



VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SLOT: A2 + TA2

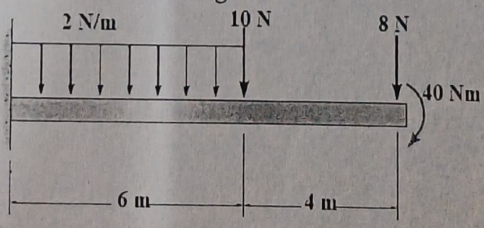
REG.NO.: 2020PM E0232

SCHOOL OF MECHANICAL ENGINEERING
CONTINUOUS ASSESSMENT TEST (CAT) -II
FALL SEMESTER 2025-2026

Programme Name & Branch : B. Tech Mechanical Engineering
Course Code : BMEE202L
Course Name : Mechanics of Solids
Faculty Name(s) : Dr. Rajesh M, Dr. Akash Mohanty,
Dr. Deepak Kumar Biswal, Dr. Rahul Singh Sikarwar,
Dr. Seenuvasaperumal P, Dr. Senthilnathan N
Class Number(s) : VL2025260102082, VL2025260102083,
VL2025260102091, VL2025260102080,
VL2025260102084, VL2025260102089
Date of Examination : 05.10.25
Exam Duration : 90 minutes
Maximum Marks: 50

General instruction(s):

- Answer All Questions
- M - Max mark; CO - Course Outcome; BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyse, 5 - Evaluate, 6 - Create)
- Course Outcomes Statements:
CO 2: Illustrate the relationship among load, shear force and bending moment for various beams.
CO 3: Evaluate the bending and shear stresses for beams with varying cross sections.
CO 4: Calculate the slope and deflection of various beams.

Q. No	Question	M	CO	BL
1.	Draw the shear force and bending moment diagrams for the cantilever beam shown in figure 1.  Fig. 1	10	2	3
2.	A truck chassis of span 8 m is modeled as a simply supported beam. A 100-ton machine is carried at mid-span, and the chassis itself has a uniformly distributed weight of 20 kN/m. Additionally, two workers, each weighing 80 kg, stand 2 m from the left support and 3 m from the right support respectively. Draw the shear force and bending moment diagrams for the chassis and determine the maximum bending moment and its location.	10	2	4



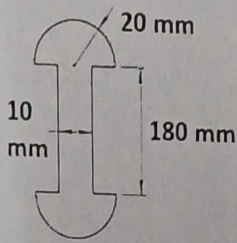
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3.	A 2m beam of cross-section as shown in Figure 2, is simply-supported at its ends and loaded uniformly over the span with 20 kN/m. Determine the maximum tensile and compressive stress values and also show the bending stress variation along the section.  Fig. 2	10	3	4
4.	A simply supported beam of 2m span carries a uniformly distributed load of 140 kN/m over the whole span. The cross-section is a axi-symmetric T-section with a flange width of 120 mm. The thickness of the flange and web is 20 mm and the overall depth of the beam is 160 mm. Determine the maximum shear stress in the beam and sketch the stress distribution for the section. The centroid is at a distance of 53.08 mm from the top surface.	10	3	4
5.	A cantilever of span 6 m, carries a point load of 12 kN at its free end and a uniformly distributed load of 4 kN/m over the entire span of beam. Determine the slope and deflection at the free end. Assume, $EI = 3 \times 10^7 \text{ Nm}^2$.	10	4	3
