



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

DEPARTMENT OF BUILDING & CIVIL ENGINEERING  
CERTIFICATE IN BUILDING & CIVIL ENGINEERING

EBC 1203: FORCES IN TRUSSES & FRAMES

**SPECIAL/SUPPLEMENTARY EXAMINATION**

**SERIES: JUNE 2015**

**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 of the **FIVE** questions

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) Derive the expression for the moment of inertia of a rectangular section by the integration method. **(6 marks)**
- b) A T-Beam is made up of two plates and two angles as shown in figure. Determine the moment of inertia of T Section above an axis passing through the centroid of the section and parallel to the top plate **(14 marks)**

160mm

### Question Two

The figure below shows a bridge truss fixed at one end and pinned at the other. Analyze the frame using the method of joint resolution. **(20 marks)**

G

### Question Three

- a) Define the following terms:
- (i) Radius of gyration
  - (ii) Centroid
  - (iii) Center of gravity
- (6 marks)**

b) Determine the moment of inertia of the figure shown in the next page

**(14 marks)**

**Figure 3**

**Question Four**

a) State FIVE assumptions in solving forces in trusses

**(5 marks)**

b) Define:

(i) A statistically determinate structure

(ii) A statistically indeterminate structure

**(3 marks)**

c) The figure below shows a truss using the method of section analyze the frame

**(12 marks)**

G

**Question Five**

The figure below shows an I section determine the moment of inertia

**(20 marks)**

5cm