Course Code: 1930113 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 Regular End Examination, March 2021

STRENGTH OF MATERIALS – I

(CIVIL)

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.

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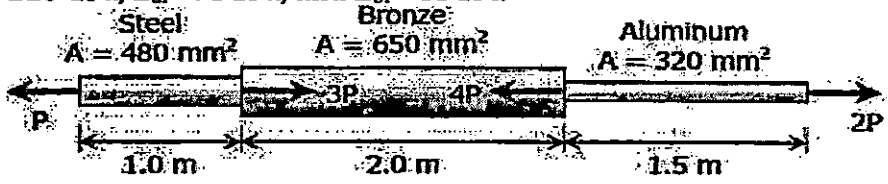
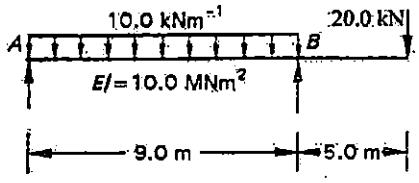
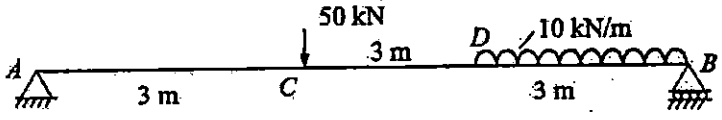
1	a)	Draw stress strain diagram of mild steel and note down the salient points	6M	CO	BL
	b)	A bronze bar is fastened between a steel bar and an aluminum bar as shown in Fig. . Axial loads are applied at the positions indicated. Find the largest value of P that will not exceed an overall deformation of 4.0 mm, or the following stresses: 140 MPa in the steel, 120 MPa in the bronze, and 80 MPa in the aluminum. Use E_{st} = 210 GPa, E_{al} =75GPa, and E_{br} =85GPa	8M	CO	BL



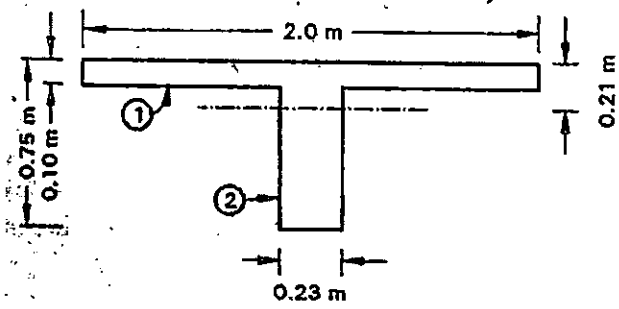
2	a)	Write the relation between Modulus of elasticity, Modulus of rigidity and Bulk Modulus.	5M	CO	BL
	b)	A weight of 4 kN falls 50 mm on to a collar fixed to a steel bar of 20 mm in diameter and 6m long. Determine the maximum stress induced in the bar and extension of the bar. Modulus of Elasticity of steel in 205 GPa.	9M	CO	BL
3	a)	Draw bending moment diagram and shear force diagram for the simply supported beam given below.	7M	CO	BL



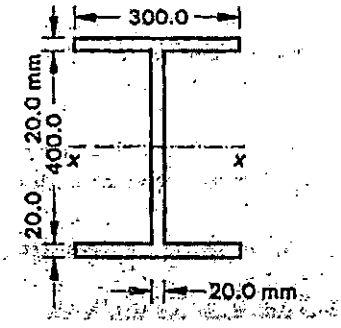
	b)	Draw bending moment diagram and shear force diagram for the simply supported beam given below.	7M	CO	BL



4 a) Determine and draw the distribution of shear stresses in the T – beam shown below, when it is subjected to a shear force of 250 kN. 7M CO BL



b) Determine the maximum bending stresses in a simply supported I - beam of span 8.0 m supporting a uniformly distributed load of 20 kN/m run over its entire length. Draw the stress distribution across the cross section. 7M CO BL

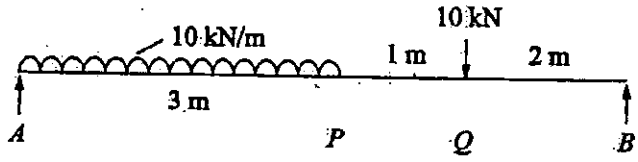


5 a) Derive the relation between S.F., B.M and rate of loading at a section of a beam. 7M CO BL

b) Derive an expression for shear stress distribution across the cross section. 7M CO BL

6 a) Derive governing differential equation for deflection for a simply supported beam carrying a point load at a centre. 7M CO BL

b) Determine the maximum deflection and support rotations in the beam shown below. Take 'E '= 2 x 10^5 MPa and 'I' = 96 x 10^6 mm^4. 7M CO BL



7 a) State and prove Moment area theorems 7M CO BL

b) Explain any two theories of failures and suitability of these theories for different materials. 7M CO BL

8 a) Explain Mohr's Stress Circle 5M CO BL

b) The stresses on two mutually perpendicular planes through a point in a body are 180 MPa and 60 MPa both being tensile along with a shear stress of 60 MPa. Determine the maximum normal stress in the body for the stress condition and indicate it's plane. Also, find the planes of maximum shear stress and the normal and shear stresses on the planes of maximum shearing stress. 9M CO BL