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PRN:	

Course Code :	UME 301

Second Year B. Tech End Semester Examination Winter 2024

Strength of material

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

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

Instructions: All questions are compulsory.

			Marks	Bloom's Level	CO
Q.1	**Attempt any two from the following**				
	a)	Explain the stress strain diagram for steel.	06	1	CO1
	b)	A Mild Steel wire 5 mm in diameter and 1 m long. If the wire is subjected to an axial tensile load 10 kN find its extension of the rod. (E = 200 GPa)	06	2	CO1
	c)	The bar shown in Fig.1 is tested in universal testing machine. It is observed that at a load of 40 kN the total extension of the bar is 0.280 mm. Determine the Young's modulus of the material.	06	2	CO1

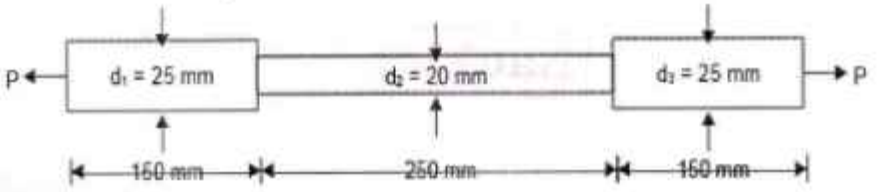


Fig 1

Q.2	**Attempt any two from the following**				
	a)	The principal tensile stresses at a point across two perpendicular planes are 80 N/mm^2 and 40 N/mm^2. Find the normal and tangential stresses and the resultant stress and its obliquity on a plane at 45^0 with the major principal plane.	06	2	CO2
	b)	Define principal planes and principal stresses and explain their uses.	06	1	CO2
	c)	A point in a strained material is subjected to two mutually perpendicular tensile stresses of 200 MPa and 100 MPa. Determine the intensities of normal, shear and resultant stresses on a plane inclined at 300 with the axis of minor tensile stress.	06	2	CO2
Q.3	**Attempt the following**				
	a)	Develop Shear force diagram and bending moment diagram for a simply supported beam with a concentrated load 'P' at its mid span.	06	1	CO3
	b)	A loaded beam as shown in Fig 2. Draw its S.F and B.M diagram.	07	2	CO3

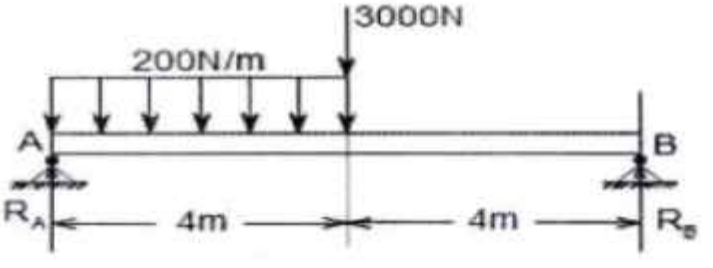


Fig 2

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OR

b) Draw shear force and bending moment diagram for the cantilever beam shown in Fig 3. 07 2 CO3

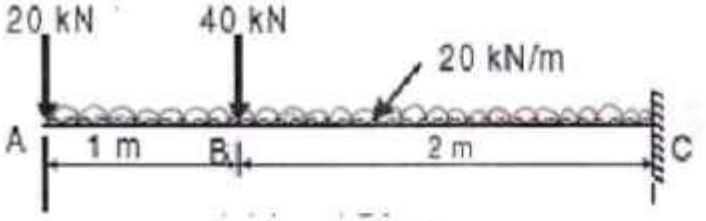


Fig 3

Q.4

Attempt the following

a) What are the assumptions are made in bending equation. 06 2 CO4

b) A simply supported beam of span 3.0 m has a cross-section 120 mm × 180 mm. If the permissible stress in the material of the beam is 10 N/mm^2, determine maximum udl it can carry. 07 3 CO4

OR

c) Explain the procedure in finding out the bending stress in a symmetrical section. 07 2 CO4

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