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PRN:		Course Code:	U13PC301

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

Structural Mechanics

Day and Date: Fri 22 Nov 2024 Max Marks: **50**

Time: 10:30AM To 12:30PM Duration: **02** hrs

Instructions: 1) All questions are compulsory.
2) assume suitable data wherever necessary.
3) Figures to the right indicate full marks.

		Description	Marks	Bloom's Level	CO
Q. 1		**Attempt the following**			
	a)	Describe **(any Five)** 1) Ductility 2) Hardness 3) Elasticity 4) Concept of stress 5) Types of Stress 6) Bending stresses 7) Point of Contraflexure	10	L1	CO1
Q. 2		**Attempt any one from the following**			
	a)	A hollow steel tube 3.5 m long has external diameter of 120 mm. The tube was subjected to a tensile load of 400 kN and extension was measured to be 2 mm. If the modulus of elasticity for the material is 200 GPA, Determine the internal diameter of tube.	10	L3	CO1
	b)	Draw SFD & BMD for a simply supported beam AB of span L subjected to UDL' W'.	10	L2	CO2
Q. 3		**Attempt the following (Any One)**			
	a)	Derive the Bending equation (Flexure Equation) for a beam.	10	L3	CO3
	b)	Draw shear stress distribution diagram for a rectangular section.	10	L2	CO3
Q. 4		**Attempt the following (Any One)**			
	a)	Determine safe axial compressive load a hallow cast iron column with one end rigidly fixed and other end hinged, can carry if the length of the column is 10 m. External diameter of column is 150mm and internal diameter is 100 mm. Use Eulers formula with a factor of safety of 5 an E = 95 GN/m²	10	L4	CO4
	b)	A hollow column 20 cm external diameter and 2.5 thickness, 8 m long has both ends fixed. It is subjected to an axial compressive load Taking factor of safety as 6 , σ= 560 N	10	L4	CO4

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/mm² and a= (1/1600), Determine the safe Rankine's load.

Q. 5		**Attempt the following (Any One)**			
	a)	Describe 'Middle Third rule' for rectangular section.	10	L2	CO3
	b)	A masonry chimney 24 m high of circular section 3.5 m external diameter and 2 m internal diameter is subjected to horizontal wind pressure of 1kN/m² on projected area. If coefficient of wind pressure is 2/3. Find maximum and minimum stress intensities at the base, Take unit weigh of weight of masonry = 20 kN/m²	10	L5	CO4

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