



# MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)  
University Examinations for 2015/2016

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**DEPARTMENT OF BUILDING AND CIVIL ENGINEERING**

**FIRST SEMESTER EXAMINATION FOR DIPLOMA IN CIVIL ENGINEERING**

**BCECD 302: THEORY OF STRUCTURES III**

**Date:18/4/2016**

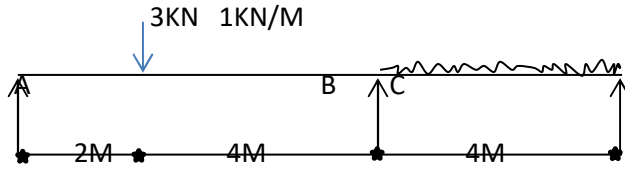
**Time:8:30-10:30am**

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## **Instructions:**

- 1. This paper comprises of **five** questions*
  - 2. **Question one is compulsory** and carry 30 marks*
  - 3. Answer any **other two** questions*
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- 1 A continuous beam ABCD is simply supported over three spans of 6m,5m and 4m respectively. The beam carries pointloads of 90KN and 80KN at 2m and 8m from the support A and a uniformly distributed load 30KN/M over the span CD. Find the moments and reactions at the supports using the three moment theorem method of analysis and draw the bending moment and shear force diagrams. (30marks)
  - 2 A beam ABCD 9m long is simply supported at A,B, and C,such that the length AB is 3m ,length BC is 4.5m and the overhang CD is 1.5m. It carries a uniformly distributed load of 1.5KN/M in span AB and a point load of 1KN at the free end D . The moments of inertia of the beam in span AB and CD is  $I$  and that in span BC is  $2I$ . Using three moment theorem method, analyze the structure and draw the bending moment and shear force diagrams for the beam. (20 marks).

3 A continuous beam ABC 10m long rests on three supports A,B and C at the same level and loaded as shown below



Using moment distribution methods determine the moment over the beam and draw the bending moment diagram. Also calculate the reactions at the supports and draw the shear force diagram. (20marks)

4 Using a three moment theorem equation analyse a continuous beam simply supported over three spans given that  $AB=8M$ ,  $BC=12M$  and  $CD=5M$ . It carries uniformly distributed load of  $4kN/M$  in span AB,  $3kN/M$  in span BC and  $6kN/M$  in span CD. Find the moments over the supports B and C. (20marks)

5 Using moment distribution method, determine the moments and support reactions for the portal frame shown below. (20mks)