Eighth Semester B.E. Degree Examination, Jan./Feb. 2021
Water Resource Engineering

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting atleast TWO questions from each part.*

PART – A

1 a. Explain briefly about word's fresh water resources and its future. **(10 Marks)**
   b. List and explain any five water management sectors. **(10 Marks)**

2 a. With a neat sketch, briefly explain precipitation process and two types of precipitation. **(10 Marks)**
   b. What is meant by design storm? Also list the various characteristic elements of the rainstorm. **(06 Marks)**
   c. Calculate the average rainfall over the area for the given isohyetes and corresponding area between the isohyetes using isohyetal method.

Isohyet (mm)	Area between isohyetes [sq.km]
125	33.28
100	197.12
75	296.96
50	501.76
25	494.11
Less 16.5	79.36

(04 Marks)

3 a. i) The peak of flood hydrograph due to a 3h duration isolated storm in a catchment is $270 m^3/s$. The total depth of rain fall is 5.9cm. Assuming an average infiltration loss of 0.3cm/h and a constant base flow of $20 m^3/s$, estimate the peak of 3h unit hydrograph of this catchment.
      ii) If the area of the catchment is $567 km^2$, determine the base width of 3h unit hydrograph by assuming it to be triangular in shape. **(10 Marks)**
   b. Define the terms drainage basin and unit hydrograph. Also explain any three characteristics of drainage basin. **(10 Marks)**

4 a. With neat sketches explain various methods of surface irrigation. **(10 Marks)**
   b. The following table gives monthly flows in river. Calculate minimum storage required to maintain a demand rate of $40 m^3/s$ per month by analytical approach.

Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Mean flow (m³/s)	60	45	35	25	15	22	50	80	105	90	80	70

(10 Marks)

PART – B

5 a. Define flood plain with neat sketch and explain any two food management methods. **(10 Marks)**
   b. Describe the structural measures adopted for management of floods. **(10 Marks)**

6 a. Describe the design criteria for storm sewers. **(10 Marks)**

  b. An engineer is required to design a drainage system for an airport with an area of $3km^2$ for a 60 year return period. The 60 year rainfall intensity in that region is given by $I = \dfrac{35}{(t+10)^{0.38}}$

  Where I is the intensity in cm/hr and t is the duration in minutes. If the concentration time for the area is estimated as 60 minutes, for what discharge must he design the system? Use rational formula, take C = 0.9. **(06 Marks)**

  c. With a neat sketch, define detention basin. **(04 Marks)**

7 a. With neat sketch, explain any two types of drain inlets. **(10 Marks)**

  b. Describe the design considerations for street pavements. **(10 Marks)**

8 a. List the types of spillway crest gates. With a net sketch, explain any one type of spillway crest gate. **(10 Marks)**

  b. With a net sketch, explain rock fill dam. **(06 Marks)**

  c. Distinguish between rigid and non-rigid dams. **(04 Marks)**

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