Code No: P21CET01

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)

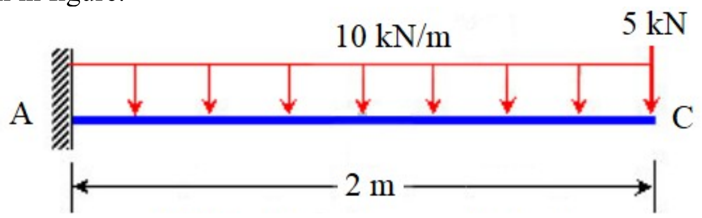
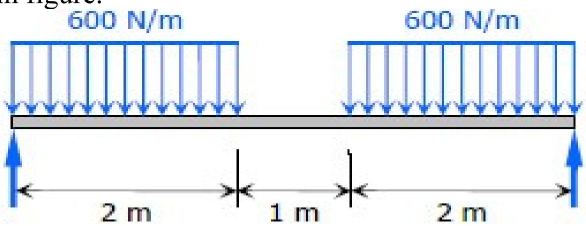
II B.TECH I SEMESTER END SUPPLEMENTARY EXAMINATIONS, MARCH/APRIL - 2023

SOLID MECHANICS

(CE Branch)

Time: 3 hours | Max. Marks: 70

Answer all the questions from each UNIT (5X14=70M)

Q.No.		Questions	Marks	C	KL
		UNIT-I			
1.		A bar of 25 mm diameter is subjected to a pull of 40 kN. The measured extension on gauge length of 200 mm is 0.085 mm and the change in diameter is 0.003 mm. Estimate the values of Poisson's ratio and the three moduli.	[14M]	1	3
		OR			
2.		Estimate the values of change in length, breadth and thickness of a steel bar 4.2 m long, 35 mm wide and 25 mm thick. When subjected to an axial pull of 130 kN in the direction of its length. Take E = 200 Gpa and Poisson's ratio = 0.3.	[14M]	1	3
		UNIT-II			
3.		Draw the shear force and bending moment diagram for the cantilever beam shown in figure. 	[14M]	2	3
		OR			
4.		Draw the shear force and bending moment diagram for the simply supported beam shown in figure. 	[14M]	2	3
		UNIT-III			
5.	a)	What is theory of simple bending? Write its assumption.	[7M]	3	3
	b)	Derive an equation for M/I = f/y = E/R.	[7M]	3	3
		OR			
6.		A 100 mm X 200 mm rolled steel I section has the flanges 12 mm thick and web 10 mm thick. Formulate (i) The safe udl the section can carry over a span of 6 m if the permissible stress is limited to 150 N/mm^2. (ii) The maximum bending stress when the beam carries a central point load of 20 kN.	[14M]	3	3
		UNIT-IV			

7.		Three planks of each 50 mm x 200 mm timber are built up to a symmetrical I section for a beam. The maximum shear force over the beam is 4 kN. Propose an alternate rectangular section of the same material so that the maximum shear stress developed is same in both sections. Assume then width of the section to be 2/3 of the depth.	[14M]	4	3
OR					
8.		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.	[14M]	4	3
UNIT-V					
9.		A beam AB of span 6 m is simply supported at its ends is subjected to a point load of 20 kN at C at a distance of 2 m from left end. Using double integration method, predict the deflection at the point C, slope at the points A, B and C. Take $I = 6 \times 10^8$ mm^4 and E = 200 GPa.	[14M]	5	3
OR					
10.		A cantilever of length 2.5 m is loaded with an udl of 10 kN/m over a length 1.5 m from the fixed end and point load 2 kN at 2 m from free end. Use double integration method. Determine the beam for slope and deflection of the beam at the free end. Take $I = 6 \times 10^8$ mm^4 and E = 200 GPa.	[14M]	5	3

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