

Total No. of printed pages = 4

19/6th Sem/DCE 612

2022

WATER RESOURCES ENGINEERING

Full Marks – 100

Time – Three hours

The figures in the margin indicate full marks
for the questions.

Answer any *five* questions.

1. (a) Describe the hydrologic cycle. 10
(b) What are the different methods available for
determining mean rainfall over a catchment ?
10
2. (a) Define inconsistency in rainfall data. How
inconsistency in rainfall data can be recti-
fied ? 5+5=10
(b) Describe the relationships among depth, area
and duration for a rainfall over an area of
a given duration. 10

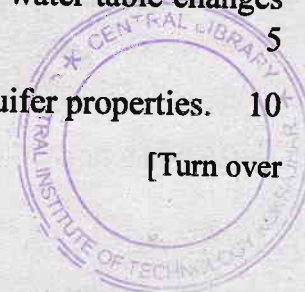
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3. (a) What are the different techniques available for measuring the stream flow? How the measurement of stage of a river can be determined? 2+8=10

(b) The following table gives the data obtained by a stream-gauging operation. The rating equation of the current meter is $v = 0.51N_s + 0.03$, m/s, where N_s = revolutions per second. Calculate the discharge in the stream: 10

Distance from left water edge (m)	0	1.0	3.0	5.0	7.0	9.0	11.0	12.0
Depth(m)	0	1.1	2.0	2.5	2.0	1.7	1.0	0
Revolutions of a current meter kept	0	39	58	112	90	45	30	0
Duration of observation (s)	0	100	100	150	150	100	100	0

4. (a) Discuss the various factors affecting the distribution of runoff. 10
- (b) What is hydrograph ? Explain the different components of a flood hydrograph with the help of a sketch. 2+8=10
5. (a) The peak of flood hydrograph due to 3 hours duration isolated storm in a catchment is $270 \text{ m}^3/\text{s}$. the total depth of rainfall is 5.9 cm. assuming an average infiltration loss of 0.3 cm/hour. and constant base flow of $20 \text{ m}^3/\text{s}$; estimate the peak 3-hrs unit hydrograph of the catchment. If the area of catchment is 567 km^2 then determine the base width of 3-hours unit hydrograph by assuming it to be triangular in shape. 10
- (b) What are the assumptions made in the Unit Hydrograph Theory ? Describe the method of deriving a new Unit Hydrograph from isolated storms. 3+7=10
6. (a) What are the sources of ground water flow ? What is the difference between infiltration and percolation ? 2+3=5
- (b) Describe briefly how the water table changes in different conditions. 5
- (c) Describe the different aquifer properties. 10



7. Write short notes on any *two* of the following :

10×2=20

- (a) Evapotranspiration
- (b) Probable maximum rainfall
- (c) Darcy's Law
- (d) Unit hydrograph.

