THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

Faculty of Engineering & Technology

DEPARTMENT OF CIVIL AND BUILDING ENGINEERING

BRIDGING TO HIGHER DIPLOMA

END OF SEMESTER EXAMINATIONS

MAY 2010 SERIES

EB 2211 - STRENGTH OF MATERIALS II

TIME: 2 HOURS

Instructions to Candidates

You should have the following:

- Answer booklet
- Pocket Calculator

This paper consists of **FIVE** Questions in **TWO** Section **A** and **B.**
Answer Question **ONE** in Section **A** and choose any other **TWO** from Section **B.**
Maximum marks for each part of a question are as shown.

SECTION A – COMPULSORY

Question ONE

(a). State the assumptions made in simple bending. **(8 Marks)**

(b). Show the distribution of shear stress is $T = QA\bar{y} - / bI$. **(15 Marks)**

(c). State the stability conditions of a dam. **(7 Marks)**

SECTION B

Question TWO

(a). Calculate the maximum horizontal shear stress in the beam shown in Figure 1. The beam is subjected to a vertical shear force of 120KN. **(16 Marks)**

(b). Sketch the shear stress variation diagram for the section. **(4 Marks)**

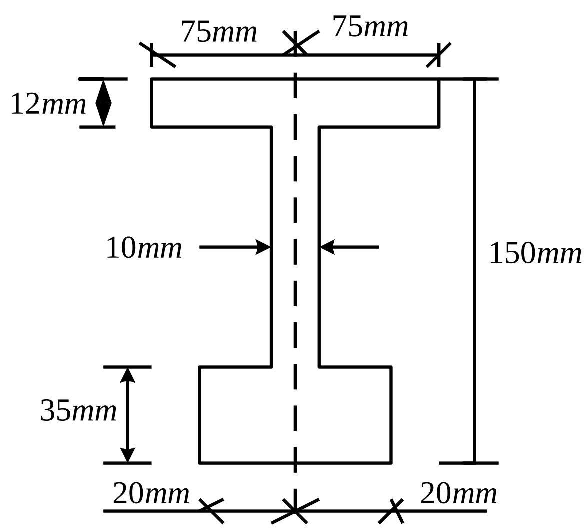

Fig. 1

Question THREE

A horizontal cantilever 1.25m long has a T-shaped cross-section as shown in Fig.2. The beam carries a uniformly distributed load along the full length of the top flange. Calculate the greatest intensity of the load which can be carried. Assume:

(a). Maximum tensile not to exceed $30N/mm^2$.
(b). Maximum compressive not exceed $90N/mm^2$. **(20 Marks)**

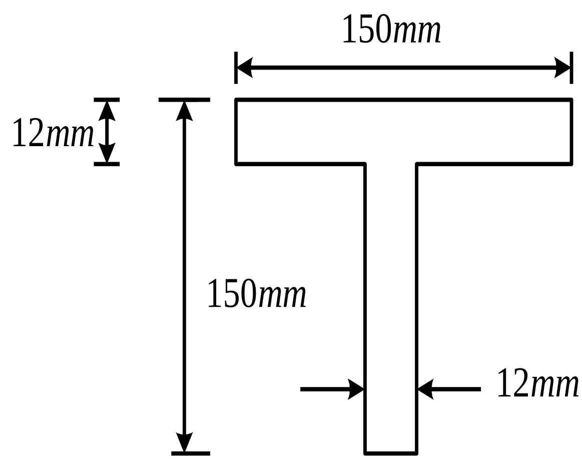

Fig. 2

Question FOUR

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 24KN/m^3; investigate the stability of the wall. Take position of centre of gravity $\bar{x}$ from the back of wall. The wall is vertical at the back. **(20 Marks)**

Question FIVE

Figure 3 shows a retaining wall 3.6m high, retaining earth of 15KN/m^3 density and angle of repose 30°. The wall is subjected to superimposed load of 7.5KN/m^2. Calculate the overturning moment on the wall about the base per metre run of wall *by*:
Constructing the pressure diagram for the wall. **(20 Marks)**

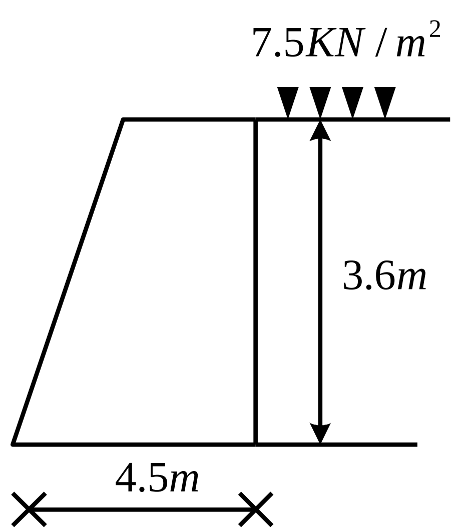

Fig. 3