PRN:		Course Code:	UCE403

Second Year **B. Tech** End Semester Examination Winter 2024

Theory of Structures

000133

Day and Date: Wed 27 NOV 2024 Max Marks: **100**

Time: 02:00PM To 05:00PM Duration: **03.00** Hrs

Instructions: All questions are compulsory.
Non programmable calculator is allowed

Q.1		**Attempt the following**	**Marks**	**Bloom's Level**	**CO**
	a)	The principal tensile stresses at a point across two perpendicular planes are 110 N/mm^2 and **55** N/mm^2. Find the normal and tangential stresses and the resultant stress and it's obliquity on a plane at 30^0 with the major principle plane. Take Poisson ratio is 0.25.	08	L3	CO1
		OR			
	a)	At a point in the web of a garden the bending and sharing stresses are 60 N/mm^2 Tensile and 30 N/mm^2 respectively. Find i. The principle stresses, ii. The maximum shear stress.	08	L3	CO1
	b)	A thin spherical shell of diameter 1.5 m has metal thickness of 12 mm at atmospheric pressure. Find the change in diameter and the capacity of the shell if fluid pressure is raised to 3.0 N/mm^2. Take E = 200GPa and Poisson Ratio = 0.25	08	L3	CO1
Q.2		**Attempt the following**			
	a)	What is Influence line? State the significance and uses of influence lines.	06	L1	CO2
	b)	Construct the influence lines for R_A, R_B, V_C and M_C for a beam shown in fig. 1.	08	L3	CO2

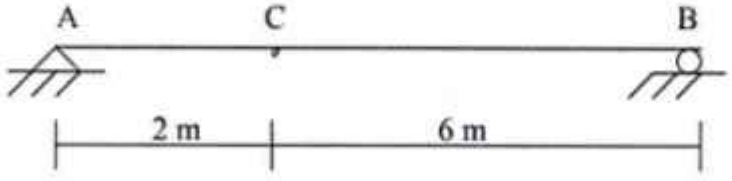


Fig.1.

Q.3		**Attempt any two from the following**			
	a)	A beam 5 m long, simply supported at its ends, is carrying a point load of 40 KN at its centre. The moment of inertia of the beam is 78 x 10^6 mm^4. If E for the material of the beam = 2.1 X 10^5 N/mm^2. calculate deflection at the centre of the beam and slope at the supports.	08	L3	CO3
	b)	A beam of uniform rectangular section 150 mm wide and 300 mm deep is simply supported at its ends. It carries a uniformly distributed load of 10 kN/m run over the entire span of 6 m. if the	08	L3	CO3

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value of E for the beam material is 1 X 10^4 N/mm^2, find the slope at the supports and maximum deflection.

c) A simply supported beam of span 6 m is carrying a UDL of 3 kN/m over the entire span. Determine maximum slope and maximum deflection of the beam. Take EI = 80× 10^9 N-mm^2. — 08 — L3 — CO3

Q.4 **Attempt from the following**

a) Using Clapeyron's theorem, analyze the continuous beam loaded and supported as shown in fig. 2. Draw BMD — 18 — L3 — CO4

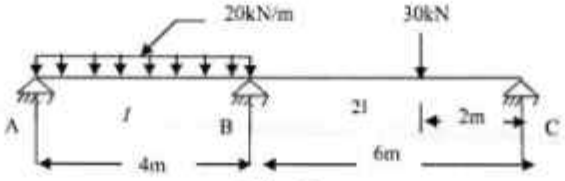


Fig. 2

OR

b) Using Clapeyron's theorem, analyze the continuous beam loaded and supported as shown in fig. 3. Draw BMD — 18 — L3 — CO4

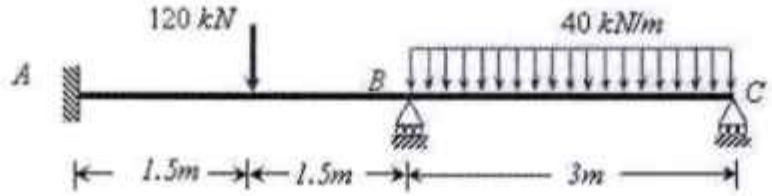


Fig. 3

Q.5 **Attempt from the following**

a) A two-span continuous beam ABC has span AB of 6m and Span BC of 5m. Analyse the beam using slop deflection method. Draw BMD — 18 — L3 — CO4

