FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI

SCHOOL OF ENVIROMENTAL TECHNOLOGY.

DEPARTMENT OF BUILDING TECHNOLOGY

Harmattan Semester Examination 2012/2013 session

**Course title: Structural Theory & Design** **Course Code: BDT 221**

**Time: 2 ½ hours**

**INSTRUCTION: ANSWER ANY 5 QUESTIONS**

1a i. List any two areas of application of trusses in construction. (2 marks)

ii. Discuss 'internal stability' of trusses. (3 marks)

b. Differentiate between the following

i. Simple truss and compound truss.

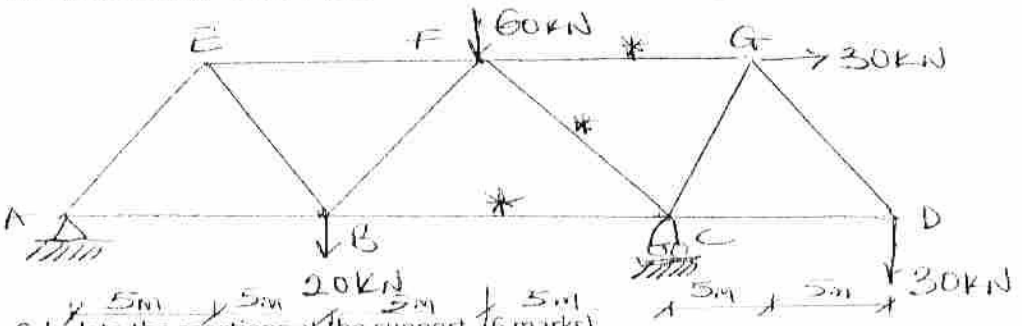
ii. Static determinacy and static indeterminacy. (10 marks)

c. List the 3 basic assumptions used in the analysis of trusses. (5 marks)

2a i. Differentiate between the method of joint and the method of sections used in truss analysis. (4 marks)

ii. What advantage(s) does the method of section have over the method of joints? (2 marks)

b. The truss section below represents a cross section of a bridge deck.




i. Calculate the reactions at the support. (6 marks)

ii. Calculate the forces on the members BC, CF and FG (ie the members identified by *) using the method of sections. (8 marks)

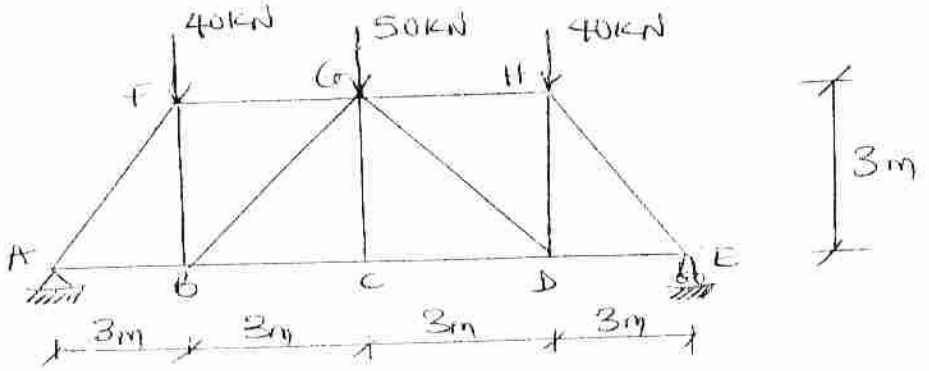
3a. What is the major structural function of 'zero force members' in a truss. (5 marks)

b. Analyse the truss system below using the method of joints. Calculate:

i. The reactions at the support points A and E (6 marks)

ii. Calculate the force on the members. (6 marks)

iii. Which members are in compression? (3 marks)




4a. List and explain three types of end support conditions for beams. (4 marks)

b. Explain the following:

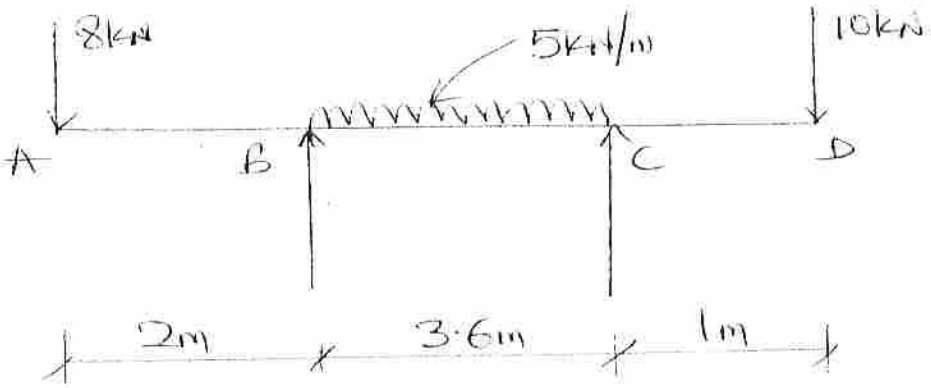
i. Live load ii. Dead load

iii. Mechanism of load transfer in buildings. (6 marks)

c. With the aid of a diagram, derive and show that the maximum bending moment for a simply supported beam with uniformly distributed load $=\frac{WL^2}{8}$

Where W = Intensity of load per length
L = Length of beam (10 marks)

5. Sketch the bending moment and shear force diagrams of the beam system below. (20 marks)




6. The diagram below is a simply supported beam loaded as shown.

a. Sketch the bending moment and shear force diagrams. (15 marks)

b. What are the values of the bending moment at 2m from A and shear force at 2m from B? (5 marks)