



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

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

EBC 2208: STRENGTH OF MATERIALS II

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 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 of the **FIVE** 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 **FOUR** printed pages

Question One

- a) State assumptions in the Theory of simple bending. **(6 marks)**
- b) Sketch the distribution of bending stress across a section of beam in figure 1(a) and loaded as in figure 1(b) **(14 marks)**

25mm

Question Two

Sketch the distribution of horizontal shear stress across the section of the beam in figure 2 if subjected to a maximum shear force of 30KN. **(20 marks)**

20mm

Question Three

- a) State assumptions made in the theory of simple bending. **(9 marks)**
- b) Determine the maximum moment which can be resisted by the section shown in figure 3 if the maximum permissible bending stresses are limited to 100N/mm^2 and 125N/mm^2 at top and bottom respectively. **(11 marks)**

175mm

Question Four

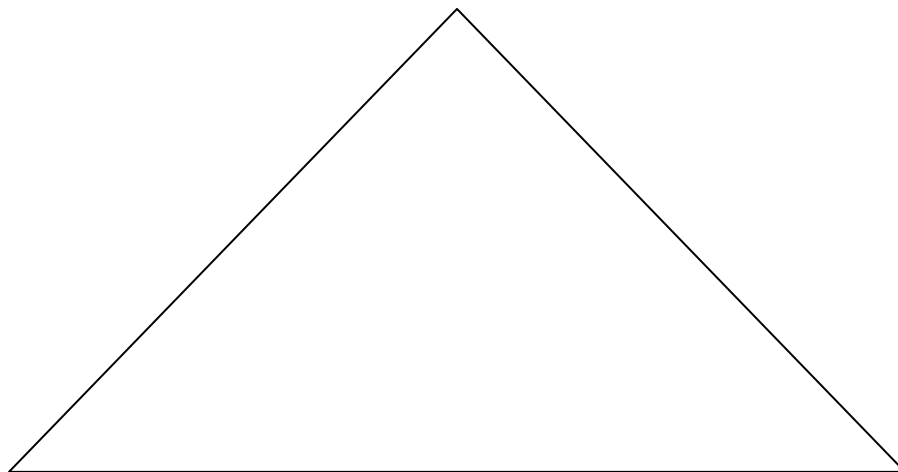
Determine the stability of the water retaining wall in figure 4 against:

- (i) Overturning
- (ii) Sliding
- (iii) Sinking
- (iv) Tension cracks

(20 marks)

Data:

- Density of concrete = 24KN/m^3
- Coefficient of friction = 0.3
- Bearing capacity of soil = 250KN/m^2



Question Five

Determine the extreme fibre stresses for the composite beam section in figure 5(a) and loaded as shown in figure 5(b) **(20 marks)**

Figure 5(b)

Data: $E_{\text{steel}} = 210 \text{KN/mm}^2$

$E_{\text{timber}} = 8.5 \text{KN/mm}^2$