



**TECHNICAL UNIVERSITY OF MOMBASA**

**FACULTY OF ENGINEERING AND TECHNOLOGY**

**DEPARTMENT BUILDING AND CIVIL ENGINEERING**

**UNIVERSITY EXAMINATION FOR:**

**BSC IN CIVIL ENGINEERING**

**ECE 2307: THEORY OF STRUCTURES III**

**END OF SEMESTER EXAMINATION**

**SERIES: APRIL 2016**

**TIME: 2 HOURS**

**DATE: 13 May 2016**

QUESTION ONE (30 marks)

- (a) Determine the moments at the supports of the continuous beam shown in Figure Q5 using the moment distribution method assuming that  $EI$  is constant with  $E = 200\text{GPa}$  and  $I = 200\text{E}6\text{ mm}^4$ . (20 Marks)

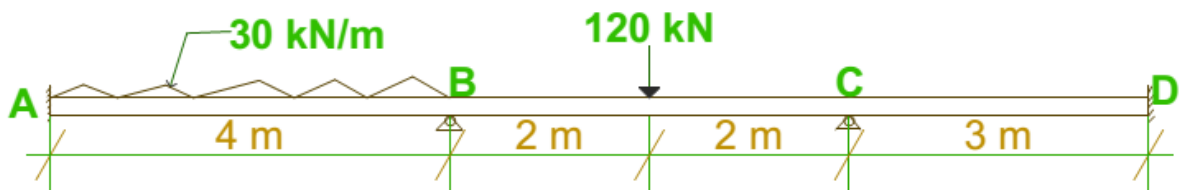


Figure Q1 (a)

- (b) Construct the influence line for vertical reaction  $Y_B$  of the indeterminate beam shown in figure Q1 (b) by static method. (10 Marks)

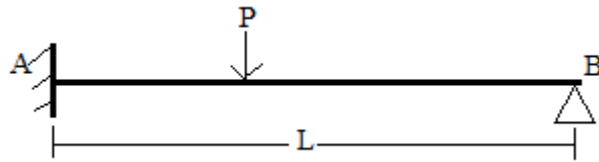


Figure Q1 (b)

QUESTION TWO (20 Marks)

Analyze the continuous beam shown in Figure Q2 using the moment distribution method and sketch the shear force diagram and the bending moment diagram.

(20 Marks)

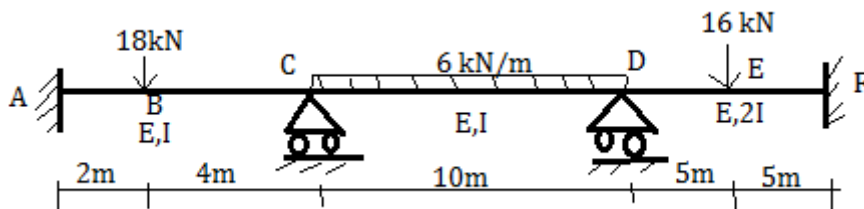


Figure Q2

QUESTION THREE (20 Marks)

Determine the position and calculate the value of the maximum bending moment in the loaded half of the semi-circular three-pinned arch shown in Figure Q3. (20 Marks)

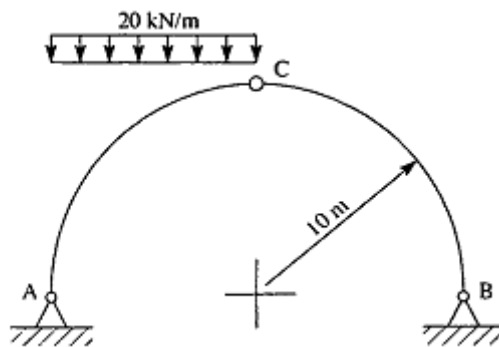


Figure Q3

QUESTION FOUR (20 Marks)

Find the force in bar 6 of the truss shown in Figure Q4, using the method of consistence deformation given  $E = 10\text{Gpa}$ ,  $A = 100\text{ cm}^2$  for all bars. (20 Marks)

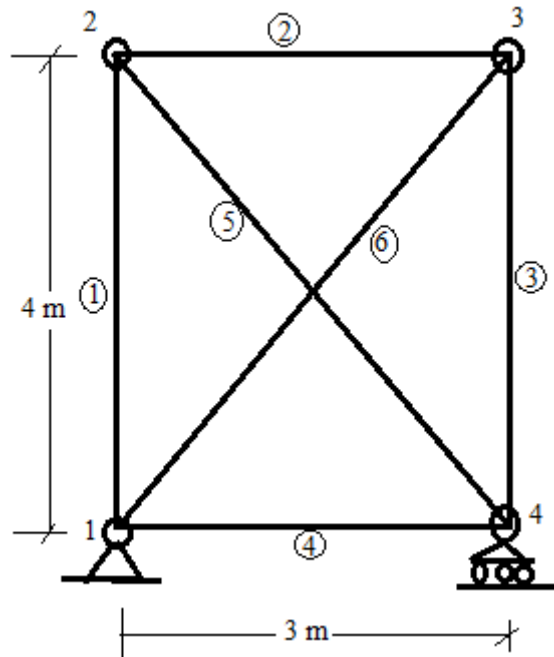


Figure Q4

QUESTION FIVE (20 Marks)

(a) Evaluate the bending moment and shear force diagrams of the beam shown in Figure Q5 using the three moment theorem. (20 Marks)

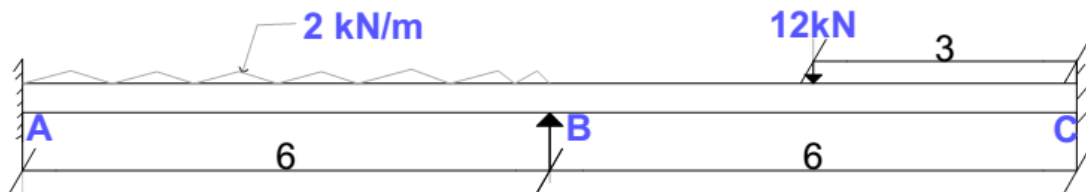


Figure Q5