Hall Ticket Number :										

R-14

Code: 4G653

III B.Tech. I Semester Supplementary Examinations August 2021

Engineering Hydrology-I

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Discuss the various practical applications of hydrology.	7M	CO1	L01
	b)	The network of 10 stations in and around a river basin has the Thiessen weights of 0.10, 0.06, 0.11, 0.07, 0.08, 0.09, 0.11, 0.12, 0.16 and 0.10 respectively. Stations 2, 4 and 5 lie outside the basin while the remaining are inside. If the rainfalls recorded at these gauges during a storm are 150, 168, 158, 135, 156, 207, 138, 162, 114 and 132 mm respectively, determine the average depth of rainfall over the basin by arithmetic and Thiessen mean methods.	7M	CO1	L01
		OR			
2.	a)	Describe with a neat sketch the principle of working of Symon's non-recording rain gauge.	7M	CO2	L02
	b)	Explain the various types and forms of precipitation.	7M	CO2	L02
		UNIT–II			
3.	a)	What is evaporation? Discuss the factors affecting evaporation.	7M	CO2	L02
	b)	Explain the Φ-index and W-index and bring out the difference between them.	7M	CO2	L02
		OR			
4.	a)	Describe the various components of runoff.	7M	CO2	L02
	b)	Discuss the various physiographic factors which affect runoff.	7M	CO2	L02
		UNIT–III			
5.	a)	Define unit hydrograph. What are the assumptions underlying the unit hydrograph theory? How do they limit the applicability of unit hydrograph?	7M	CO3	L03
	b)	The peak of flood hydrograph due to a 3-h duration isolated storm in a catchment is 270 m^3/s. The total depth of rainfall is 5.9cm. Assuming an average infiltration loss of 0.3 cm/h and a constant base flow of 20m^3/s, estimate the peak of the 3-h unit hydrograph of this catchment. If the area of the catchment is 567 km^2, determine the base width of the 3-h unit hydrograph by assuming it to be triangular in shape.	7M	CO3	L03
		OR			
6.	a)	Explain a procedure of deriving a synthetic unit hydrograph for a catchment by using Snyder's method.	7M	CO4	L04
	b)	Explain the following: (i) Rational formula and (ii) SCS method.	7M	CO4	L04
		UNIT–IV			
7.	a)	Derive an expression for the steady state discharge of a well in an unconfined aquifer.	7M	CO5	L05
	b)	In an artesian aquifer of 8m thickness, a 10cm diameter well is pumped at a constant rate of 100 lit/minute. The steady state drawdown observed in two wells located at 10m and 50m distances from the centre of the well are 3m and 0.05 m respectively. Compute the transmissivity and hydraulic conductivity of the aquifer.	7M	CO5	L05

OR

8.	a)	Explain the classification of canals.	7M	CO5	L05
	b)	Design an irrigation channel in alluvial soil according to Lacey's silt theory for the following data. Full supply discharge =10 m^3/s Lacey's silt factor =0.9 Side slopes of channel =½(H): 1(V).	7M	CO5	L05

UNIT–V

9.	a)	Define irrigation. Enumerate and explain the factors which necessitate irrigation.	7M	CO5	L05
	b)	Explain the various methods of improving soil fertility.	7M	CO5	L05

OR

10.	a)	What is 'duty'? Explain the factors affecting duty.	7M	CO5	L05
	b)	A water course commands an irrigated area 1000 hectares. The intensity of irrigation of rice in this area is 70%. The transplantation of rice crop takes 15 days and during the transplantation period the total depth of water required by the crop on the field is 500mm. During the transplantation period, the useful rain falling on the field is 120mm. Find the duty of irrigation water for the crop on the field during transplantation, at the head of the field and also and also at the head of the water course assuming losses of water to be 20% in the water course. Also calculate the discharge required in the water course.	7M	CO5	L05

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III B.Tech. I Semester Supplementary Examinations August 2021

Structural Analysis-II

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. A parabolic 3 hinged arch carries a UDL of 25 kN/m on the left half of the span. It has a span of 40 m and a central rise of 7 m. Determine the resultant reaction at supports. Find the bending moment, normal thrust and radial shear at a section 15 m from left support. 14M

OR

2. A parabolic two hinged arch of span 60 m and central rise of 6 m is subjected to a crown load of 40 kN. Allowing rib shortening and temperature rise of 20° C, determine horizontal thrust, H. Take moment of Inertia as 6×10^5 cm^4 , Area = 1000 cm^2 , E = 2×10^4 MPa, $\alpha = 11 \times 10^{-6}$ / o C, $I = I_o \sec \theta$. 14M

UNIT–II

3. A portal frame ABCD is hinged at A and fixed at D and has stiff joints at B and C. the loading is as shown in Fig.1. Draw the bending moment diagram and deflected shape of the frame. All dimensions are in m. Use Slope deflection method.

