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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Fourth Semester, B. E. - Civil Engineering

Semester End Examination; July / August - 2022

Hydrology and Irrigation Engineering

Time: 3 hrs *Max. Marks: 100*

Course Outcome's

The Students will be able to:

CO1: Apply the knowledge of science and mathematics to understand climatological parameters, runoff, stream flow and ground water flow.

CO2 Classify and to analyze problems related to crop water requirement, stream flow, hydrograph and ground water hydrology under different conditions.

CO3: To interpret data related to climatological parameter, stream flow reservoirs, ground water flow.

CO4: Apply the knowledge of hydrology and irrigation in future to design hydraulic structures either as an individual or as a team to satisfy the changing professional, environment and societal needs

Note: *i) **PART-A** is compulsory. One question from each unit for maximum of 2 marks*
*ii) **PART-B**: Answer any **TWO** sub questions (from a, b, c) from each unit for a Maximum of 18 marks.*

Q. No.	Questions	Marks	BLs	COs
	I : PART - A	**10**		
I a.	Define precipitation and list the types of precipitation.	2	L1	CO1
b.	Define runoff and Infiltration.	2	L1	CO1
c.	Define duty and delta of a crop.	2	L1	CO1
d.	Define surcharge storage and valley storage in reservoir.	2	L1	CO1
e.	Define aquifuge and aquiclude.	2	L1	CO1
	II : PART - B	**90**		
	UNIT - I	**18**		
1 a.	With a neat sketch, describe qualitative representation of hydrological cycle.	9	L1	CO2
b.	Explain float type of rain gauge with a neat sketch?	9	L2	CO2
c.	A semicircle of diameter 20 km with an equilateral triangle of side 20 km below its diameter is a close approximation to river basin. The portion coordinates of 5 rain gauge stations A, B, C, D and E located with the basin with respect to a coordinate axis system whose *x*-axis and origin are coincident with diameter and centre of the circle are (5, 5), (-5, 5), (-5, -5), (5, -5), and (0, 0), km respectively. If the rainfall record at these rain gauge are 85, 92, 77, 80 and 105 mm respectively. Determine the average depth of rainfall using thiessen polygon method.	9	L3	CO3
	UNIT - II	**18**		
2 a.	Define Evaporation. With a neat sketch, explain the measurement of evaporation using ISI standard pan.	9	L1,2	CO1,2
b.	A 6 hr storm produced rainfall intensities of 7, 18, 25, 12, 10, and 3 mm/hr. in successive one hour intervals over a basin of 800 km^2. The resulting runoff is observed to be 2640 hectare-meters. Determine ϕ-index for the basin.	9	L3	CO3

Contd….2

c.	Explain the working of a double ring infiltrometer with adjustable depth of flooding with the help of neat sketch.	9	L2	CO2
	UNIT - III	**18**		
3 a.	After how many days will you supply water to soil in order to ensure sufficient irrigation of the given crop, if i) Field capacity of the soil = 28% ii) Permanent wilting point = 13% iii) Dry density of soil = 1.3 gm/cc iv) Efficiency depth of root zone = 70 cm v) Daily consumptive use of water for the given crop = 12 mm Assume RAMC as 80% of available moisture	9	L3	CO3
b.	Design a regime for channel for a discharge of 50 m^3/s and silt factor as 1.1, using lacey's theory.	9	L5	CO3
c.	Explain the surface and subsurface irrigation.	9	L2	CO2
	UNIT - IV	**18**		
4 a.	Briefly explain any three force acting on gravity dam	9	L2	CO3
b.	Define reservoir and list the types of reservoir and the factors to be considered while selecting site for a reservoir.	9	L1,2	CO2
c.	Explain the procedure for two dimensional stability analyses by analytical method.	9	L2	CO3
	UNIT - V	**18**		
5 a.	Explain the measurement of discharge by slope area method.	9	L2	CO2
b.	Explain the causes of failure of earthen dam.	9	L2	CO2
c.	The ordinates of a storm hydrograph due to 6 hours isolated storm is given, obtain the ordinates of, 6hr unit hydrograph for the catchment, if its area is 423 km^2. Let us consider the base flow as 10m^3/s by the observation of food hydrograph ordinates.	9	L3	CO3

Time(hr)	0	6	12	18	24	30	36	42
Discharge(m^3/s)	10	32	88	116	102	85	71	59
Time(hr)	48	54	60	66	72	78	84	90
Discharge(m^3/s)	57	39	32	26	22	18	15	10

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