B.Tech III Year II Semester (R15) Regular Examinations May/June 2018
WATER RESOURCES ENGINEERING – I
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

PART – A
(Compulsory Question)
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1   Answer the following: (10 X 02 = 20 Marks)
   (a)   Distinguish between scientific hydrology and engineering hydrology. State one example under each case.
   (b)   Enumerate various methods of field evaporation.
   (c)   State any two merits and demerits of unit hydrograph.
   (d)   Distinguish between confined, unconfined and leaky aquifers.
   (e)   Enumerate methods of improving duty.
   (f)   Enlist functions of irrigation water.
   (g)   State any two merits of Lacey's theory over Kennedy's theory.
   (h)   Enumerate causes of water logging.
   (i)   Distinguish between weir and barrage.
   (j)   Enlist the requirements to be fulfilled by canal outlets.

PART – B
(Answer all five units, 5 X 10 = 50 Marks)

| UNIT – I |

2   The shape of a catchment approximately resembles a square of side 8 km. With reference to an x-y coordinate frame whose origin is coinciding with one of the corners of the catchment then locations of the four corners of the catchment are (0, 0), (8, 0), (8, 8) and (0, 8). There are four rain gauges A, B, C and D within this catchment whose position with reference to the same coordinate frame are (2, 2), (6, 2), (6, 6) and (2, 6) respectively. The rainfall recorded by the rain gauges A, B, C and D during a storm are 8, 6, 9 and 11 cm respectively. Determine the average depths of rainfall over the catchment by Arithmetic mean and Thiessen methods.

OR

3   A reservoir with a surface area of 250 hectares had the following average values of parameters during a week: Water temperature = 20°C, relative humidity = 40%, wind velocity at 1.0 m above ground = 16 km/h. Estimate the average daily evaporation from the lake using Mayer's formula and the volume of water evaporated from the lake during that one week.

| UNIT – II |

4   The ordinates of a 6-h unit hydrograph for a catchment are given below. Derive and plot a 12-h unit hydrograph for the catchment.

Time (h)	Ordinates of 6-h UH (m^3/S)
0	0
6	20
12	60
18	150
24	120
30	90
36	66
42	50
48	32
54	20
60	10
66	0

OR

5   An unconfined aquifer has a thickness of 30 m. A fully penetrating 20 cm diameter well in this aquifer is pumped at a rate of 35 lit/s. The drawdown measured in two observation wells located at distance of 10 m and 100 m from the well are 7.5 m and 0.5 m respectively. Determine the average hydraulic conductivity of the aquifer. At what distance from the well the drawdown is insignificant

UNIT – III

6   Define the terms: Duty and Delta. Drive the relationship between Duty and Delta

OR

7   A watercourse has a culturable commanded area of 1500 hectares. The intensity of Irrigation for crop A is 45% and for B is 40%, both the crops being rabi crops. Crop A has a kor period of 20 days and crop B has kor period of 15 days. Calculate the discharge of watercourse if the kor depth for crop A is 10cm and for B it is 16 cm

UNIT – IV

8   Design an irrigation channel using Lacey's theory for the data given below:

   Discharge, Q   = 50 cumecs
   Silt factor, f   = 1
   Side slops   = ½ : 1

OR

9   Explain briefly the various types of canal lining with examples.

UNIT – V

10   Draw a neat sketch of Diversion head work and name various components in it. Also state function of each component.

OR

11   Design a submerged pipe outlet for the following data:

   Discharge through outlet   = 0.06 m^3/s
   F.S.L. of distributing canal   = 100.00 m
   F.S.L. of water course   = 99.90m
   Full supply depth of distributing canal = 1.1 m

Assume an average value of coefficient of discharge = 0.75.

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