MACHAKOS UNIVERSITY

University Examinations for 2019/2020Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

DIPLOMA IN CIVIL ENGINEERING

BCECD 213: THEORY OF STRUCTURES II

DATE: 9/11/2020 **TIME: 2.00-4.00 PM**

INSTRUCTIONS

- *This paper consists of **Five** questions.*
- *Answer question **ONE** and any other **TWO** questions*
- *Maximum marks for each part of the question are as shown.*

QUESTION ONE (30 MARKS) (COMPULSORY)

a) A concentrated load of 10kN crosses a beam of span 10m from left to right. Determine the maximum negative and positive shear force and bending moment at a section 4m from the left hand support (10 marks)

b) A uniformly distributed load of 10kN/m and 20m long crosses a girder of span 15m. Determine the maximum shear force and bending moment at a section 6m from the left eng of the girder. (10 marks)

c) A three hinged parabolic arch of span 30m and central rise 5m carries a horizontal uniformly distributed load of 10kN/m from the extreme left to the middle of span. Determine the horizontal and vertical reactions. (10 marks)

QUESTION TWO (20 MARKS)

A point load of 20kN rolls over a girder of 15m span.

a) Draw the influence lines for the shear force and bending moment at a point 6m from the left hand end.

b) Using the influence lines determine the maximum negative and positive shear force and bending moment at a point 6m from the left hand end.

QUESTION THREE (20 MARKS)

A uniformly distributed load of 4kN/m, longer than the span, rolls over a beam of span 12m. Using influence lines, determine the maximum shear force and bending moment at a section 3m from the left hand support.

QUESTION FOUR (20 MARKS)

Figure 1 shows a truss to be used as a girder.

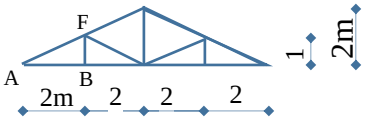

Fig. 1

Draw the influence lines for the forces in members AB and AF.

If a force of 2kN traverses the truss from left to right, determine the maximum value of the forces in the two members mentioned above.

QUESTION FIVE (20 MARKS)

A three hinged circular arch of span 18m has a rise of 3m. The arch is loaded with a point load of 40kN at a horizontal distance of 4m from the left hand support. Determine the following values:

a) The horizontal thrust

b) Reactions

c) The bending moment under the load