



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

Faculty of Engineering & Technology

DEPARTMENT OF CIVIL AND BUILDING ENGINEERING

**CERTIFICATE IN TECHNICIAN PART I
(CA 109)**

SEMESTER EXAMINATIONS

APRIL/MAY 2010 SERIES

ANALYSIS OF FORCES IN TRUSSES

TIME: 2 HOURS

Instructions to Candidates

Question **ONE** is **COMPULSORY** and choose **TWO** Questions from other questions.

Question ONE (COMPULSORY)

- (a). Define the following terms as used in the analysis of forces in trusses.
- (i). Plane truss
 - (ii). A statically Determinate truss
 - (iii). Truss analysis **(4½ Marks)**
- (b). Using the method of resolution of joints, determine the member forces of the truss structure below in figure I and indicate if the member is in Tension or compression. **(25½ Marks)**

OPTIONAL

Question TWO

The figure 2 below shows a warren girder consisting of eleven members and freely supported at its end points. The girder is loaded at points C, E, G, D and F. Using the method of section, Determine the forces in members AD, CD, CE, DE, DF, EF, EG and FE, indicating whether the forces are Tension or compression. **(20 Marks)**

Question THREE

- (a). Define the following terms as used in Graphical method of force analysis.
- (i). Law of triangle of forces. **(2 Marks)**
 - (ii). Law of polygon of forces. **(2 Marks)**
- (b). The figure 3 below shows part of the roof truss consisting of support, principal rafter and a Tie. Determine the forces in the principal rafter and the tie indicating whether forces are tension or compression. **(16 Marks)**

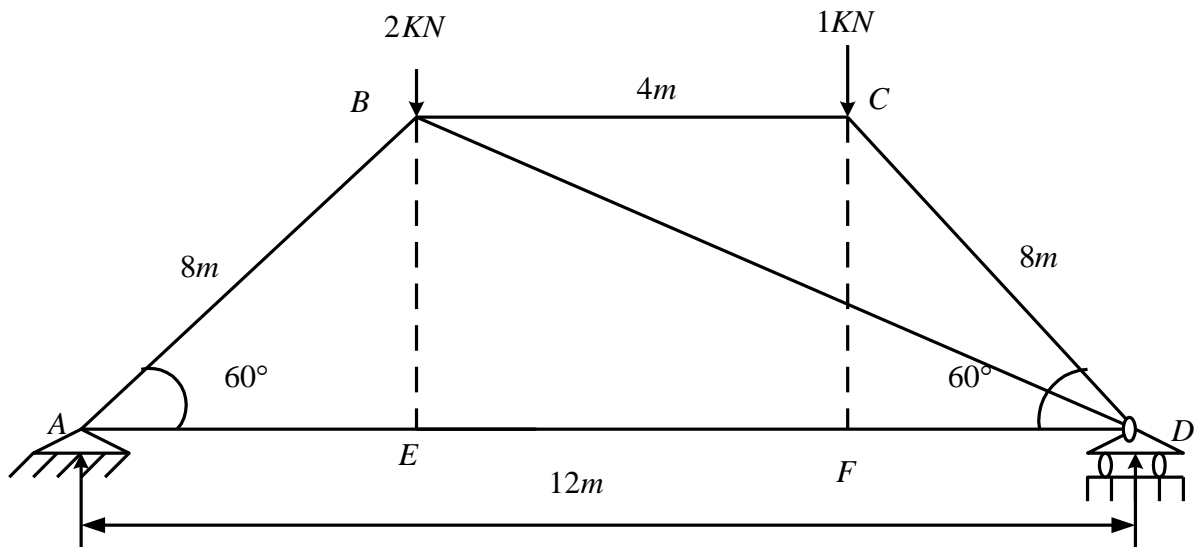
Question FOUR

- (a). The figure (4) below shows a bridge truss carrying a load of 20KN. The Bridge rests on the Roller at each ends. Find the force on members FG and EG indicating whether the force is in tension or compression. NB. Use the method of section. **(10Marks)**

- (b). Figure (5) shows A warren Girder loaded at points G and F. Using any method of force analysis in Truss, determine the forces in members GC and BC indicating whether the forces are in tension or compression. **(10 Marks)**

Question FIVE

The figure below shows the truss structure loaded at point B and C. The length of the members are also indicated. Using the method of tension coefficient determine the member forces giving the nature of the forces.



