B. Tech 3rd semester (Mechanical Engineering)- Oct 2024

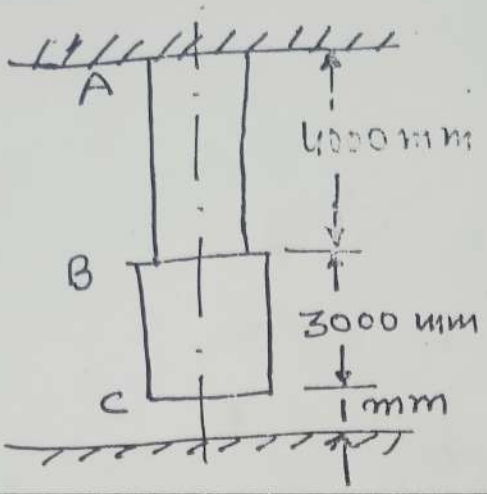
sessional test 1

Strength of materials (PEC-ME-302/21)

MM: 30

Time :90 Minute

Note: Attempt any three questions. Assume suitable data any if missing.

	Statement	Marks	CO
Q 1	A steel bar ABC is fixed rigidly at end A and its bottom end C is at height of 1mm from bottom rigid support as shown in figure below: if E= 200 kN/mm^2, determine the reactions of the support at the top & bottom, and stress in the parts AB and BC. 	10	1
Q 2	A point is subjected to a tensile stress of 100 N/mm^2 and a compressive stress of 80 N/mm^2 acting on two mutually perpendicular planes and a shear stress of 20 N/mm^2 along this plane. Determine the principal stresses and maximum shear stress. Solve with the help of Mohr's circle.	10	1
Q 3	A beam ABC of 10 meters length is imply supported at A and B and has overhanging portion BC such that AB= 8m and BC = 2m. the beam carries a uniformly distributed load of 2kN meter over a length of 4m from A, two concentrated load of 4kN and 2 kN at a distance of 6m from A and at the free end C respectively. i. Find the reactions at the supports A and B. ii. Draw the bending and shear force diagrams for the beam mentioning their values at the silent points. iii. Find the location and magnitude of the maximum bending moment.	10	2
Q 4	A timber beam of 15 cm width and 24 cm depth is reinforced by bolting two steel plates each 15 cm wide and 1 cm thick at the top and bottom of the beam. Calculate the moment of resistance of the beam if the permissible bending stresses in steel and timber is 13 kN/cm^2 and 1kN/cm^2 respectively. Take the modular ratio as 16.	10	2