TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY IN CONJUCTION WITH KENYA INSTITUTE OF HIGHWAYS AND BUILIDNG TECHNOLOGY (KIHBT)

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING
UNIVERSITY EXAMINATION FOR:

HIGHER DIPLOMA IN BUILDING ECONOMICS

EBE 3115: THEORY OF STRUCTURES I

END OF SEMESTER EXAMINATIONS
SERIES: OCTOBER 2016

TIME: 2HOURS

Instruction to candidates

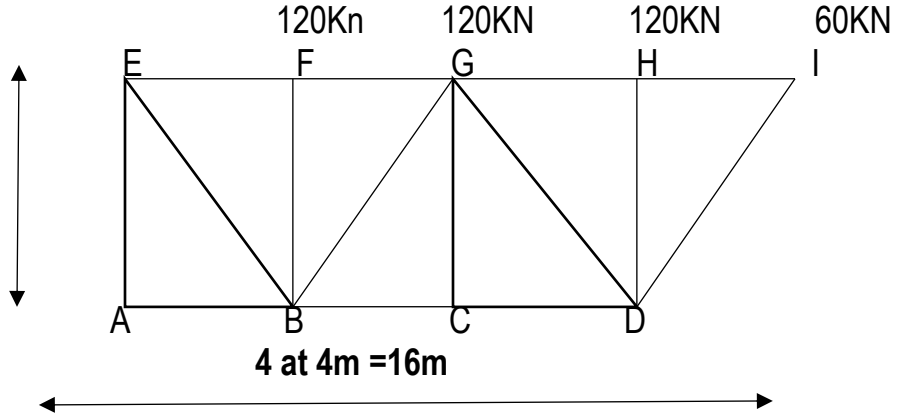
You should have the following for this examination

- Answer booklet
- Pocket Calculator

This paper consist of five question.
Answer any three questions of the five questions
All question carry equal marks
Maximum marks for each part of a question are as shown
This paper consist of two printed pages

Question one

i. Determine the forces in members CD, DG and GH of the truss shown in fig below by the method of section.



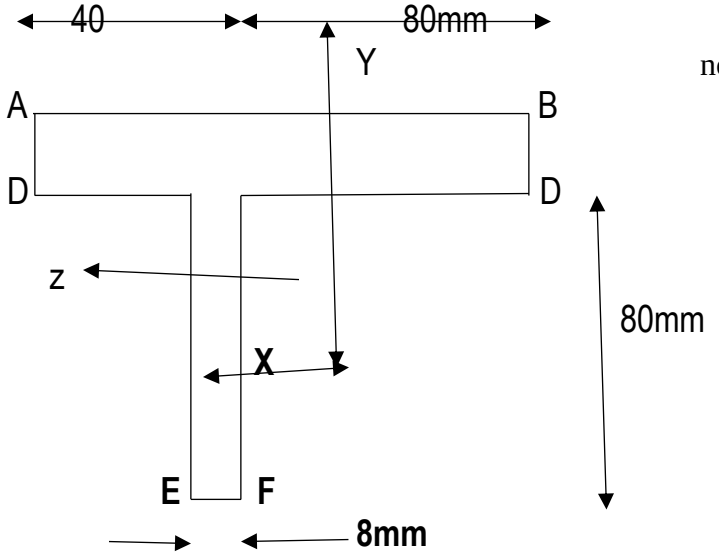
State the assumption made in framed structures **(20marks)**

Question two

a) State the assumptions of theory of simple bending **(6marks)**

b) A beam having the cross section shown below is subjected to a hogging bending moment of 1500Nm in a vesicle plane. Calculate the maximum direct stress due to bending stating the point at which it acts.

(14 marks)



note AD and BD is 8mm

Question three

Short column has a rectangular

i) Cross section with sides in the ratio 1:2. Determine the minimum dimensions of the columns if the column carries an axial load 800KN and the failure stresses of the material of the column is 400N/mm^2. **(6marks)**

ii) A cube of material is subjected to a compressive stress on each of its faces if V=0.3 and E=200000N/mm^2 calculate the value of this stress if the volume of the cube is reduced by 0.1% calculate also the percentage reduction in length of one of the sides. **(14marks)**

Question four

i) A structural member is loaded in such a way that at a particular point in the member a two i) dimensional stress system exists consisting of $d_x = +60N/mm^2$,

$6y = -40N/mm^2$, and $Txy = 50N/mm^2$

a) Calculate the direct strain in the x and y directions and the shear $\sqrt{xy}$ at the point.

b) Calculate the principal strains at the point and determine the position of the principal strains.

ii) Discuss stress and strain Relationship briefly (10marks)

Question five

Draw influence lines for the shear force and bending moment at the section C of the beam shown below: (20marks)