TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF BUILDING & CIVIL ENGINEERING
UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN CIVIL ENGINEERING
ECV 4322: THEORY OF STRUCTURES IV

END OF SEMESTER EXAMINATION
SERIES: APRIL 2025
TIME: 2 HOURS

QUESTION ONE – Compulsory (30 Marks)

(a) Two beams AC and CD are hinged internally at C and simply supported at A and D. When it is subjected to transverse loading as shown in the figure Q1(a), find the reaction at third support B use the principle of virtual work. (10 Marks)

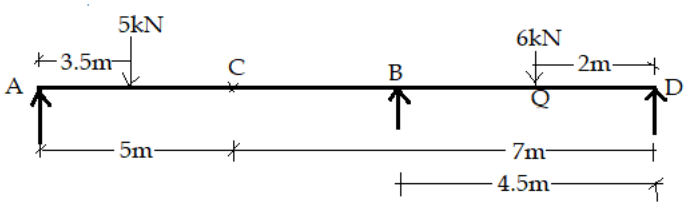

Fig. Q1(a).

(b) Determine the deflection and the slope at *C* of the simply supported beam shown in figure Q1(b) using the conjugate beam method. (20 Marks)

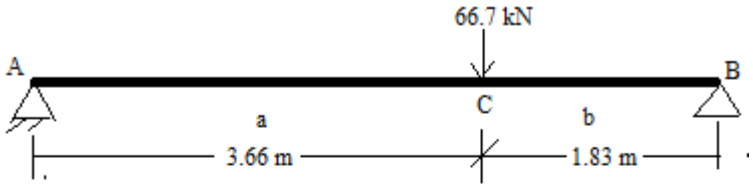

Figure Q1(b)

QUESTION TWO (20 Marks)

Using the Castigliano's theorem determine the slope at A and the deflection at C for the beam shown in Fig. Q2. Assume the beam to have a constant EI. (20 Marks)

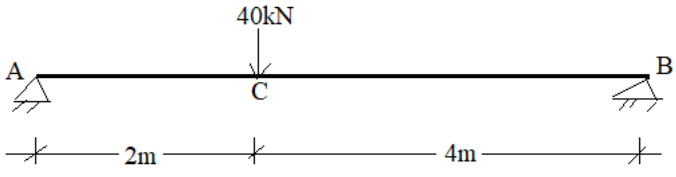

Fig. Q2.

QUESTION THREE (20 Marks)

Determine the slope at *B* and *C* and the deflection at *B* and *C* for the cantilever beam shown in Fig. Q3 using the moment area method.

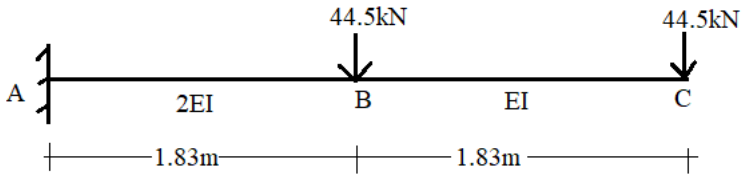

Fig. Q3.

QUESTION FOUR (20 Marks)

Determine the slopes and deflections at points B and C of the cantilever beam shown in Fig. Q4 by the conjugate-beam method.

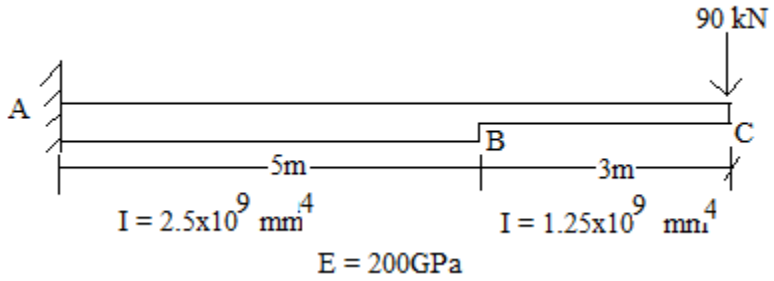

Fig. Q4

QUESTION FIVE (20 Marks)

Find the slope and deflection at B and C using the moment area method of the cantilever beam shown in figure Q5.

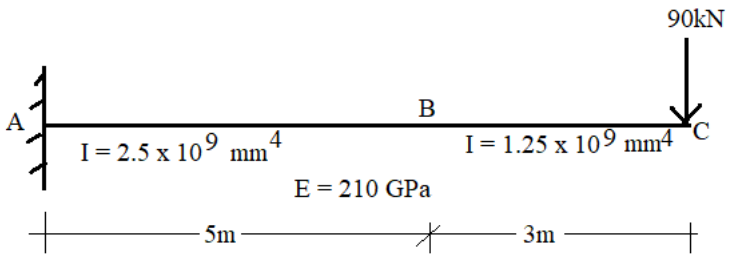

Figure Q5.