THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

(A Centre of Excellence)

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

CONSTRUCTION TECHNICIAN II

EBC 1115: THEORY OF DEFLECTION

END OF SEMESTER EXAMINATION
SERIES: AUGUST 2012
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination

- *Answer Booklet*
- *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 (20 marks)

A pin-jointed shown in figure 1 is carrying a load of 600KN at C. Find the vertical deflection of C.

Take: Area of member AB = $1000mm^2$
Area of member AC = BC = $1500mm^2$
Young's Modulus (E) = $200 \times 10^6 KN/m^2$

(20 marks)

C

Question Two (20 marks)

a) Prove that the maximum deflection for a simply supported beam with a uniformly distributed load is $y = 5WL^4/384EI$. **(12 marks)**

b) A simply supported beam of span 4m is carrying a uniformly distributed load of 2KN.m over the entire span. Find the maximum slope and deflection of the beam. Take EI for the beam as 80 x $109N/mm^2$. **(8 marks)**

Question Three (20 marks)

With the aid of a sketch, show that the general differential equation is equal to $M/EI = d^2y/dx^2$.

(20 marks)

Question Four (20 marks)

a) State:
   i) Mohr's first theorem
   ii) Mohr's second theorem **(8 marks)**

b) Using Mohr's theorem, determine:
   i) Maximum slope

ii) Maximum deflection for a simply supported beam of span 4m with a point load of 6KN at the centre. Take EI = 4 x 10^{12}N/mm^2 **(12 marks)**

Question Five (20 marks)

A simply supported beam of span 14.0m carries two concentrated loads 4KN at 8m and 10KN at 12m from left as shown in figure 2. Calculate deflection under each load. Take EI = 2.0 X 10^{14}.

(20 marks)

C