



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

DEPARTMENT OF BUILDING & CIVIL ENGINEERING
DIPLOMA IN BUILDING & CIVIL ENGINEERING (DBCE 13M)

EBC 2203: STRENGTH OF MATERIALS I

END OF SEMESTER EXAMINATION

SERIES: AUGUST 2014

TIME ALLOWED: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions. Answer any **THREE** questions

All questions carry equal marks

Maximum marks for each part of a question are as shown

Use neat, large and well labeled diagrams where required.

This paper consists of **THREE** printed pages

Question One

- a) State Hooke's Law. **(3 marks)**
- b) Figure 1 is a square platform 1.5m by 1.5m of weight 4KN. It is long by four vertical wires of the same material, length and section. The wires are attached to the carriers A, B, C and D. The centre of gravity A to B is 0.6m and 0.4m from to D. Determine the tension in each wire assuming that all the wires remain vertical and stretched within the elastic limit. **(17 marks)**
- 0.6m

Question Two

- Determine I_{xx} , I_{yy} and r_{xx} of the section in figure 2. **(20 marks)**
- 25mm

Question Three

- a) State the THREE laws of static equilibrium. **(4 marks)**
- b) Sketch shear force and bending moments diagrams for the beam in figure 3 and indicate values at all the critical points. **(16 marks)**

C

Question Four

- a) Illustrate diagrammatically the variation of stress and strain for mild steel rod subjected to a tensile force. **(6 marks)**
- b) Define the following terms as applied to properties of engineering materials.
(i) Proof stress
(ii) Elastic limit
(iii) Poisson's ratio **(6 marks)**
- c) A steel rod of cross-section 125mm depth and 50mm breadth is subjected to a tensile force of 150KN. Determine that result in the cross sectional dimensions.
Take $E_{\text{steel}} = 205 \text{ KN/mm}^2$
Poisson's Ratio = 0.4 **(8 marks)**

Question Five

- a) Determine support reactions for the beam in figure 4 **(8 marks)**
- b) Sketch shear force and bending moment diagrams and indicate values at all the critical points. **(12 marks)**

A