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

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) A UDL of 4kN/m covers left half span of a three-hinged parabolic arch of span 36 m and central rise 8m as shown in Figure Q1(a). Determine the;

i.	Horizontal thrust	(4 Marks)
ii.	Bending moment	(4 Marks)
iii.	Shear force	(4 Marks)
iv.	Normal thrust	(4 Marks)
v.	Radial shear at the loaded quarter point	(4 Marks)

4 kN/m

h = 8 m

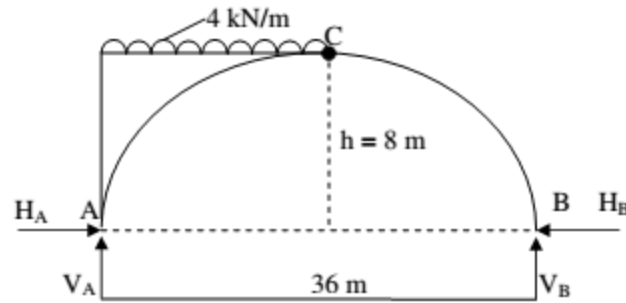H_A A   B H_B

V_A 36 m V_B

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)
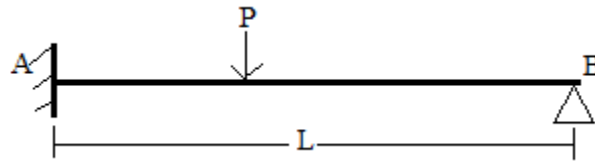

P

A   B

L

Figure Q1(b)

Attempt any TWO questions

QUESTION TWO

A continuous beam ABC is supported on an elastic column BD and is loaded as shown in Figure Q2. Treating joint B as rigid, analyze the frame using the method of slope deflection and plot the bending moment diagram of the structure. (20 Marks)
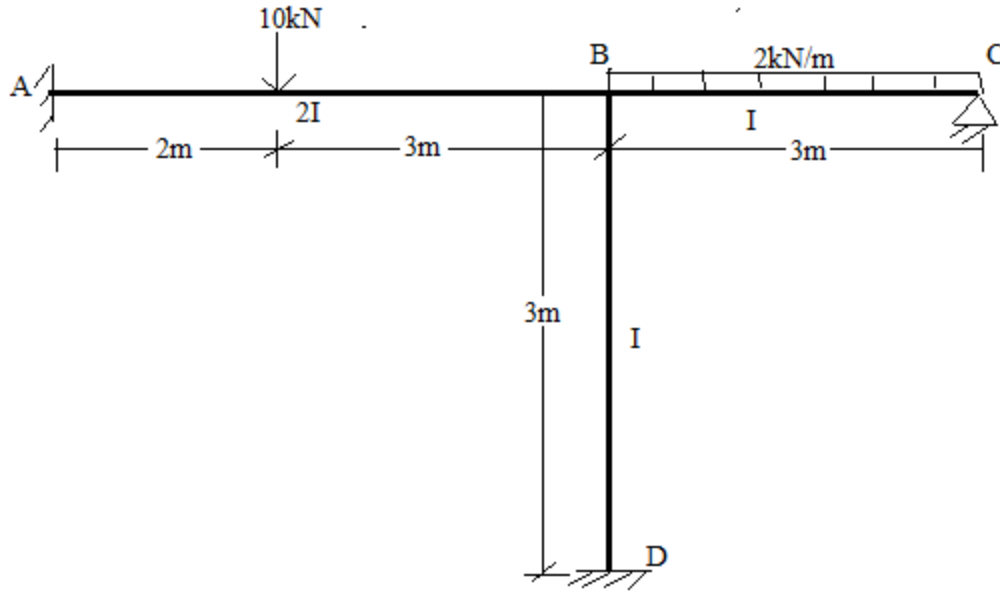
Figure Q2

QUESTION THREE

A continuous beam ABCD, simply supported at A, B, C and D, is loaded as shown in Figure Q3. Find the moments over the beam using three moment theorem method and draw bending moment and shear force diagrams.   (20 Marks)
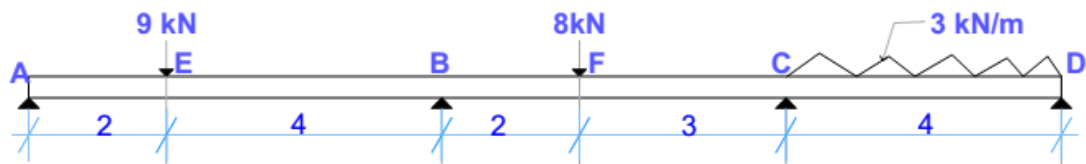

Figure Q3

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.
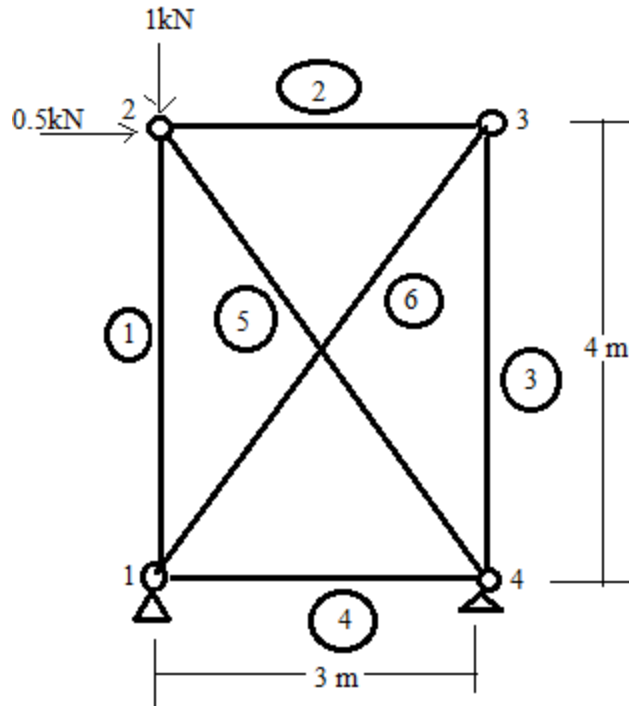
1kN

0.5kN

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 $E = 200\text{GPa}$ and $I = 200\text{E}6 \text{ mm}^4$.
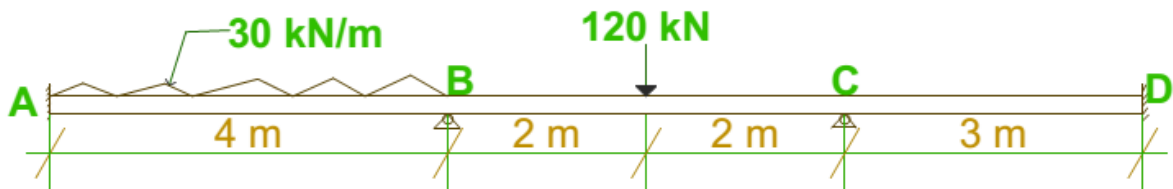
(20 Marks)

Figure Q5