Course Code: 1930311 **Roll No:** **MLRS- R19**

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
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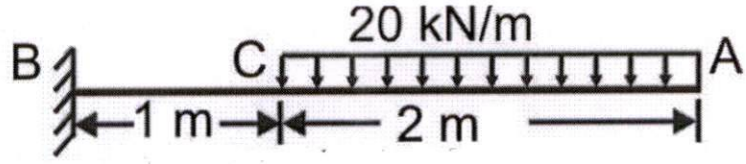
II B.Tech I Sem Supplementary Examination, February-2022

Mechanics of Solids

(MECHANICAL)

Time: 3 Hours. **Max. Marks: 70**

Note: 1. Answer any FIVE questions.
2. Each question carries 14 marks and may have a, b as sub questions.

1	a)	Draw stress – Strain diagram and mark all salient points?	7M	CO1	BL2
	b)	Derive an expression for elongation of tapering circular section subjected to an axial load	7M	CO1	BL2
2		A coper rod 25 mm in diameter in encased in a steel tube 30 mm internal diameter and 35 mm external diameter. The ends are rigidly attached. The composite bar is 500 mm long and is subjected to an axial pull of 30 kN. Find the stresses induced in the rod and tube. Take E for steel as 2×10^5 N/mm² and E for copper as 1×10^5 N/mm².	14M	CO1	BL4
3	a)	Draw the BMD and SFD for a cantilever beam subjected to central concentrated load.	7M	CO2	BL3
	b)	Draw the BMD and SFD for a simply supported beam with udl over entire span.	7M	CO2	BL3
4		Draw the shear force and bending moment diagram for the beam given. 	14M	CO2	BL4
5	a)	Write the assumptions in theory of simple bending	7M	CO3	BL1
	b)	A 300 mm x 160 mm rolled steel joist of I section has flanges 11 mm thick and web 8 mm thick. Find the safe uniformly distributed load that the section will carry over a span of 5 m if the permissible stress is limited to 120 N/mm².	7M	CO3	BL3
6		Derive the bending equation M/I = f/Y = E/R	14M	CO3	BL3
7	a)	Explain Principal planes and principal stresses	7M	CO4	BL2
	b)	A point is subjected to a tensile stress of 60 N/mm² and a compressive stress of 40 N/mm², acting on two mutually perpendicular planes. A shear stress of 10 N/mm² is also acting on these planes. Determine the principal stresses and the maximum shear stress.	7M	CO4	BL4
8		Select a suitable diameter of a solid shaft of circular section to transmit 112.5 kW of power at 200 r.p.m., if the allowable shear stress is 75 N/mm² and the allowable twist is 1^0 in a length of 3 m. Take G = 0.82×10^5 N/mm².	14M	CO5	BL 5

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