Code No: P18CET01

R18

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
II B.TECH I SEMESTER END REGULAR/SUPPLEMENTARY EXAMINATIONS, JAN - 2023
STRENGTH OF MATERIALS-I
(CE Branch)

Time: 3 hours Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

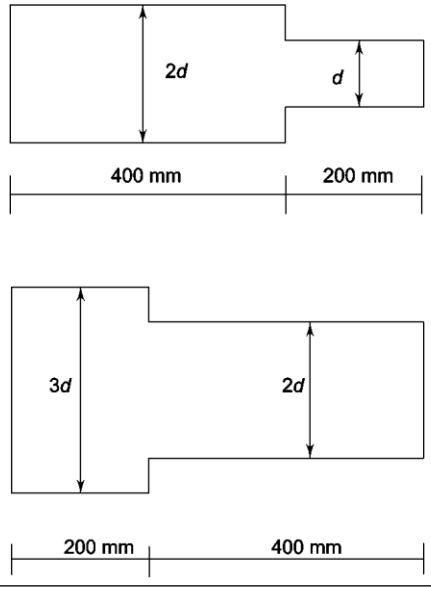
PART-A

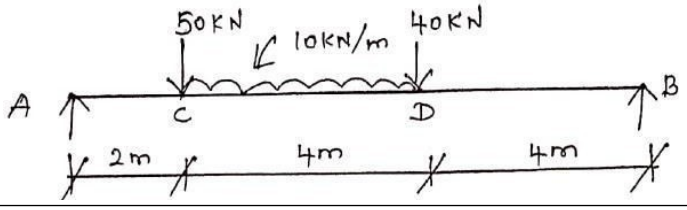
Answer all the questions in Part-A (5X2=10M)

Q.No.		Questions	Marks	CO	KL
1	a)	Draw the stress-strain diagram for mild steel.	[2M]	1	
	b)	Define Shear force and Bending moment.	[2M]	2	
	c)	Write the assumptions in the theory of simple bending.	[2M]	3	
	d)	What are the methods for finding out the slope and deflection at a section?	[2M]	4	
	e)	Distinguish between longitudinal and circumferential stresses.	[2M]	5	

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.		Questions	Marks	CO	KL
		UNIT-I			
2.		Compare the strain energies of the two bars of the same material, shown in figure, when they are subjected to the same load. If d = 10 mm. Find the strain energies of the two bars when the maximum stress in both the bars is equal to 200 MPa. Take E = 200 GN/m^2. 	[10M]	1	
		OR			
3.	a)	A uniform metal bar has a cross-sectional area of 700 mm^2 and a length of 1.5 m. If the stress at the elastic limit is 160 N/mm^2, what will be its proof resilience? Determine also the maximum value of an applied load, which may be suddenly applied without exceeding the elastic limit. Calculate the value of the gradually applied load which will produce the same extension as that produced by the suddenly applied load above.	[5M]	1	

	b)	Calculate the instantaneous stress produced in a bar 10 cm^2 in area and 3 m long by the sudden application of a tensile load of unknown magnitude, if the extension of the bar due to suddenly applied load is 1.5 mm. Also determine the suddenly applied load. Take E = 2 x 10^5 N/mm^2.	[5M]	1	
		UNIT-II			
4.		A cantilever of length 2 m carries a UDL of 1 kN/m run over a length of 1.5 m from the free end. Draw the shear force and bending moment diagrams for the cantilever beam. Also calculate the maximum bending moment.	[10M]	2	
		OR			
5.		A simply supported beam of length 10 m carries the UDL and two point loads as shown in figure. Draw the shear force and bending moment diagrams for the beam. Also calculate the maximum bending moment. 	[10M]	2	
		UNIT-III			
6.		A T – section of a beam has the following dimensions width of the flange 100 mm, overall depth 80 mm, thickness of the web 10 mm, thickness of flange 10 mm. Determine the maximum bending stress in the beam, when the bending moment of 200 Nm is acting one of the sections.	[10M]	3	
		OR			
7.		A rectangular beam of width 100 mm and depth 200 mm is simply supported over a span of 6 m and carries a central concentrated load of 20 kN. Determine the maximum bending and shear stress in the beam and indicate where in the beam they occur. Plot the distribution of the stresses across the depth at any cross section.	[10M]	3	
		UNIT-IV			
8.		A beam of length 6 m is simply supported at its ends and carries two point loads of 48 kN and 40 kN at a distance of 1 m and 3 m respectively from the left support. Find: (i) deflection under each load (ii) maximum deflection. Given E = 2 x 10^5 N/mm^2 and I = 85 x 10^6 mm^4. Use Macaulay's method.	[10M]	4	
		OR			
9.		A cantilever beam of length 7 m carries a UDL of 18 kN/m over a length of 3 m from the free end along with a point load of 2 kN at 3 m from the free end. Determine the deflection at the free end of the beam. Take E = 2.1 x 10^5 N/mm^2 and I = 1.2 x 10^8 mm^4. Use double integration method.	[10M]	4	
		UNIT-V			
10.		A thin cylindrical shell 3 m long has 1m internal diameter and 15 mm metal thickness. Calculate the circumferential and longitudinal stresses induced and also the change in the dimensions of the shell, if it is subjected to an internal pressure of 1.5 N/mm^2. Take E = 2x10^5 N/mm^2 and poison's ratio =0.3. Also calculate change in volume.	[10M]	5	
		OR			
11.		A compound cylinder is made by shrinking a cylinder of external diameter 300 mm and internal diameter 250 mm over another cylinder of external diameter 250 mm and internal diameter 200 mm. The radial pressure at the junction is 8 N/mm^2. Find the final stresses set up across the section when the compound cylinder is subjected to an internal pressure of 84.5 N/mm^2.	[10M]	5	

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