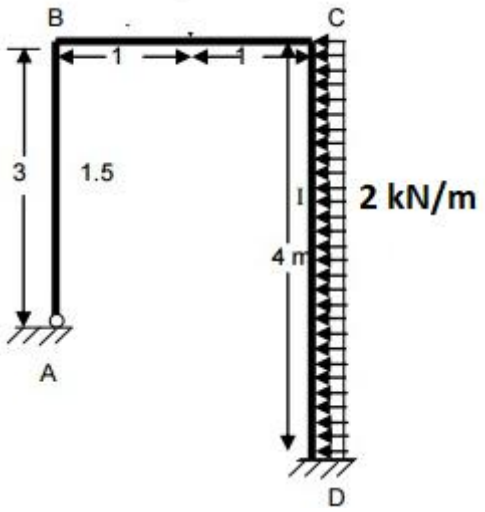


Fig.1 14M

OR

4. Analyse the frame shown in Fig. 2 by moment distribution method. Draw the bending moment diagram.

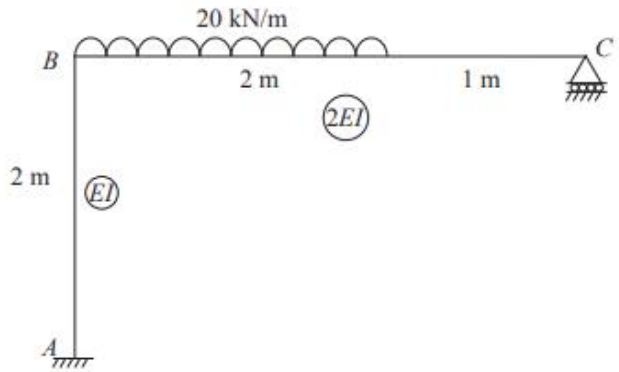
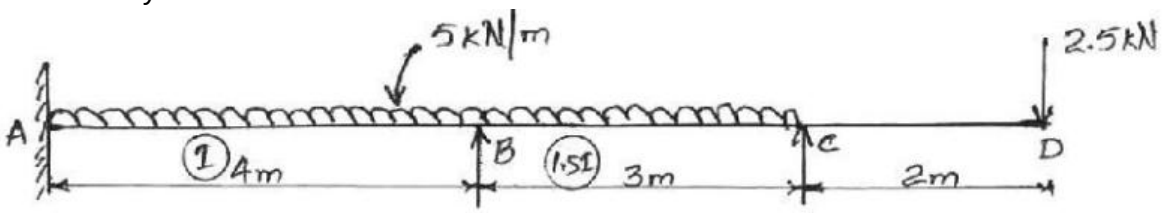


Fig.2 14M

UNIT–III

5. In a continuous beam shown in Fig.2 The support 'B' sinks by 10mm.Determine the moments by Kani's method and draw BMD.



F

ig.2 14M

OR

6. Determine the end moments of the continuous beam as shown in Fig. 3 below by Kani's method. E is constant.

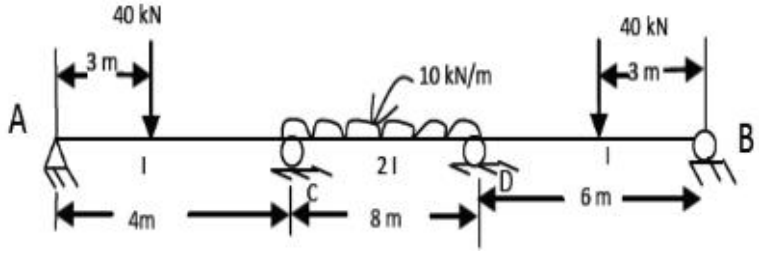


Fig.3 14M

UNIT–IV

7. Analyse the continuous beam shown in Fig.4 by flexibility method, support B sinks by 10 mm.

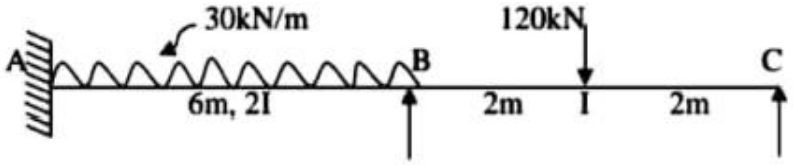


Fig.4 14M

OR

8. Analyse the continuous beam shown in Fig.5. by stiffness method.

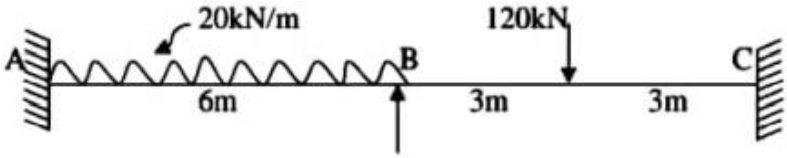


Fig.5 14M

UNIT–V

9. A beam of span 6 m is to be designed for an ultimate UDLof 25 kN/m for entire span. The beam is simply supported at the ends. Design a suitable I section using plastic theory, assuming σy= 250 MPa. 14M

OR

10. The section shown in Fig.6 is ISMB 400. Calculate plastic moment M, and shape factor. Take σy = 250 MPa.

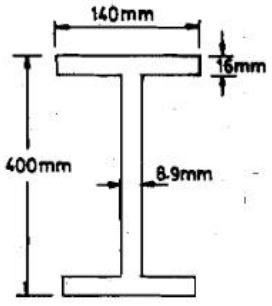


Fig.6 14M

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