



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

((A Constituent College of JKUAT)

(A Centre of Excellence)

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

**UNIVERSITY EXAMINATION FOR DEGREE IN BACHELOR OF SCIENCE IN
CIVIL ENGINEERING**

ECE 2307: THEORY OF STRUCTURES III

END OF SEMESTER EXAMINATION

SERIES: AUGUST 2012

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions.

Answer any **THREE** questions

Maximum marks for each part of a question are as shown

This paper consists of **THREE** printed pages

Question One (Compulsory - 30 Marks)

- a) Using the method of consistent deformation and moment area, determine all the support reactions A and C supporting the load P at the position shown. Assume that EI is constant. **(20 marks)**

Question Two (20 marks)

Using the slope deflection method:

- a) Determine the slopes at B and C and the deflection at B
- b) Draw the moment diagram. Given that the frame shown is allowed to sway horizontally.

(20 marks)

Question Three (20 marks)

Using the theorem of 3 moments: For the beam shown.

- a) Show that $16M_A + 8M_B = -128$
- b) If $R_A = 4.15\text{kN}$ $R_B = 7.6\text{kN}$ $R_C = 2.25\text{kN}$, use these values to draw the shear and moment diagrams.

Question Four (20 marks)

Using the moment distribution method for the frame shown.

(20 marks)

- a) Determine the moments and reactions
- b) Drawing the moment and shear diagrams

Question Five (20 marks)

A simply supported beam with a span of 60m is traversed by a train of four wheel loads i.e. 6, 14, 10, 10kN spaced 10m apart. The train may travel in either direction with the 10kN wheel leading. Use influence lines to determine the max values of the shear force 12m from the left hand support and the bending moment 20m from the same support.

(20 marks)