

PAPER A



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology
DEPARTMENT OF ARCHITECTURAL STUDIES
UNIVERSITY EXAMINATION FOR:

BACHELOR OF ARCHITECTURAL STUDIES
EAR 4311 : STRUCTURES FOR ARCHITECTS III
END OF SEMESTER EXAMINATION

SERIES: APRIL 2025

TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of five questions.

Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

QUESTION ONE (COMPULSORY) 30 marks

- a) Analyze the three span beam shown in **Figure Q1** below using moment distribution method and draw the shear force and bending moment diagrams. EI is constant.

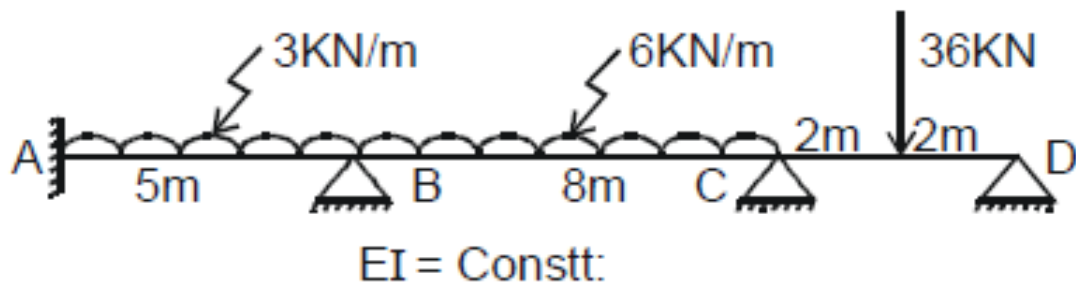


Figure Q1

(20 Marks)

- b) Discuss four differences between determinate and indeterminate structures

(4 Marks)

- c) Discuss force and displacement methods of analysis of indeterminate structures giving two examples for each.

(6 Marks)

QUESTION TWO (20 Marks)

Analyse the two-span continuous beam shown in **Figure Q2** by slope deflection method and draw the bending moment and shear force diagrams. EI is constant.

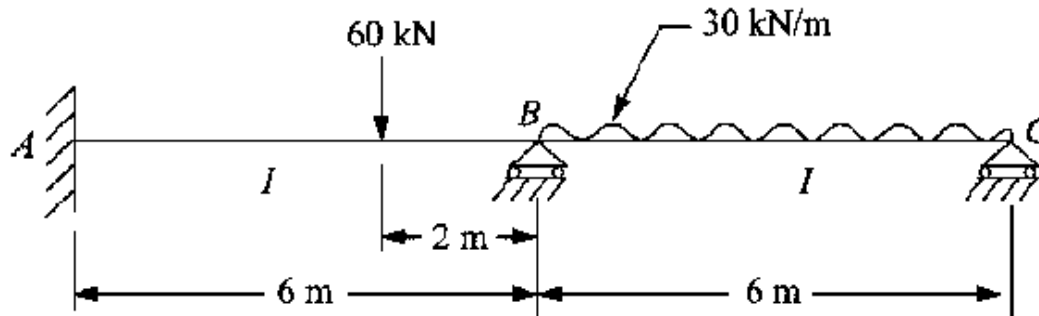


Figure Q2

(20 Marks)

QUESTION THREE (20 Marks)

Analyse the continuous beam shown in **Figure Q3** below using three moments equation and draw the shear force and bending moment diagrams.

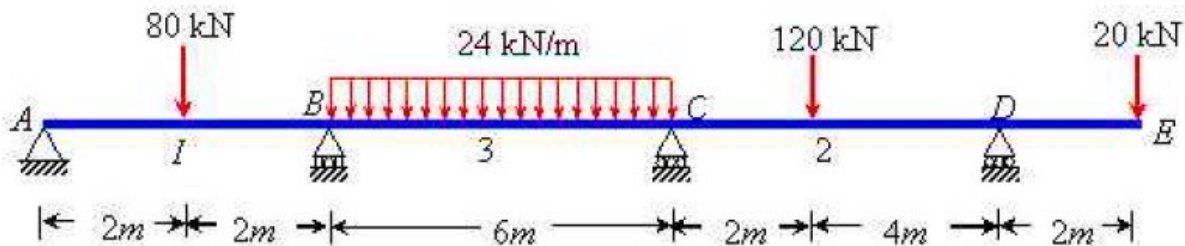


Figure Q3

(20 Marks)

QUESTION FOUR (20 Marks)

Analyse the beam shown in **Figure Q4** below to obtain reactions at A and B and moment at A by method of consistent deformation assuming EI is constant.

- By considering reaction at B as the redundant
- By considering moment at A as the redundant

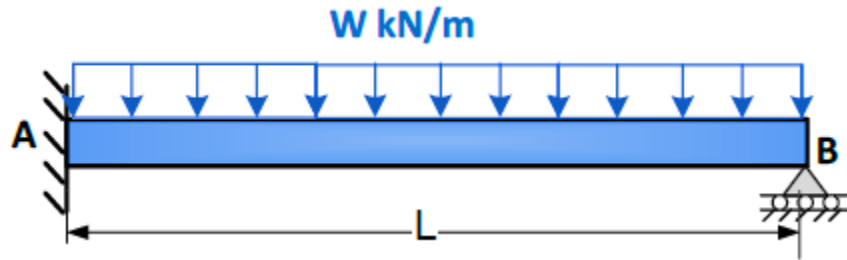


Figure Q1

(20 Marks)

QUESTION FIVE (20 Marks)

Figure Q5 below shows an indeterminate beam simply supported at A and fixed at B. Using moment distribution;

- Construct the influence lines for the reactions at supports A and B of the beam by placing the unit load at six points (distance of $0.2 L$ apart)
- Construct the influence lines for the moment at B.
- Given that $L = 30\text{m}$, determine the moment created at support B by 26 kN and 34 kN set of wheel loads, when they are positioned at points 3 and 5.

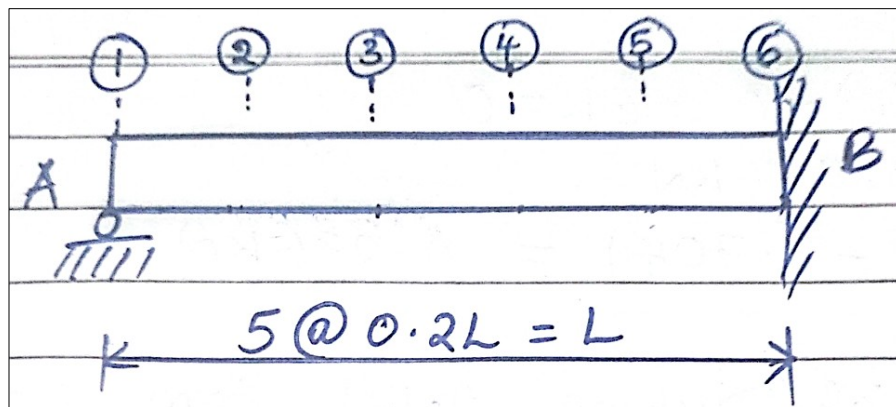


Figure Q5

(20 Marks)