A Centre of Excellence

TECHNICAL UNIVERSITY OF MOMBASA (TUM)

UNIVERSITRY REGULAR EXAMINATIONS FOR:

BACHELOR OF TECHNOLOGY IN CIVIL ENGINEERING

TCV 4426: STRUCTURAL TIMBER DESIGN

END OF SEMESTER EXAMINATION
SERIES: 2024/2025
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**

ECV 4426: STRUCTURAL TIMBER DESIGN

Question One [20 marks]

a) Discuss the factors which influence the strength of timber and explain how the strength of timber is assessed in practice.[**12 marks**]

(b) Outline the properties of good timber. [**8 marks**]

Question Two [20 marks]

(a) Briefly explain the Mechanical properties of timber [**6 marks**]

(b) A solid timber beam of cross section 75 mm wide × 250 mm deep, in strength class C16 spans 3.5 m is simply supported. It supports uniformly distributed permanent (including self-weight of beam) and variable actions of respectively $0.3\,\text{kN/m}$ and $2.2\,\text{kN/m}$. Assuming the beam is torsionally restrained at supports and the exposure is service class 2 check it's bending capacity. [**14 marks**]

Question Three [20 marks]

A mechanically graded timber column of strength class C22 consists of a 150 mm square section as shown in figure Q2 which is restrained at both ends in position but not in direction. Assuming that the service conditions comply with Service Class 1 and the actual height of the column is 4m.

i) Calculate the axial load capacity of the column can support **[12 marks]**

ii) Check the adequacy of the column to resist a long-term design axial load of 12 kN applied 50 mm Eccentric to its y–y axis. **[8 marks]**

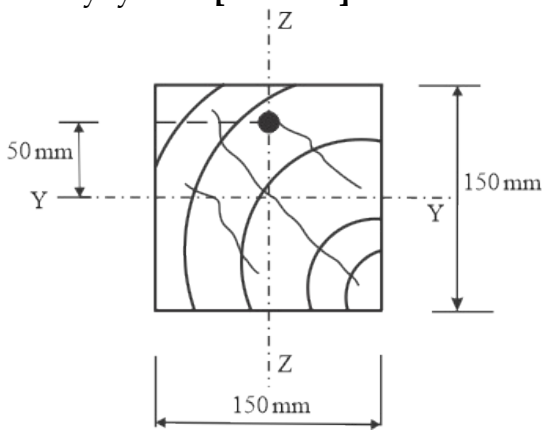

Figure Q2

Question Four [20 marks]

A sawn softwood beam in C16 of cross section 63 mm wide × 200 mm deep is supported on 100mm wide bearing. The load is medium term and service class 2 applies. Find the ultimate capacity of the bearing:

(i) if the bearing is at the end of the joist so that $a = 0$

(ii if the bearing is internal so that $a \geq \frac{200}{3} = 67\,\text{mm}$