(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY SUPPLEMENTARY/SPECIAL EXAMINATIONS

2021/2022 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER EXAMINATIONS

FOR THE DEGREE
OF
BACHELOR OF TECHNOLOGY EDUCATION (CIVIL AND BUILDING TECHNOLOGY)

COURSE CODE: **TEB 212**

COURSE TITLE: THEORY OF STRUCTURES II

DATE: 4ᵀᴴ AUGUST 2022   **TIME: 8 A.M – 10 A.M**

INSTRUCTIONS:
1. This paper contains **Four** questions
2. Answer **Question one** and any **other two Questions**
3. Marks for each question are indicated in the parenthesis.
4. Examination duration is 2 **Hours**

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 3 Printed Pages. Please Turn Over.

QUESTION ONE (40 Marks) - COMPULSORY

a) i) Using the area-moment theorems, derive the slope-deflection equations used in analysis of structures. (10 Marks)

ii) For the continuous beam shown in Figure Q1 (a), determine the support moments and reactions using Slope deflection equations. Hence draw shear force and bending moment diagrams. (14 Marks)
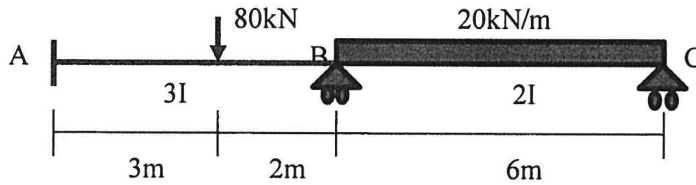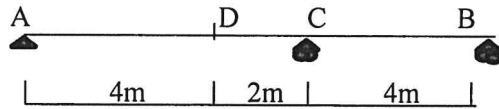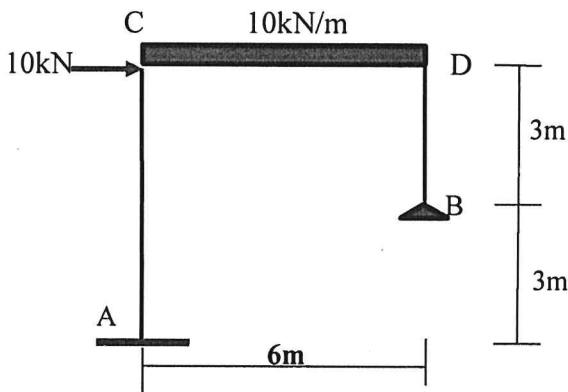

Figure Q1(a)

b) State the Castigliano's strain energy Theorems (6 Marks)

c) Draw the influence lines for the vertical reactions at the supports and shear force & bending moment at point D of the two-span continuous beam shown in Figure Q1 (c) (10 Marks)

QUESTION TWO (30 Marks)

The frame shown in Figure Q2 is acted upon by a uniformly distributed load of 10kN/m and a point load of 10kN. Use stain energy method to determine the reactions at the supports (30 Marks)

QUESTION THREE (30 Marks)

By applying the method of Moment Distribution, analyze the beam shown in figure Q3 for support moments and reactions. The modulus of elasticity E is constant throughout the structure. (30 Marks)
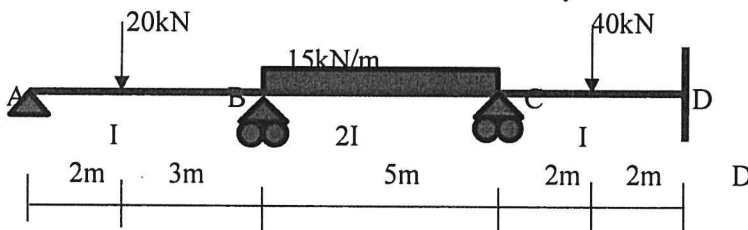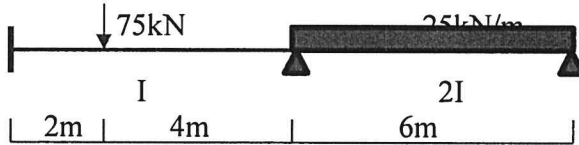

Figure Q3

QUESTION FOUR (30 Marks)

Use three moment equations to analyze the continuous beam shown in Figure Q4 for moments and vertical reactions at the supports.

Fixed end moments

$$M_{AB} = -\frac{wl^2}{12}, \quad M_{BA} = \frac{wl^2}{12}$$

$$M_{AB} = -\frac{Pab^2}{L^2}, \quad M_{BA} = \frac{Pba^2}{L^2}$$

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