MACHAKOS UNIVERSITY

University examinations 2022/2023

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

THIRD YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR BACHELOR IN CIVIL ENGINEERING

ECV 305: THEORY OF STRUCTURES III

Date 7/3/2023 **Time: 2:00 – 4:00 PM**

INSTRUCTIONS

- *This paper comprises of five questions. Answer three questions*
- *Question one is **compulsory** and carry 30 marks*
- *Answer any other **two** questions*

Q1. Analyse the two span continuous beam ABC in **Fig Q1** by slope deflection method. Then draw shear force & bending moment diagrams. Take EI constant. (30 marks)

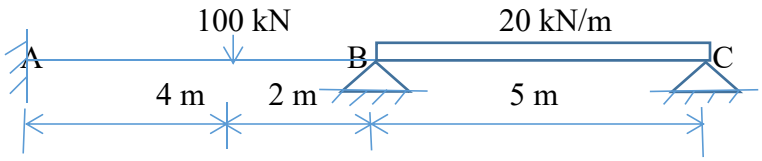

Fig Q1 Indeterminate beam

Q 2. Using the moment distribution method, determine the end moments and the reactions at the supports of the beam shown in Fig Q2. Draw the shearing force and the bending moment diagrams. *EI* = constant (20 marks)

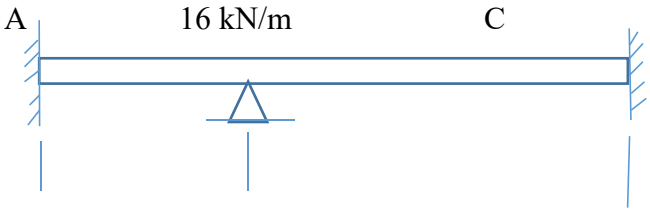

Fig Q2 Indeterminate beam

Q3. Using conjugate beam method, determine the slope and deflection of point A of a cantilever beam AB of length L and uniform flexural rigidity EI. A concentrated force P is applied at the free end of beam. (20 marks)

Q4. Determine the end slope and deflection of the mid-point C in a simply supported beam using moment area method. (20 marks)

Q5. A semicircular two hinged arch of constant cross section is subjected to a concentrated load in **Fig Q5**. Calculate reactions of the arch and draw bending moment diagram. (20 marks)

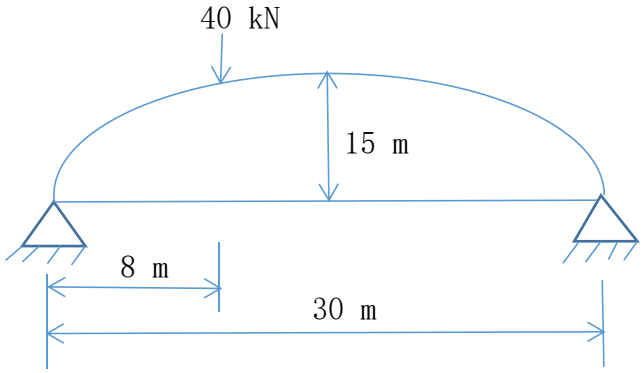

Fig Q5