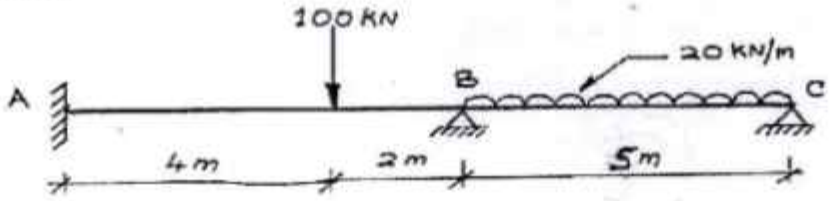


fig.4

OR

b) Analyze the portal frame structure as shown in fig.5 by slope deflection method. Sketch the BMD. — 18 — L3 — CO4

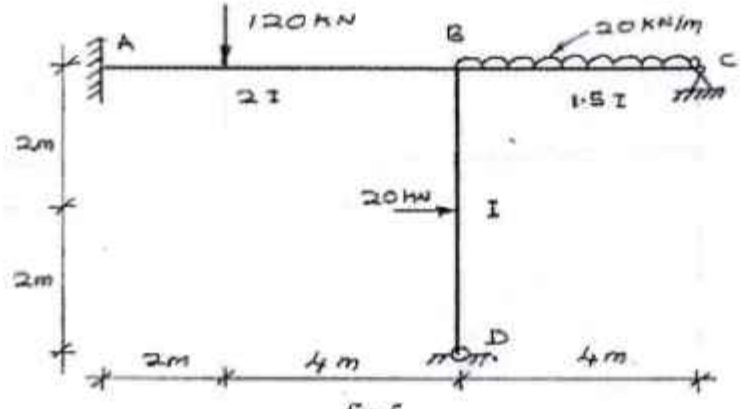


fig.5

Q.6 **Attempt from the following**

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a) Analyze the continuous beam loaded as shown in fig 6. by moment distribution method. Draw BMD. 18 L3 CO4

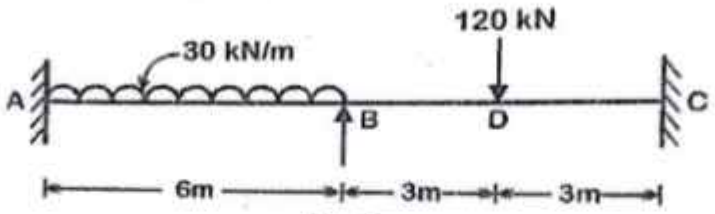


Fig.6

OR

c) Analyze portal frame shown in fig.7 by Moment Distribution method. 18 L3 CO4

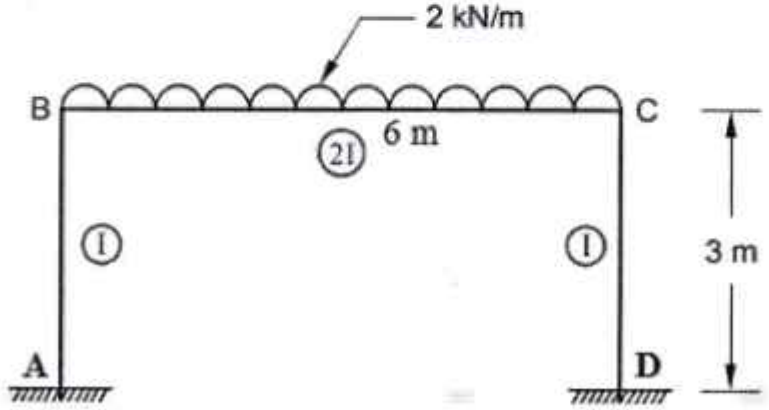


Fig.7

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