# TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

**UNIVERSITY EXAMINATION FOR:**

BACHELOR OF SCIENCE IN CIVIL ENGINEERING
(INSTITUTION BASED EXAMINATION)

**ECE 2307 : THEORY OF STRUCTURES III**

END OF SEMESTER EXAMINATION

**SERIES:** MARCH 2017

**TIME:** 2  HOURS

**DATE:** 3rd  April 2017

**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)**

(a)    Evaluate the bending moment and shear force diagrams of the beam shown in Figure Q1(a)
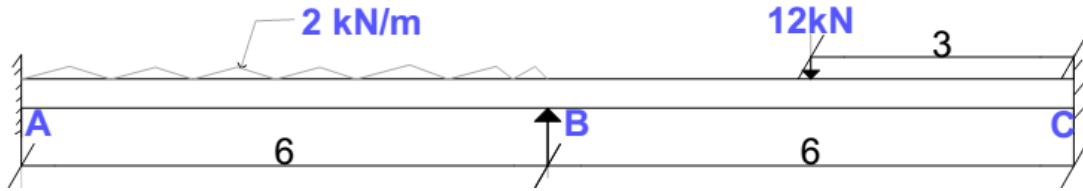       using the three-moment theorem. (20 Marks)

Figure Q1(a)

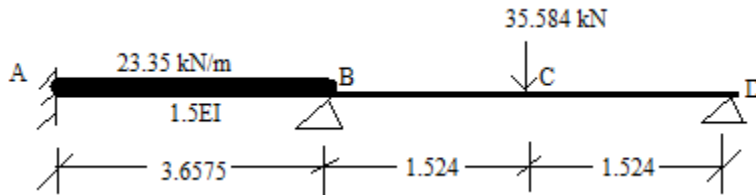(b) Determine the slope and moments of the beam shown in Figure Q1(b) by using the slope deflection method. (10 Marks)



Figure Q1(b)

**Attempt any TWO questions**

**QUESTION TWO**

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)
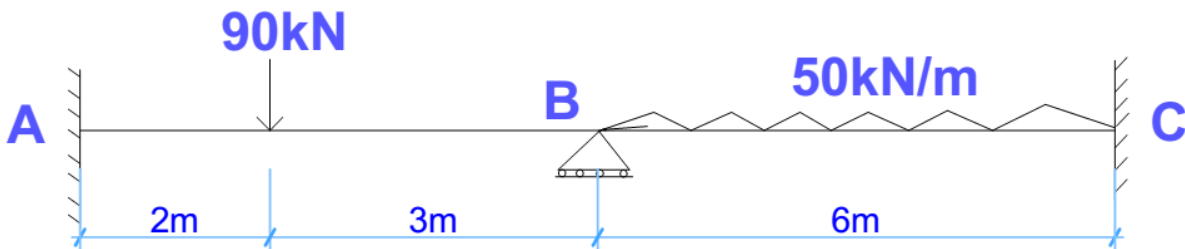


Figure Q2

**QUESTION THREE**

A three-hinged parabolic arch of span 40m and rise 10m is carrying a uniformly distributed load as shown in Figure Q3. Find the horizontal thrust at the springing. (20 Marks)
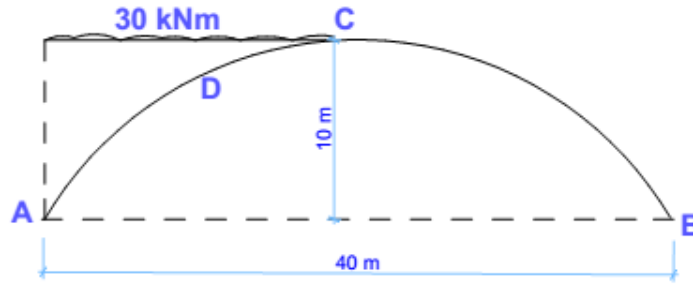
Figure Q3

## QUESTION FOUR

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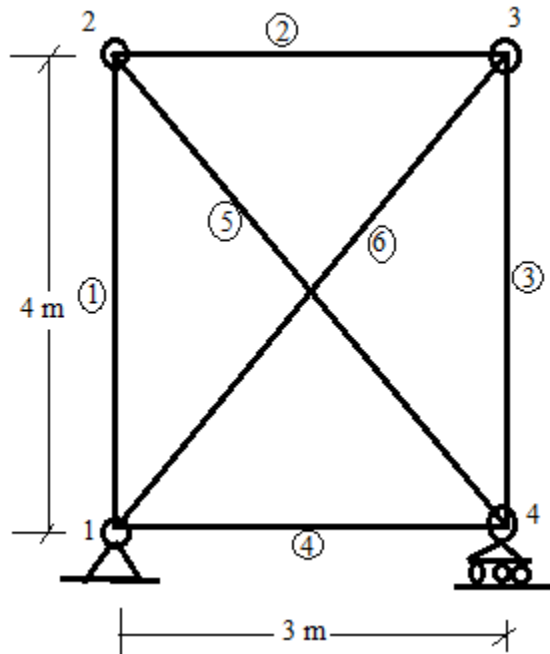


Figure Q4

## QUESTION FIVE

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 $E = 200GPa$ and $I = 200E6$ mm$^4$. (20 Marks)
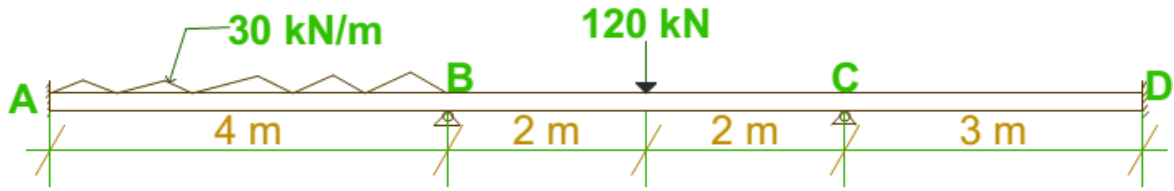
Figure Q5