THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

Faculty of Engineering & Technology

DEPARTMENT OF CIVIL AND BUILDING ENGINEERING

DIPLOMA IN BUILDING AND CIVIL (DBC 08)
DIPLOMA IN CIVIL ENGINEERING WITH CAD (DCC 08)

END SEMESTER EXAMINATIONS

MAY 2010 SERIES

CE2C 2204 : THEORY OF STRUCTURE II

TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination:

- Answer booklet
- Scientific calculator

This paper consists of **FIVE** Questions in Sections **A** and **B**.
Answer Question **ONE** in Section A and chooses **TWO** Questions in Section **B.**
Marks for each section of the question is as shown.

SECTION A

Question ONE (COMPULSORY)

A three hinged parabolic arch shown in Fig. I has a span of 20m and central rise of 4m. It is loaded with uniformly distributed load of 20KN/m for a length of 8m from the left end support as shown below. Find:

(I). Vertical reactions at A and B.
(II). Horizontal thrust
(III). Normal thrust at Points A, B, and D.
(IV). Draw the bending moment diagram for the arch and hence find the value of maximum positive bending moment.

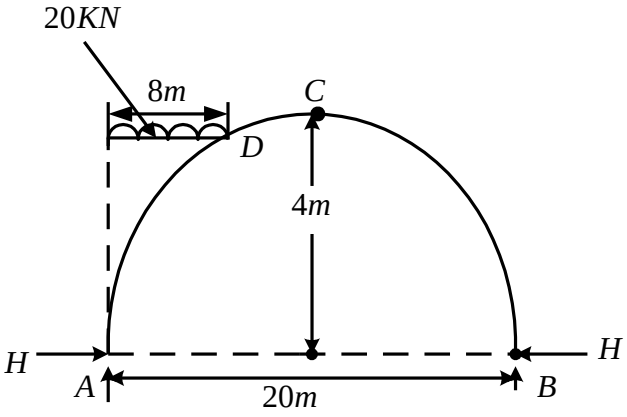


Fig.1

(30 Marks)

SECTION B

Question TWO

A uniformly distributed load of 50KN/m of 6m length crosses a girder of a span 40m, from left to right. With the help of Influence line, determine the values of shearforce and bending moment at point X, 12m from the left support when the head of the load is 16m from the left support of Fig.2.

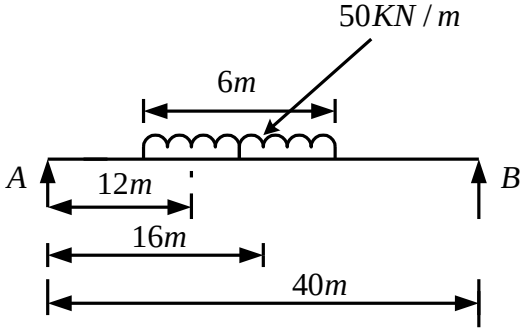


Fig. 3 **(20 Marks)**

Question THREE

(a). List **THREE** classification of arches giving an example for each.

(1½ Marks)

(b). (i). Define the term 'influence line as used in theory of structures.

(2 Marks)

(ii). Using the usual notations and graphical representations, show the Influence lines for:

- Reactions A and B in Fig. 3.
- Shear force at a
- Bending moment at point a,

For a simply supported beam of span l, with a unit loading.
NB a is at the centre of span AB.

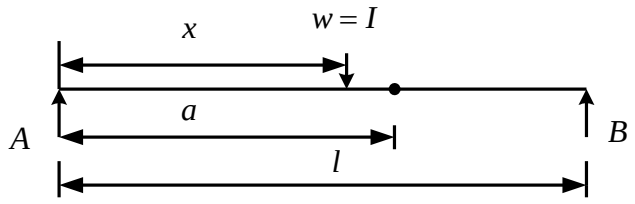
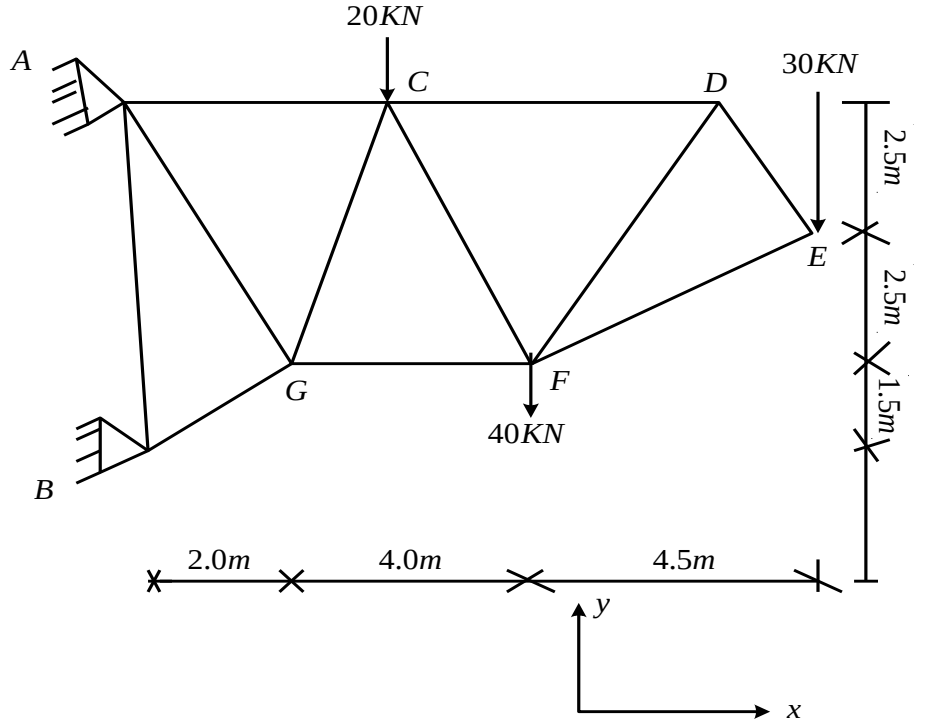


Fig. 3

(16½ Marks)

Question FOUR

Determine the nature and tension coefficient o the members shown in Fig.4.



(20 Marks)

Question FIVE

(a). State Mohr's 1st and 2nd Theorem on slope and deflection. **(4 Marks)**

(b). Derive the expressions for maximum slope and deflection for a simply supported beam carrying a uniformly distributed load over the entire span. Use Mohr's mount-area method. **(10 Marks)**

(c). A timber beam 50mm wide by 100mm deep is required to support a uniformly distributed load, over a span of 3.0m. Determine the safe load the beam would carry over its entire span if maximum deflection is limited to $Span/300$. Take: $E_{Timber} = 10.5 KN/mm^2$. **(6 Marks)**