

Registration No :

--	--	--	--	--	--	--	--	--	--

Total Number of Pages : 02

B.Tech
PECI5401

7th Semester Back Examination 2018-19

WATER RESOURCES ENGINEERING

BRANCH : CIVIL

Time : 3 Hours

Max Marks : 70

Q.CODE : E351

**Answer Question No.1 which is compulsory and any FIVE from the rest.
The figures in the right hand margin indicate marks.**

Semi-logarithmic sheets are to be supplied

Q1 Answer the following questions :

(2 x 10)

- What is 24-hours maximum annual series?
- Write various types of precipitation.
- What is mass curve of rainfall? From where this curve is obtained?
- How the sufficient numbers of rain-gauges are ensured in a basin?
- Why there are two methods of estimation of missing data?
- Differentiate intermittent and ephemeral stream
- Explain attenuation and Lag time in routing.
- How the routing interval is selected in Muskingum channel routing for suitable result?
- Differentiate field capacity and infiltration capacity.
- What it indicates if summation of Muskingum channel routing coefficients ($C_0 + C_1 + C_2$) is equal to 1 and greater than 1?

Q2 a) What is maximum depth-Area-Duration curve? Explain the utility of the curve.

(5)

- b) For a drainage basin of 600 km², isohyets drawn for a storm gave the following data. Estimate the average depth of precipitation over the catchment.**

(5)

Isohyets (interval)(cm)	15-12	12-9	9-6	6-3	3-1
Inter-isohyetal area (Km²)	92	128	120	175	85

Q3 a) Explain Sub-critical, Critical, Super-critical flow by the help of energy diagram.

(5)

b)

Time (h)	0	4	8	12	16	20	24	28
Inflow (m³/s)	8	16	30	30	25	20	15	10

(5)

Route the following flood hydrograph through a river reach for which Muskingum coefficient $K = 8h$ and $x=0.25$.

The initial outflow discharge from the reach is 8.0 m³/s.

Q4 Prepare the Maximum depth-duration curve for the 90 minutes storm given below.

(10)

Time (Minutes)	0	10	20	30	40	50	60	70	80	90
Cumulative Rainfall (mm)	0	8	15	25	30	46	55	60	64	67

- Q5** a) Discuss the salient features of various types of Evaporimeter. (5)
 b) The regression analysis of a 30 years flood data at a point on a river yielded sample mean of 1200 m³/s and standard deviation of 650 m³/s. For what discharge would you design the structure to provide 95% assurance that the structure would not fail in the next 50 years? use Gumbel's method. The value of the mean and standard deviation of the reduced variate for N =30 are 0.53622 and 1.11238 respectively. (5)

- Q6** a) Describe the factors influence the shape of hydrograph. (5)
 b) The annual maximum runoff values at a station P for a period of 20 years as follow (5)

Year	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Annual maximum runoff (m³/s)	120	84	68	92	102	92	95	88	76	84
Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Annual maximum runoff (m³/s)	101	109	106	115	95	90	70	89	80	90

- i. Determine the value of annual rainfall at P with a recurrence interval of 15 years.
 ii. The probability of occurrence of an annual rainfall of 100 cm.

- Q7** Using the ordinates of a 12-h unit hydrograph given below, computer the ordinate of the 6-h unit hydrograph of the basin. (10)

Time (h)	Ordinate of 12-h UH (m³/s)	Time (h)	Ordinate of 12-h UH (m³/s)	Time (h)	Ordinate of 12-h UH (m³/s)
0	0	54	130	108	17
6	10	60	114	114	12
12	37	66	99	120	8
18	76	72	84	126	6
24	111	78	71	132	3
30	136	84	58	138	2
36	150	90	46	144	0
42	153	96	35		
48	146	102	25		

- Q8** Write short answer on any TWO : (5 x 2)

- a) Synthetic Unit Hydrograph
 b) Hydraulic Jump
 c) Most economical section
 d) Current meter