



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING
DIPLOMA IN BUILDING & CIVIL ENGINEERING (DBC 12J)
DIPLOMA IN ARCHITECTURE (DA 12J)

EBC 2209: THEOR OF STRUCTURES II

END OF SEMESTER EXAMINATION

SERIES: APRIL 2013

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 any **THREE** questions

Maximum marks for each part of a question are as shown

This paper consists of **THREE** printed pages

Question One

- a) State the first and second Mohr's theorem and give their mathematical expressions. **(4 marks)**
- b) Figure 1 shows a simple beam supported at points A and B and acted on by two moving points' loads 1.0 apart.
- (i) Sketch the influence line diagrams for R_A R_B , shear force and bending moment at point E on the beam.
 - (ii) Determine the maximum shear force and bending moment at point E on the beams. **(16 marks)**

D

Question Two

A simply supported beam has a span of 20m. A uniformly distributed load of 20KN/m and 5m long, crosses the span. Find the maximum bending moment produced at a point 8m from the left support. **(20 marks)**

Question Three

A cantilever 12cm wide and 20cm deep is 2.5m long. What uniformly distributed load should the beam carry to produce a deflection of 0.5cm at the free end? Take $E = 2 \times 10^4 \text{ kg/cm}^2$. **(20 marks)**

Question Four

Using Macaulay's method determine deflection at mid-span for figure 2. **(20 marks)**

2m

Question Five

Using influence lines, determine the maximum bending moment at a point 20m from the left hand support of the girder shown in figure 3 when the loads move from A to B. **(20 marks)**

A