

Total No. of Questions : 4]

SEAT No. :

P-5015

[Total No. of Pages : 2

[6187]-415

T.E. (Civil) (Insem)

**HYDROLOGY AND WATER RESOURCE ENGINEERING
(2019 Pattern) (Semester - I) (301001)**

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) *Answer Q. No. 1 or Q.2, Q.3 or Q.4.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat diagrams wherever necessary.*
- 4) *Use of logarithmic table, slide rule and electronic pocket calculator are allowed.*
- 5) *Assume suitable data if necessary, stating it clearly.*

- Q1)** a) Hydrology is the study of movement of water through different paths in the nature resulting in hydrologic cycle, justify. Explain any two practical application of study of hydrology. [5]
- b) Explain 1. Missing rainfall data and methods to correct it & 2, Consistency of rainfall record. [6]
- c) Rain gauge station A was found to be inoperative during a storm which produced a rainfall of 100, 75 and 85mm in the three surrounding stations P, Q, R. The normal annual rainfall at station A, P, Q, R, are 1050, 875, 725 and 830 mm respectively. Find the missing rainfall data for station A. [4]

OR

- Q2)** a) What are the different abstraction of precipitation? Explain ϕ and W infiltration indices their uses and practical application. [5]
- b) A Isohyetal map for a storm was drawn for a catchment area. The isohyet and the area bounded by each isohyet is given below. Estimate the average depth of rainfall due to this storm. [6]

Isohyetal Interval (mm)	200-160	160-120	120-80	80-40	40-0
Area (Km ²)	96	88	65	66	85

- c) Differentiate between evaporation, transpiration, and evapotranspiration. Explain any one factor which effect transpiration. [4]

P.T.O.

- Q3) a)** Part of total precipitation is converted into runoff, Justify. What are the different components of runoff and how these components are derived from run off process? [5]
- b) Explain how run off is estimated using Strange's tables and Barlow's tables. [5]
- c) Why is it necessary to separate base flow from hydrograph? Explain different methods of base flow separation. [5]

OR

- Q4) a)** What is a unit hydrograph, its uses and limitations? [4]
- b) Stream flow data is necessary for Civil Engineering applications, discuss. What are the different methods of measurement of stream flow measurement? [4]
- c) Derive the unit hydrograph for a drainage basin of area 150 km² using the stream flow data given in the table below. Assume a constant base flow of 150 m³/s. [7]

Time (hr)	0	2	4	6	8	10	12	14	16	18	20	22
Run off (m ³ /s)	150	280	360	540	900	720	615	510	380	250	180	150

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