THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

Faculty of Engineering & Technology

DEPARTMENT OF CIVIL AND BUILDING ENGINEERING

DCC 08

END OF SEMESTER EXAMINATIONS

APRIL/MAY 2010 SERIES

CE 2C 2203: STRENGTH OF MATERIAL II

TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination:

- Answer booklet
- Scientific calculator

This paper consists of **FIVE** Questions in **TWO** Sections **A** and **B.**
Answer question **ONE** in Section A and any other **TWO** Questions in Section **B.**
Marks for each part of a question are as shown.

SECTION A

Question ONE

(a). Sketch and explain any **FOUR** modes of failure criteria of a retaining wall.

(b). A gravity brick wall 6m high has a vertical back and retains a soil of bulk unit weight of 17.65KN/m^3 and angle of shearing resistance of 30°. If the wall is of unit weight of 19.62KN/m^3 and is 1.2m wide at the top, determine the width of the wall at the base if no tension is to occur.

(30 Marks)

SECTION B

Question TWO

Fig. 1 below shows an unreinforced concrete beam section. Determine the B.M. max. which would be applied to the section in the plane of the web if the tensile and compressive stresses are limited to 14 and 1.4N/mm^2 respectively.

(20 Marks)

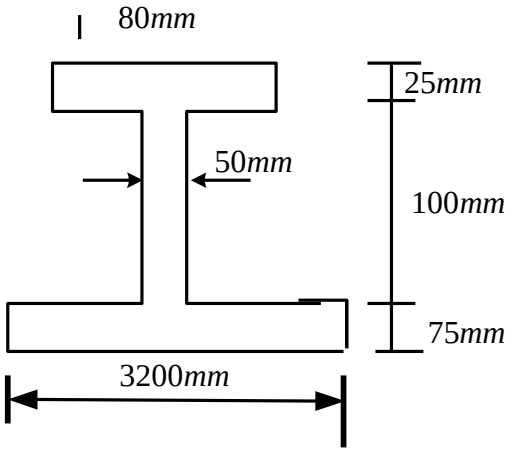

Fig. 1

Question THREE

Fig. 2 below shows a flitched beam consists of two timber joists 200mm x 75mm and a steel plate 150mm x 10mm securely bolted between them. The beam is simply supported on a span of six metres and carries an inclusive uniformly distributed load of 900N/m. Calculate the maximum tensile and compressive stresses in both materials due this load. $E_{steel} = 210KN/mm^2$. $E_{timber} = 8.75KN/mm^2$

(20 Marks)

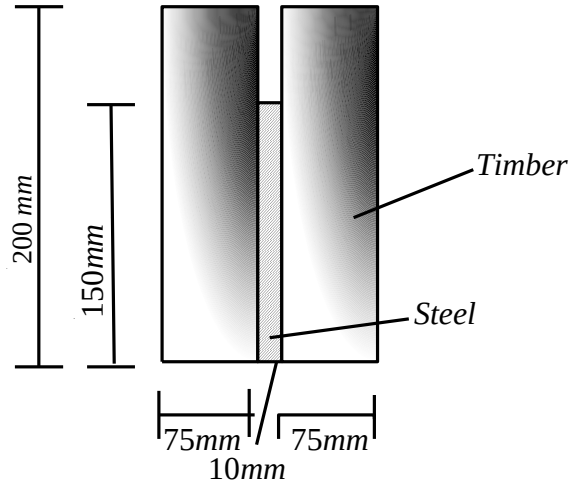

Fig. 2

Question FOUR

(a). Fig. 3 shows the loading on a flitched beam and its cross-section. Determine the maximum tensile and compressive stresses developed in both materials given:

$E_s = 210KN/mm^2$

$E_t = 8.75KN/mm^2$

(16 Marks)

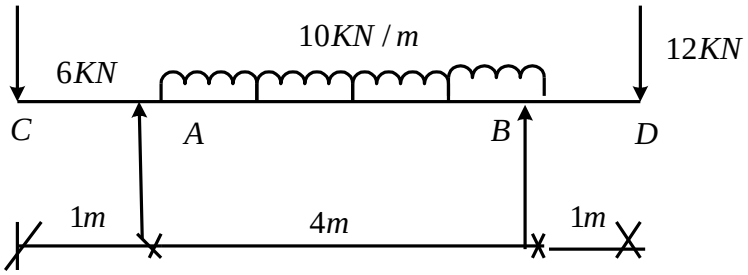

Fig. 3(a)

