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10CV55

Fifth Semester B.E. Degree Examination, Aug./Sept.2020
Hydrology and Irrigation Engineering

Time: 3 hrs.

Max. Marks:100

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

PART - A

- 1
 - a. With a neat sketch, explain the working of Syphon self recording Raingauge. (05 Marks)
 - b. Explain double mass curve method for checking the consistence of Rainfall data. (05 Marks)
 - c. The rainfall measured at Five Raingauge stations are 89, 54,45, 41 and 55cm. If the error in the measurement of rainfall not to exceed 10%. Calculate i) Optimum number of gauges ii) Additional gauges required. (10 Marks)
- 2
 - a. Explain with a neat sketch, measurement of evaporation using ISI class A Pan. (05 Marks)
 - b. For the data given in the Table below, determine the evapotranspiration using Blaney Criddle method. The crop factor can be taken as 0.8. (05 Marks)

Month	Nov	Dec	Jan	Feb
Mean monthly Temp (⁰ C)	18	15	13.5	14.5
Mean monthly % of day time hour of the year	7.20	7.15	7.30	7.10

- 3
 - a. Define Unit hydrograph. Explain any two methods of base flow separation. (05 Marks)
 - b. Given below are the observed flows from a storm of 4 – hr duration in a stream having drainage area of 1600 km². Derive 4 – hr unit hydrograph ordinates. Assume a constant base flow of 100m³/s. (05 Marks)

Time (day)	1	2	3	4	5	6	7	8	9	10	11	12
Flow m ³ /s	100	1000	830	630	520	420	350	280	218	180	155	100

- 4
 - a. Explain factors affecting infiltration. (10 Marks)
- 3
 - c. Given the ordinates of a 4-hr unit hydrograph. Derive 12-hr unit hydrograph ordinates using S – Curve method. (10 Marks)

Time (hr)	0	4	8	12	16	20	24	28	32	36	40	44
4-hr UHO	0	20	80	130	150	130	90	52	27	15	5	0

- 4
 - a. Define Flood. Mention factors affecting flood. (05 Marks)
 - b. Explain any three Empirical formulae used to estimate the flood. (05 Marks)
 - c. In a river, the following inflow hydrograph was recorded. Route the hydrograph in the reach, when K = 10 hrs , X = 0.25 , Initial outflow = 10m³/s. (10 Marks)

Time (hr)	0	6	12	18	24	30	36	42	48	54	60	66
In flow	10	25	50	75	80	74	65	50	40	30	20	10

PART - B

- 5
 - a. Define Irrigation and mention the benefits of irrigation. (05 Marks)
 - b. Explain the term Infiltration galleries. (05 Marks)
 - c. Explain the following systems of Irrigation briefly : Gravity irrigation , Lift irrigation , Tube well irrigation. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice

- 6 a. Mention classification of Indian Soils. (05 Marks)
 b. Explain with a neat sketch, the presence of Soil – moisture in different zones. (05 Marks)
 c. Determine the frequency of Irrigation using the following data :
 Field capacity = 27% ; Permanent wilting point = 13% ;
 Density of soil = 1.5 g/cm³ ; Depth of Root zone = 1.25 mt ;
 Daily consumptive use of water = 20mm. Readily available moisture in soil 80% of available moisture content. (10 Marks)

- 7 a. Define Duty , Delta and Base period and derive the relation between them. (05 Marks)
 b. Define any five Irrigation efficiencies. (05 Marks)
 c. A main canal taking off from a storage reservoir has to irrigate a land with following crops. Assuming 25% losses in the canal system and giving an allowance of 20% for peak demand, calculate the capacity of the main canal and volume of water required for each crop.

Crop	Crop period (days)	Area to be Irrigated (Ha)	Duty Ha/Cumec
Sugar can	365	1250	850
Paddy	120	1500	850
Wheat	120	2500	1700

(10 Marks)

- 8 a. List the different types of Canal. (05 Marks)
 b. Mention the stepwise procedure to design canal using Kenedy's theory. (05 Marks)
 c. Design a canal in alluvial soil by Lacey's theory for the data given below :
 Full supply discharge = 10 cumec.
 Silt factor = 1.0.
 Canal side slope $\frac{1}{2} H : 1 V$
 Find also the bed slope of the canal. (10 Marks)
