



TECHNICAL UNIVERSITY OF MOMBASA
**Faculty of Engineering &
Technology**

DEPARTMENT OF BUILDING & CIVIL ENGINEERING
**UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN CIVIL ENGINEERING
(BSCE)**

ECE 2205: THEORY OF STRUCTURES I

**END OF SEMESTER EXAMINATION
SERIES: APRIL 2014
TIME ALLOWED: 2 HOURS**

Instructions to Candidates:

You should have the following for this examination

- Answer booklet
- Scientific Calculator

This paper consists of **FIVE** questions.

Answer question **ONE (COMPULSORY)** and any other **TWO** questions

All questions carry equal marks

Maximum marks for each part of a question are as shown

This paper consists of **THREE** printed pages

Question One (COMPULSORY)

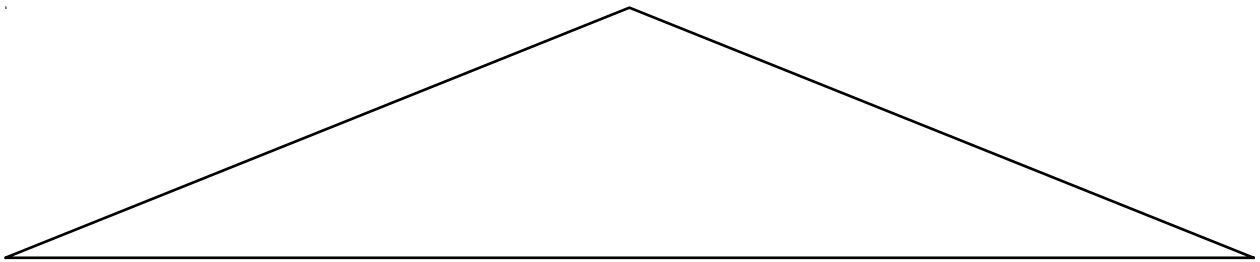
a) Define the following terms in analysis of structures:

- (i) Free body
- (ii) Statically determine structural form

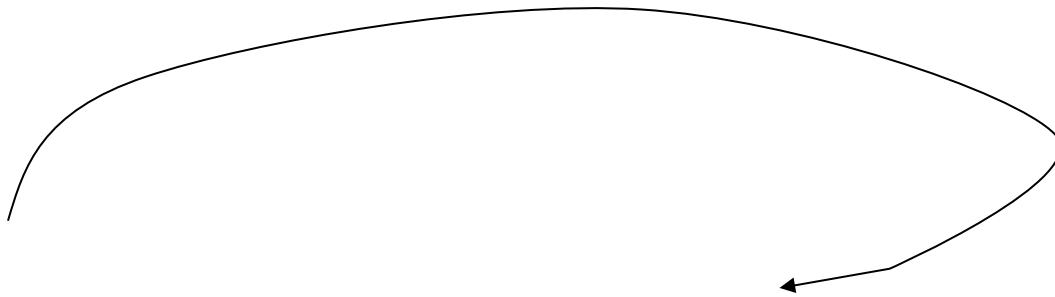
(6 marks)

- b) Determine the degree of stastical indeterminacy for each of the following structures shown in figure 1b(i) – (iii) **(9 marks)**

Figure 1 b(i)



- c) Differentiate between internally indeterminate structures and externally indeterminate structures. **(4 marks)**
- d) Figure 1(d) shows a beam AB of length 4m acted upon by the forces and moments. Draw the bending moment and shear force diagrams. **(11 marks)**



Question Two

A beam AB 10 metres long carries a uniformly distributed load of 20KN/m over its entire length together with concentrated load of 50KN at the left and A and 80KN at the end B. (see figure 2). The beam is to be supported at two props at the same level 6m apart, so that the reaction is the same at each. Determine the position of the supports and draw the shear force and bending moment diagrams.

(20 marks)

Figure 2

Question Three

The frame structure shown in figure 3 has hinges at A, D and F. Determine the components of the reactions at supports A and F and hence sketch the deflected shape, shear force diagram and bending moment diagram. **(20 marks)**

5KN

Question Four

Construct shear force and bending moment diagrams for the beam loaded as shown in figure 4. Also find the location of the inflexion of the beam. **(20 marks)**

Figure 4

Question Five

A truss of 12m span is loaded as shown in figure 5. Find the forces in the members of the truss by method of joints.

6m