THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Engineering and Technology

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

BRIDGING TO HIGHER DIPLOMA

EBC 2411: STRENGTH OF MATERIALS II

END OF SEMESTER EXAMINATION

SERIES: AUGUST/SEPTEMBER 2011

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer booklet*
- *Pocket calculator*

This paper consists of **FIVE** questions in **TWO** sections: **A** and **B**
Answer question **ONE** is compulsory from Section A and any other **TWO** questions from section B
Maximum marks for each question are as shown
This paper consists of **THREE** printed pages
SECTION A – COMPULSORY – 30 MARKS

Question 1

a) State the assumptions made in simple bending (8 marks)

b) Using a sketch, derive a formula for distribution of shearing stress in rectangular section (15 marks)

c) State the stability conditions of earth-dams (7 marks)

SECTION B *(Answer any TWO questions)*

Question 2

Calculate the maximum horizontal shear stress in the beam shown in Figure 1.0 if it is subjected to a vertical shear stress variation diagram for the section (20 marks)

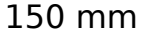
Fig 1.0

35

Question 3

A horizontal cantilever 1.25m long has a T shaped cross-section as shown in Figure 2. It carries a uniformly distributed load along the full length of the top flange. Calculate the greatest intensity of the load which can be carried if the maximum tensile and compressive stresses are not to exceed 30 N/mm^2 and 90 N/mm^2 respectively. (20 marks)

Fig 2.0



Question 4

A retaining wall 4.5m high, 1.2m wide at the top and 2.7m wide at the base, retains water which is level with the top of the wall. If the wall material weighs 24 KN/m^3; investigate the stability of the wall. Draw a diagram of soil pressure distribution at the base of the wall . (20 marks)

Question 5

A retaining wall shown in figure is 3.6m high. It retains earth whose density is 15KN/m3 and angle of repose of 30o. The wall is subjected to superimposed load of 7.5KN/m2.

Calculate the overturning moment on the wall about the base per metre run of wall by constructing pressure diagram for the wall (20 marks)

Fig 3.0