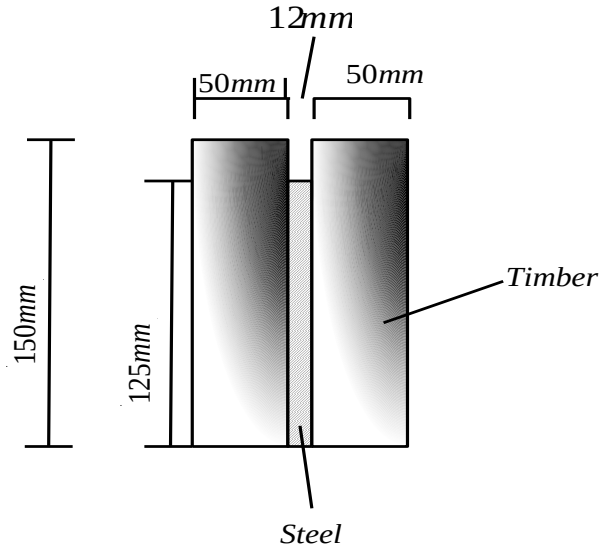

Fig. 3(b)

(b). A beam of cross-section as shown in Fig. 4 conveys a maximum shear force of 60KN. Determine the maximum horizontal shear stress in the section.

(4 Marks)

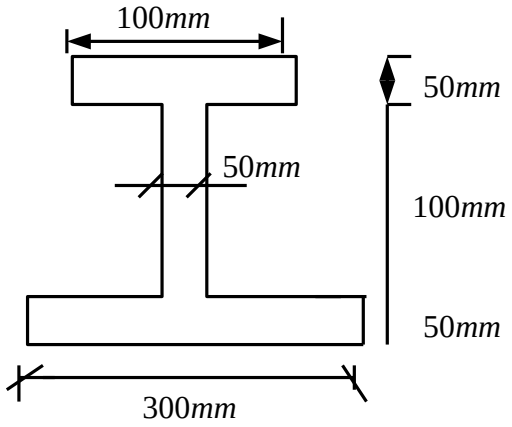

Fig. 4

Question FIVE

If the beam shown in fig.5(a) is of the cross-section shown in figure 5(b), draw the shear stress distribution diagram at the point of maximum shear force.

(20 Marks)

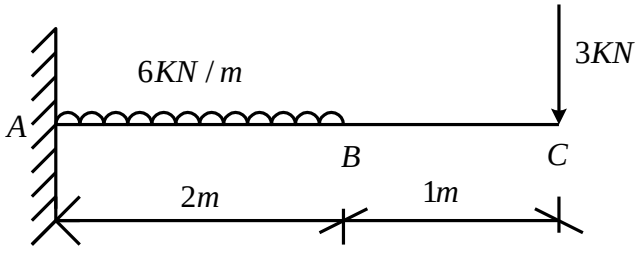

Fig. 5(a)

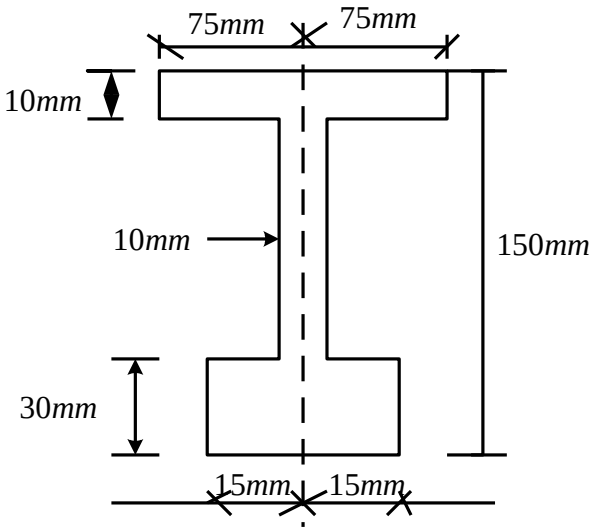

Fig. 5(b)