 year - 24 hour maximum rainfall at Bangalore is 160 mm. What do you understand by this statement ?

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[Contd...

- e) The isohyets for annual rainfall over a catchment basin were drawn. The areas of strips between isohyets are indicated below. Find the average depth of annual precipitation over the basin.

isohyets (cm)	Areas (sq. km.)	isohyets (cm)	Areas (sq. km.)
75-85	580	105-115	1000
85-95	2960	115-135	610
95-105	2850	135-155	160

- f) Write the short notes on any two of the following :
- Flow measuring structures
 - Mass curve of rainfall
 - Depth area duration curves.

2 Attempt any **two** parts of the following : $10 \times 2 = 20$

- a) Find the mean precipitation for the area sketched below by Thiessen's method. The area composed of a square plus an equilateral triangle plot of side 5 km. Rainfall readings in cm at the various stations are given in Fig. 2.1.

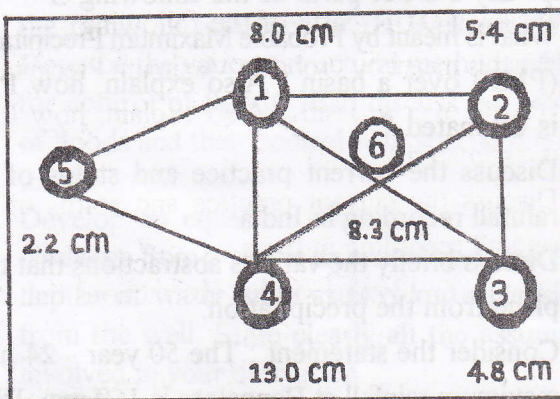


Fig. 2.1

- b) The rates of rainfall for successive 20 minutes period of a 140 minutes storm are : 3.0, 3.0, 9.0, 6.6, 1.2, 1.2 and 6.0 mm/hr. Assuming the value of ϕ_{index} as 3.2 mm/hr and initial loss of 0.8 mm. Find out the net runoff and the total rainfall and value of W_{index} for the storm.
- c) Briefly distinguish between :
- Actual and Potential evapotranspiration
 - Field Capacity and permanent wilting point
 - Depression storage and interdeption
 - Infiltration capacity and infiltration rate.

3 Attempt any **TWO** parts of the following : **10×2=20**

- a) Sketch a typical flow duration curve. Also explain, how it can be used in water resources planning and development activities ?
- b) The ordinates of a 4-h unit hydrograph are given. Determine the ordinates of an S-curve hydrograph and using this, determine the ordinates of 2-h unit hydrograph.

Time(hr)	0	4	8	12	16	20	24	28	32	36	40	44
4-hUH Ordinate (m^3/s)	0	20	80	130	150	130	90	52	27	15	5	0

- c) (i) Describe the analysis of the recession limb of a flood hydrograph.
- (ii) Write the short notes on synthetic unit hydrograph and IUH.

4 Attempt any **TWO** parts of the following : **10×2=20**

- a) Explain the rational method of computing the peak discharge of a small catchment. Where it is commonly used and what are its merits and demerits ? Also discuss the runoff coefficient C of the rational formula.

- b) Explain the terms risk, reliability and safety factor. A factory is proposed to be located on the edge of the 40 year flood plain of a river. If design life of factory is 20 years, what is the reliability that it will not be flooded during its design life?
- c) For a river, the estimated flood peaks for two return periods by using Gumbel's method, are as follows :

Return Period T (years)	Peak Flood m^3/s
100	435
50	395

Estimate the flood magnitude in this river with a return period of 1000 years.

5 Attempt any **TWO** parts of the following : **10×2=20**

- a) A 30 cm well completely penetrates an artesian aquifer. The length of the strainer is 25 m. Determine the discharge from the well when the drawdown at pumping well is 4.0 m. The coefficient of permeability of the aquifer is 45 m/day. Assume the radius of influence of the well as 350 m.
- b) Describe the various structural methods adopted for control of floods. Also discuss the problem of floods and their control with special reference to the Indian scene.
- c) Develop an equation relating the steady state discharge from a well in an unconfined aquifer and depths of water table at two known positions from the well. State clearly all the assumption involved in your derivation.