



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)
Faculty of Engineering and Technology

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

HIGHER DIPLOMA (BRIDGING)

EBC 2412: THEORY OF STRUCTURES II

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2011

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions

Answer question **ONE (COMPULSORY)** from **SECTION A** and any other **TWO** questions from **SECTION B**

Maximum marks for each part of a question are clearly shown

This paper consists of **THREE** printed pages

SECTION A (COMPULSORY)

Question 1

- a) Determine support reactions at supports A and B for the THREE-PINNED parabolic arch shown in figure. 1 (20 marks)
- b) Determine bending moments at points P, Q and R. (10 marks)

Fig. 10.

SECTION B (Answer any TWO questions from this section)

Question 2

- a) Sketch influence line diagrams for reactions A, B and also influence diagram for shear force and bending moment at point E for the beam in figure 2.

D

- b) Determine shear force and bending moment at point E for that two travelling loads shown. (6 marks)

Question 3

- a) Determine reactions A and B for the 3-pinned arch in figure 3. (14 marks)
- b) Determine bending moments at points D, E (6 marks)

Fig. 3

Question 4

a) Define the following:

- i) Reaction influence line
- ii) Shear force influence line
- iii) Bending moment influence line
- iv) Deflection influence line

(8 marks)

b) Determine positive shear force and bending moment at point E for the beam in figure 4 subjected to travelling load (12 marks)

10KN/m

Question 5

$$\frac{M}{I} = \frac{f}{y} = \frac{E}{R}$$

a) Derive the expression

(14 marks)

b) Determine maximum bending stresses in figure 5.

Fig. 5