



NAVRACHANA UNIVERSITY

School: School of Engineering and Technology
Program/s: BTech Civil Engineering
Year: II Semester: III
Examination: End Semester Examination
Examination year: November 2023

Course Code: CE219 **Course Name:** Solid Mechanics
Date: 23/11/2023
Time: 13:00 to 15:00 (24 h clock)

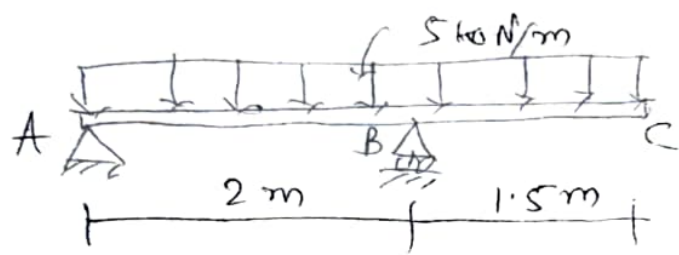
Total Marks: 40
Total Pages:

Instructions:

- ➔ Xerox, hand written notes and books are allowed
- ➔ Use of a calculator is permitted.
- ➔ * COs=Course Outcome mapping. # BTL=Bloom's Taxonomy Level mapping

Q. No.	Details	Marks	COs'	BTL#
Q.1	<p>A beam with a T-section is supported and loaded as shown in the figure. The cross section has width $b = 65 \text{ mm}$, height $h = 75 \text{ mm}$, and thickness $t = 13 \text{ mm}$. Determine the maximum tensile and compressive stresses in the beam.</p>	12	CO1, CO2	BT3., BT4
Q.2	<p>Find the maximum tensile stress and maximum compressive stress if the cross section has the dimensions indicated and the moment of inertia about the z axis (the neutral axis) is $I = 130 \text{ cm}^4$</p>	6	CO1, CO2	BT2, BT3, BT4
Q.3	<p>Plot the shear force and bending moment diagrams for the following beam. Also, show the detailed expressions for the moment and shear at various sections.</p>	8	CO1, CO2, CO4	BT3, BT4

Plot the shear force diagram for the beam shown. Show the detailed expressions for the shear force equations.



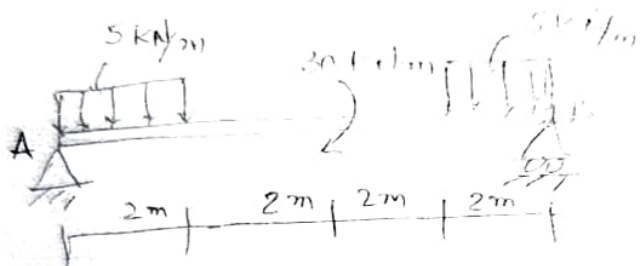
Q.4

6

CO1, CO2, CO4

BT3, BT4

OR



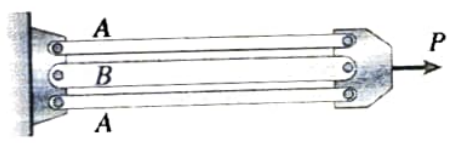
Q.5

8

CO3

BT2, BT3, BT4

Three prismatic bars, two of material A and one of material B, transmit a tensile load P (see figure). The two outer bars (material A) are identical. The cross-sectional area of the middle bar (material B) is 50% larger than the cross-sectional area of one of the outer bars. Also, the modulus of elasticity of material A is twice that of material B. What fraction of the load P is transmitted by the middle bar?



*****End of Question Paper*****