



A Centre of Excellence

TECHNICAL UNIVERSITY OF MOMBASA (TUM)

**SPECIAL/SUPPLEMENTARY EXAMINATIONS FOR:
BACHELOR OF TECHNOLOGY IN CIVIL ENGINEERING**

**TCV 4426: STRUCTURAL TIMBER DESIGN
2024/2025
SERIES:**

TIME: 2 HOURS

Instructions to Candidates:

1. You should have answer booklet for this examination.
 2. This paper contains **FOUR** questions
 3. Answer question **ONE** any **TWO** questions.
 4. Marks for each question are indicated in the parenthesis.
 5. Examination duration is **2 Hours**
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TCV 4426: STRUCTURAL TIMBER DESIGN

Question One [20 marks]

(a) Describe the advantages and disadvantages of using timber as a structural material [12 marks]

(b) Discuss the fire safety and resistance of timber [8 marks]

Question Two [20 marks]

A simply supported rectangular joist is subjected to a design load of $q_{\text{dim}} = 4 \text{ kN/m}^2$ consisting of permanent and medium-term loads. The clear span l is 5 m and the joists are spaced at 0.6 m centres. The joist is part of an indoor floor assume Service class 1. Design the joist in structural timber of strength class C24, for:

- bending moment
- Shear load.
- Check the bearing strength at the end supports if the bearing length is restricted to 70 mm at each end.

Question Three [20 marks]

The timber column shown in figure Q3 has a cross-section $100 \text{ mm} \times 200 \text{ mm}$ is of strength class C24 and functions under service class 2 conditions. It supports a characteristic permanent compressive action of 8 kN and a characteristic variable short-term compressive action of 20 kN. The loading is applied 70 mm eccentric from the y - y axis as shown in the figure and the permanent action includes an allowance to cover for the effect of the self-weight of the column. The column is 4 m high and at each end is effectively held in position but not in direction about the z - z axis and the y - y axis. Check that the column will meet the ULS requirements of EC5.

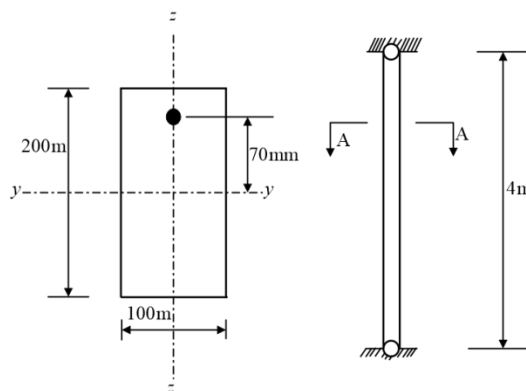
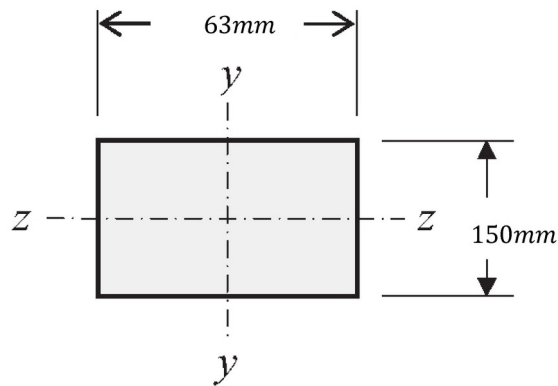


Figure Q3

Question Four [20 marks]

A 63 mm by 150 mm sawn timber section of strength class C27 functioning under service class 2 conditions is shown in figure Q4 and is subjected to a characteristic permanent tensile action of 1.2 kN and a characteristic variable tensile medium term action of 3 kN along the direction of the x - x axis of the member. The variable tensile action also induces a variable medium-term moment of 1.1 kNm about the y - y axis and 0.10 kNm about the z - z axis. There is no loss of area in the member at each end connection. Check that the member will meet the ULS requirements of EC5.

**Figure Q4**