



MACHAKOS UNIVERSITY

University Examinations for 2022/2023

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

THIRD YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (CIVIL ENGINEERING)

ECV 305: THEORY OF STRUCTURES III

DATE:

TIME:

INSTRUCTIONS: Attempt questions ONE and any other TWO questions

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Analyze the continuous beam shown in Fig. Q1 using the moment distribution method and sketch the shear force diagram and the bending moment diagram. (20 marks)

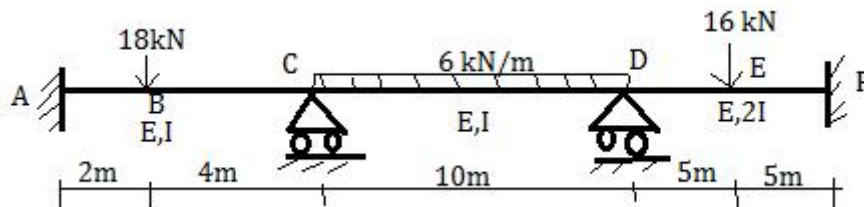


Fig. Q1

- b) Determine the slope and moments of the beam shown in Figure Q1(b) by using the slope deflection method. (10 marks)

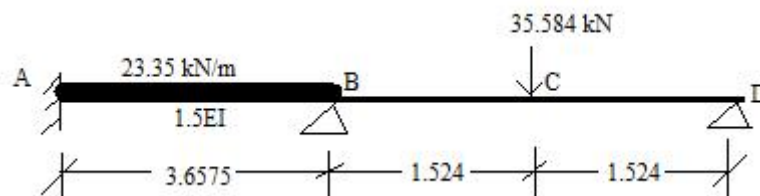


Figure Q1(b)

QUESTION TWO (20 MARKS)

Determine the deflection and the slope at C of the simply supported beam shown in figure Q2 using the conjugate beam method. (20 Marks)

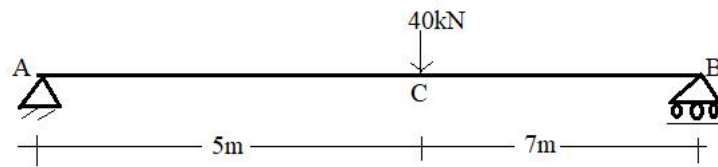


Figure Q2

QUESTION THREE (20 MARKS)

Determine the slope and moments of the beam shown in Figure Q3 by using the slope deflection method.

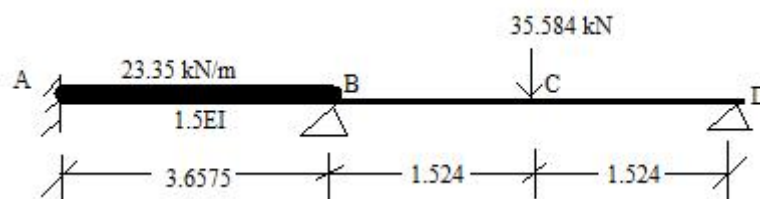
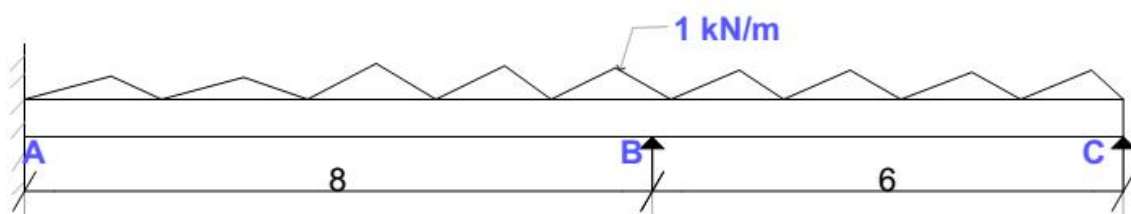


Figure Q3

QUESTION FOUR (20 MARKS)

A continuous beam ABC of uniform section, with span AB as 8 m and BC as 6 m, is fixed at A and simply supported at B and C. The beam is carrying a uniformly distributed load of 1 kN/m throughout its length. Find the moments along the beam and the reactions at the supports using the three-moment theorem method. Also draw the bending moment and shear force diagrams.



QUESTION FIVE (20 MARKS)

Find by the moment-area method θ_B and Δ_B of the cantilever beam shown in Figure Q5

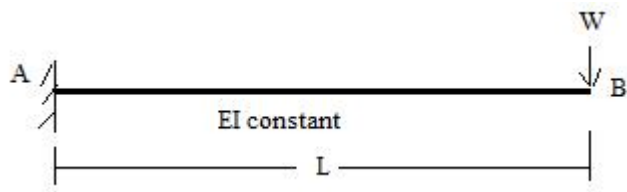


Figure Q5