



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

*Faculty of Engineering & Technology*

DEPARTMENT OF CIVIL AND BUILDING ENGINEERING

CERTIFICATE IN TECHNICIAN PART I (CA 109)

END OF SEMESTER EXAMINATIONS

APRIL/MAY 2010 SERIES

**ANALYSIS OF FORCES IN TRUSSES**

TIME: 2 HOURS

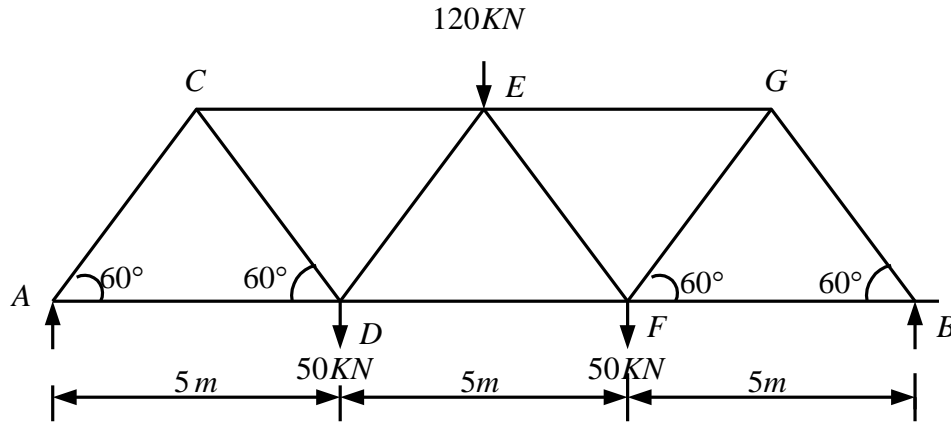
**Instructions to Candidates**

This paper consists of **FIVE** questions.

Answer question **ONE (Compulsory)** and choose any other **TWO** Questions from other questions.

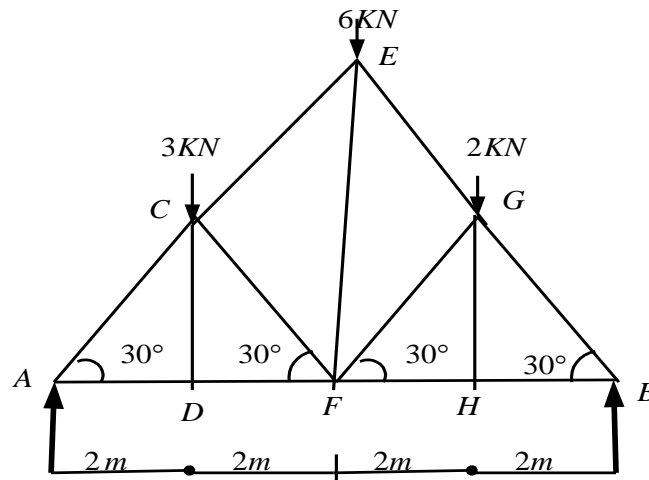
**Question ONE (COMPULSORY) (30 Marks)**

- (a). Give **THREE** assumptions made in analyzing of trusses. **(4½ Marks)**
- (b). The figure below shows a warren girder loaded at point E, D, and F, and freely supported at the ends. Using the method of section, find the member forces, indicating which members are in tension or compression. **(25½ Marks)**



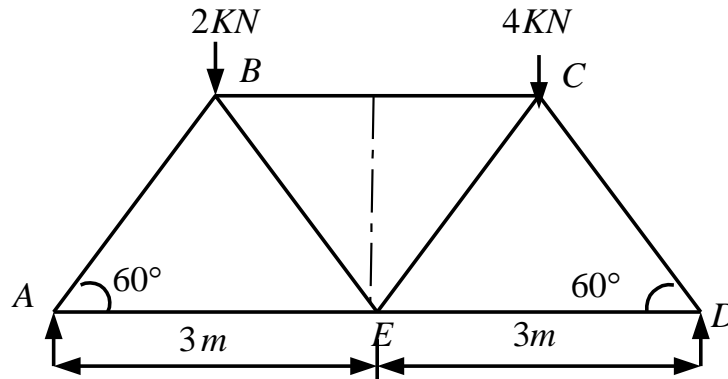
**Question TWO**

The figure below shows a roof truss freely supported at its ends and loaded at Point C, E and G. using the method of joint resolution. Determine the magnitudes and nature of forces in members AC, AD, CD, DF, CE and EF. **(20 Marks)**



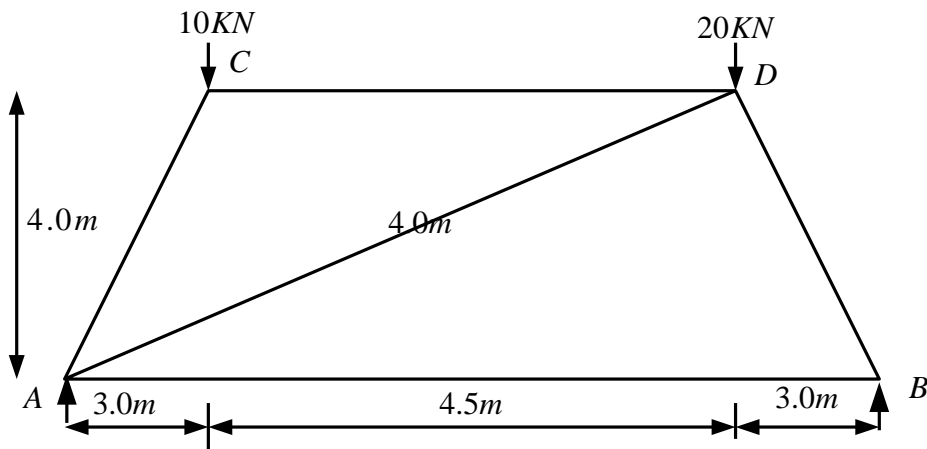
### Question THREE

The figure below shows a warren girder consisting of seven members each 3m length, freely supported at its end points. The girder is loaded at B and C as shown. Using the graphical method find forces in all the members, indicating whether the force is compressive or tensile. **(20 Marks)**



### Question FOUR

- (a). The figure shown below is a truss structure loaded at points C and D; and freely supported at its end points A and B. Using the method of section, determine the forces in member AC, AD, AB and CD indicating whether the members are ties or struts. **(14 Marks)**



- (b). Using appropriate examples; define the following principles as used in graphical method of analysis.
- (i). Law of triangle of forces. **(3 Marks)**
  - (ii). Law of polygon of forces. **(3 Marks)**

### **Question FIVE**

Using usual notations, for the method of tension coefficient, show that, force in the bar TAB is given by  $L_{AB} \cdot t_{AB}$ , and hence give the general procedure for using tension coefficient in determining the magnitude of the force in the members. **(20 Marks)**