



MACHAKOS UNIVERSITY

University Examinations 2016/2017

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

THIRD YEAR FIRST SEMESTER EXAMINATION FOR DIPLOMA IN CIVIL
ENGINEERING

BCECD 302: THEORY OF STRUCTURES III

DATE: 30/5/2017

TIME: 2:00 – 4:00 PM

INSTRUCTIONS:

- This paper comprises of **five** questions
- Question **one** is **compulsory** and carry 30 marks
- Answer **question one** and any **other two** questions
- No mobile phones are allowed in the exam room

- 1 A continuous beam ABCD is simply supported over three spans of 5.0m, 6.0m and 5.0m respectively. The beam carries a uniformly distributed load of 20KN/M at span AB , a point load of 40KN at a distance of 2.0m from support B and a central point load of 60KN at 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.

(30 marks)

- 2 A beam ABCD 9.5m long is simply supported at A, B, and C, such that the length AB is 3.5m, length BC is 4.5m and the overhang CD is 1.5m. It carries a uniformly distributed load of 35KN/M in span AB, a central point load of 60KN/M at span BC and a point load of 15KN 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 beam ABCD is fixed at support A and simply supported at the other supports. Span AB carries a uniformly distributed load of 40KN/M , Span BC carries a uniformly distributed load of 30KN/M and Span CD carries a uniformly distributed load of 20KN/M . Using moment distribution methods determine the moments and reactions over the beam. Also draw the bending moment and the shear force diagrams. Span AB = 4.5m , span BC = 3.0m and span CD = 5.0m . (20 marks)
- 4 Using moment distribution method determine the moments and support reactions for the portal frame shown below. (20 marks)
- 5 Using three moment theorem equation, analyse a continuous beam ABCD simply supported over three spans given that AB= 3.0m , BC= 4.0m and CD= 4.5m . It carries a uniformly distributed load of 35KN/M in span AB, 40KN/M in span BC and 30KN/M in span CD. Find the moments and reactions on the beam. Also draw the bending moment and shear force diagrams. (20 marks)