B.E.(with Credits)-Regular-Semester 2012 - Civil Engineering Sem IV **CE-404 - Hydrology & Water Resources Engineering**

P. Pages : 2

Time : Three Hours

GUG/W/16/3874

Max. Marks: 80

	Note	s: 1. 2. 3. 4. 5. 6.	All questions carry equal marks. Answer all questions. Due credit will be given to neatness and adequate dimensions. Assume suitable data wherever necessary. Illustrate your answers wherever necessary with the help of neat sketches. Non programmable calculator is permitted.							
1.	a)	a) Explain different forms of precipitation.								
	b)	Explain features and working of weighing bucket rain gauge with neat sketch.								
	c)	Describe the radar measurement of rainfall.								
2.	a)	Describe the different methods of estimation of missing rainfall data. 6								
	b)	State the various considerations governing the selection of site for installation of raingauge.								
	c)	Raingauge station 'P' did not function for a part of a month during which a storm occurred. The storm produced rainfalls of 66, 69 and 73 mm at three surrounding stations X, Y, Z respectively. The normal annual rainfalls at the station P, X, Y, Z are 635, 750, 860 and 950mm respectively. Estimate the mission storm rainfall at station P.								
3.	a)	How yo	bu will derive the value of K from the equation	6						

3. How you will derive the value of K from the equation a)

 $f = f_c + (f_0 - f_c)e^{-kt}$

The infiltration capacities of an area at different intervals of time are indicated below. b) 10 Find the equation for the infiltration capacity in the exponential form.

Time in Hrs.	0	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00
Infiltration cap (f) in cm/hr.	10.4	5.6	3.2	2.10	1.50	1.20	1.10	1.0	1.0

OR

- What is evapotranspiration? What are the different field methods to estimate it? Explain 4. a) 8 with neat sketch any one in detail.
 - Calculate total consumptive use (PET) for rice crop grown from January to March at a b) 8 latitude 22° N from the following data taken from a nearby observatory.

Month	Jan	Feb	March			
Mean temp °C	12	16	24			
Rainfall in mm	8	20	16			
Sunshine Hrs.	7.62	7.20	8.40			

for Rice crop, monthly crop co-effi = 1.10

5.	a)	 a) Differentiate between i) Fan shape and fern leaf shape catchment. ii) Stream density and Drainage density. 													4		
	b)	b) Explain Area slope method of stream gauging.														4	
6.	 c) During the flood of a river, the following data was collected. Compute the flood discharge. i) River stages at two sites, 1.73 km apart are 380.38 and 400.20m ii) Mean C/S at the channel = 335m² iii) Mean wetted perimeter = 98m and Manning's constant = 0.035 6. a) What are the various factors affecting run off? b) Compute S – curve ordinates for the following 4 hr unit hydrograph of a catchment of 300 sqkm area. Then compute 5 Hr unit hydrograph for this basin with the help of desired S ourse 												00 1	8 4 12			
	Time ir	Urc.		0	1	2	3	1	5	6	7	8	0	10	11	12	l
	A Hr II H umace			0	6	2 36	66	91	106	93	79	68	58	<u>10</u> <u>4</u> 9	<u>11</u> <u>41</u>	34	
	Time ir	.11. u	nices	13	1/	15	16	17	18	_10	20	21	50	77	41	54	
	4 Hr. U	H o	rdinate	27	23	17	13	9	6	3	1	0					l

7. a) Enlist the methods for estimating design peak flood based on probability theory.

6

5

5

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- b) Peak flow records for a river at a station where a reservoir is to be constructed for a period **10** of 80 yrs is as follows :
 - i) The arithmetic mean of peaks = 7820 cumecs
 - ii) The standard deviation = $2500 \text{ m}^3/\text{sec}$

using Gumbel's method, determine the recurrence interval for a flood of 20000 cumecs.

OR

- 8. a) What are the causes of flood? What are the different methods of estimating design flood 6 and flood flows.
 - b) From the analysis of available data on annual flood peaks of a small stream for a period of 35 years, the 50 year and 100 year flood have been estimated to be 800 m³/sec. and 980 m³/sec. Estimate the 200 yrs flood for the stream using Gumbel's method. Take for n = 35, $\overline{Y}_n = 0.54034$ and $\sigma_n = 1.12847$.
- 9. a) Explain Dupuit theory of ground water movement. State various assumptions of this theory. 6
 - b) Discuss the various methods of recharging of ground water.
 - c) What do you mean by inter basin water transfer?

OR

10. Write short notes on :

- i) Yield test of an open well.
- ii) Movement of Ground water.
- iii) Importance of Water Resources Planning.
- iv) Watershed Management.