APPENDIX

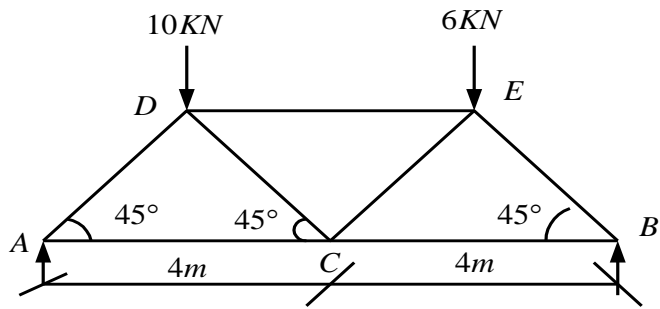


Fig. 1

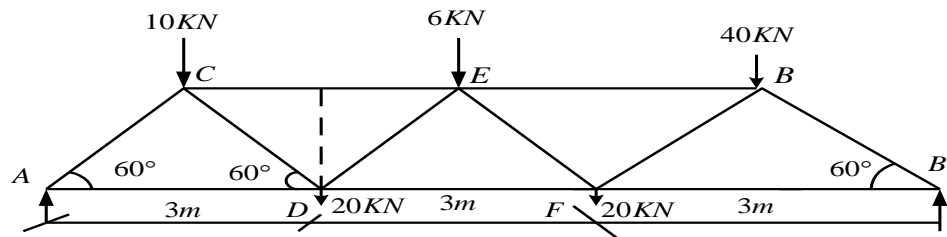


Fig. 2

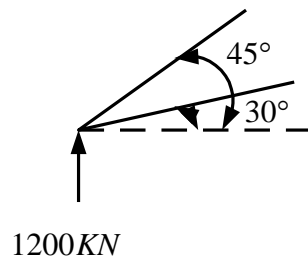


Fig. 3

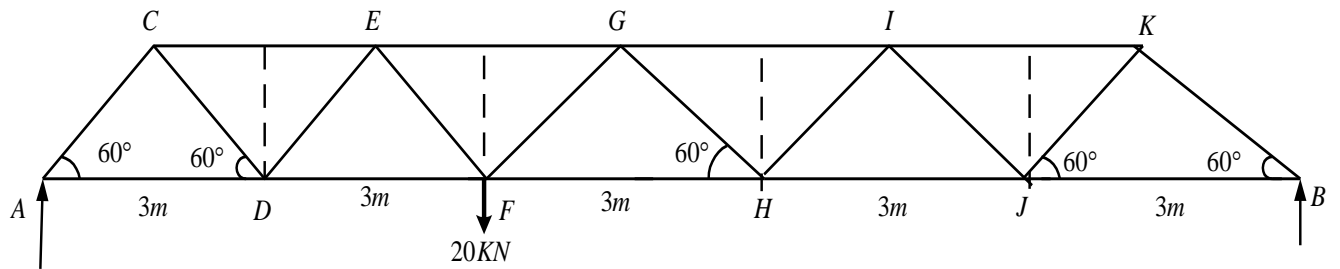


Fig. 4

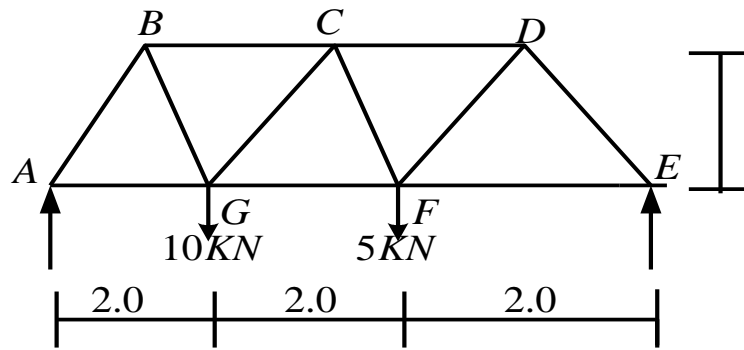


Fig.5