TECHNICAL UNIVERSITY OF MOMBASA

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

BACHELOR OF TECHNOLOGY IN CIVIL ENGINEERING

TCV 4213: ANALYSIS OF STRUCTURES I

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: JULY 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.
All symbols have their usual meaning
Do not write on the question paper.

QUESTION ONE (30 Marks)

(a) The beam ABCDE shown in Figure Q1 (a) carries two-point loads plus a UDL. Draw the S.F.D and B.M.D for the beam, indicting all significant values. (15 Marks)

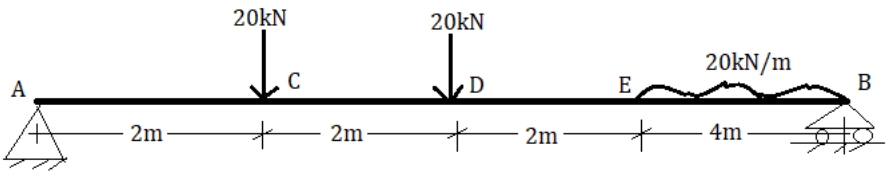

Figure Q1(a)

(b) A cable support loads at B and C as shown in Figure Q1(b). Determine the sag at point C and the maximum tension in the cable. (15 Marks)

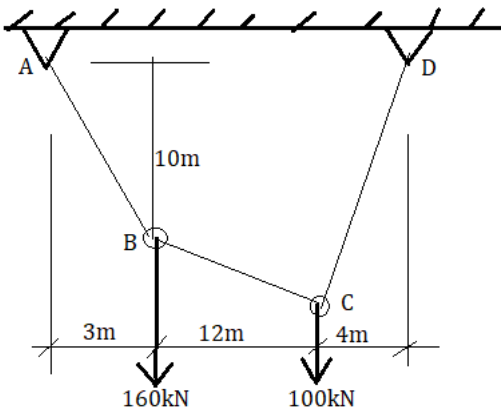

Figure Q1(b)

QUESTION TWO (20 Marks)

Figure Q2 shows a three-hinged symmetrical parabolic arch of span 100 m and central rise of 25m. It is required to find the support reactions due to the loading applied. The left half of the span carries a uniformly distributed load of 2kN/m while two concentrated loads of 50kN and 100kN act at 30m and 10m from right hand support as shown. Find the bending moment, normal thrust and radial shear at a point 20m from either support.

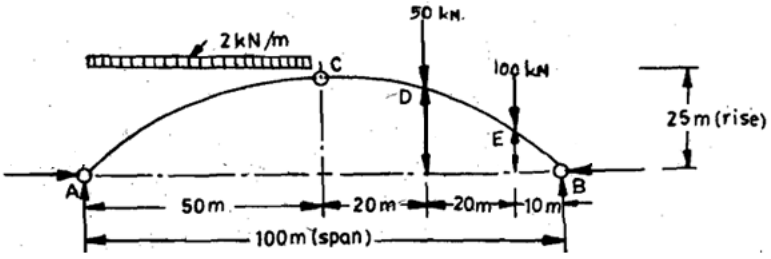

Figure Q2

QUESTION THREE (20 Marks)

(a) Clear differentiate between collinear, coplanar and concurrent forces. (6 Marks)

(b) Determine the horizontal and vertical components of reaction at the pins A, B and C of the two-member frame shown in figure Q3(b). (14 Marks)

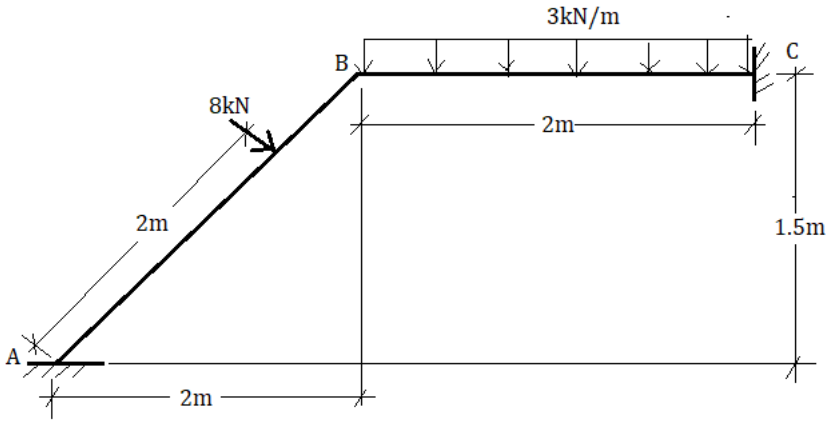

Figure Q3(b)

QUESTION FOUR (20Marks)

Analyse the truss shown in Figure Q4 using the method of resolution by joints. Clearly indicate the nature of the force.

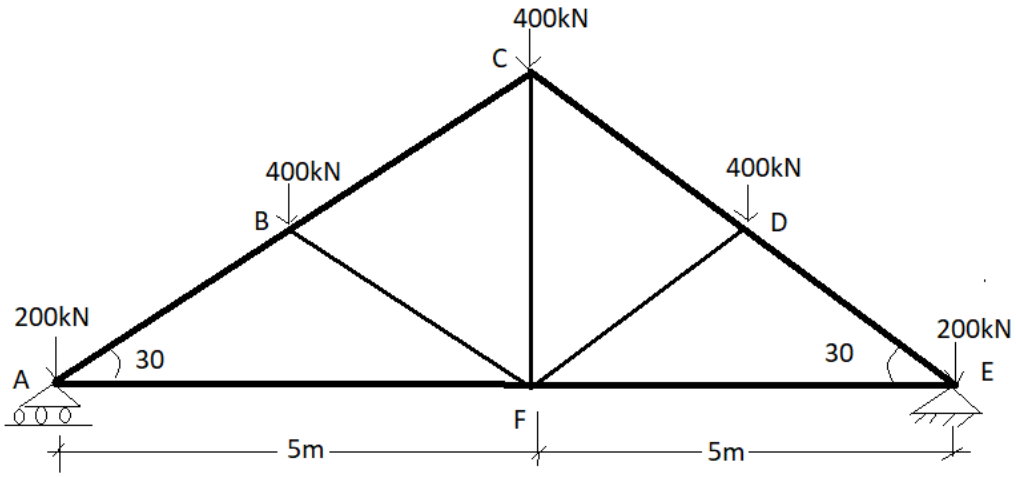

Figure Q4

QUESTION FIVE (20 Marks)

Draw the shear force and bending moment diagrams for the beam shown in figure Q5. (20 marks)

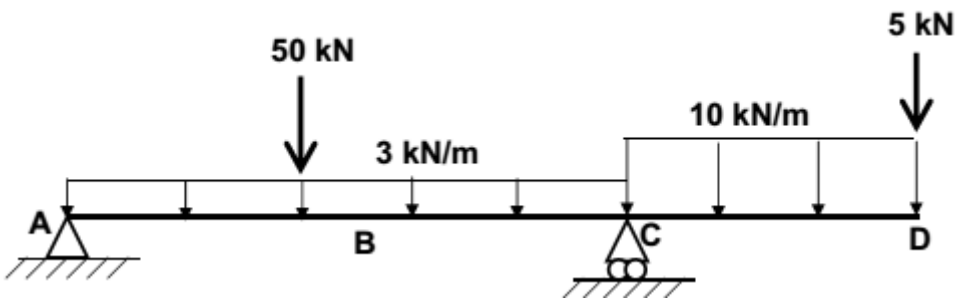

Figure Q5