

# TECHNICAL UNIVERSITY OF MOMBASA

*Faculty of Engineering & Technology*

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

**CERTIFICATE IN BUILDING & CIVIL ENGINEERING**

EBC 1203: FORCES IN TRUSSES AND FRAMES

Series: August 2019

Time allowed: 2 hours

## **Instructions to Candidates**

You should have the following for this examination:

- Answer booklet
- A set of drawing instruments
- Non programmable Scientific calculator

This paper consists of **FIVE** questions. Answer any **THREE** of the **FIVE** questions.

All questions carry equal marks.

Maximum marks for each part of a question are as shown

This paper consists of **FOUR** printed pages

**Question 1**

Determine, by the method of sections, the nature and magnitude of the forces acting in members B2, 23, G3, D6, 67, and F7 of the members of the warren girder shown in fig. 1.

(20 marks)

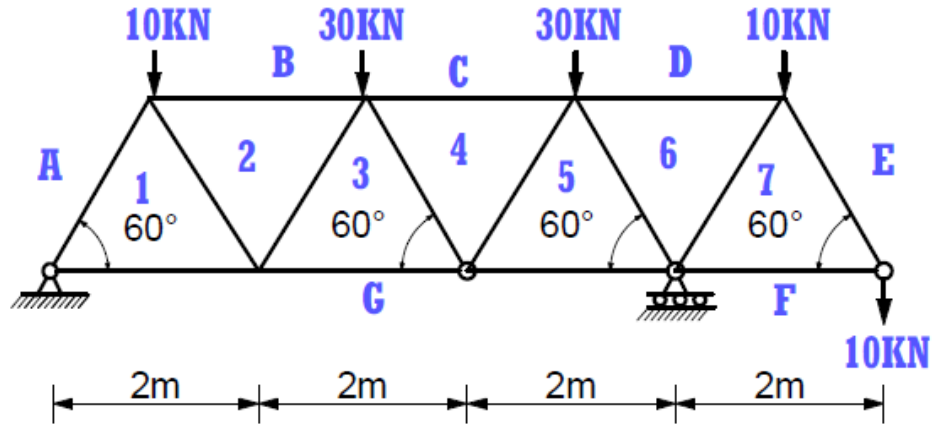


Fig 1

**Question 2**

Shown in fig 2 is a structural frame loaded with a system of forces. Calculate, by the method of resolution at joints, the nature and magnitude of the forces acting in each of the members of the frame.

(20 marks)

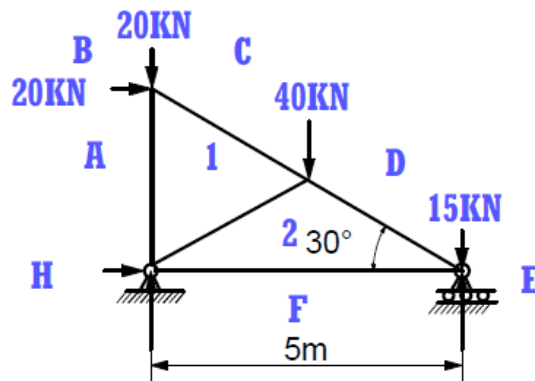


Fig 2

**Question 3**

Determine, by the method of tension co-efficient, the magnitude and type of the forces acting in each of the members of framework shown in fig. 3.

(20 Marks)

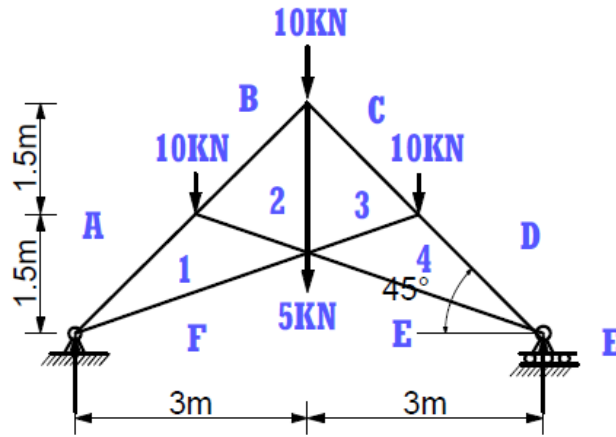


Fig 3

**Question 4**

Calculate the following sectional properties for the section shown in fig 4:

- a) Second moment of area about the X---X axis
- b) Radius of gyration about the x-x axis

(20 marks)

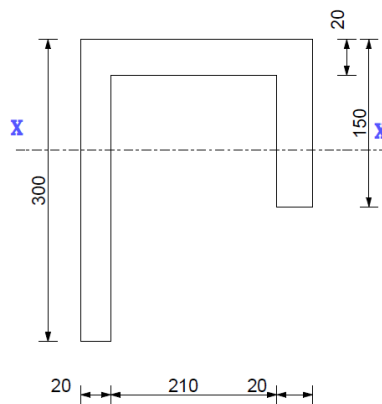


Fig 4

### Question 5

Calculate, by the graphical method, the magnitude and type of the force acting in each of the members of the cantilever framework shown in fig.5.

(20 marks)

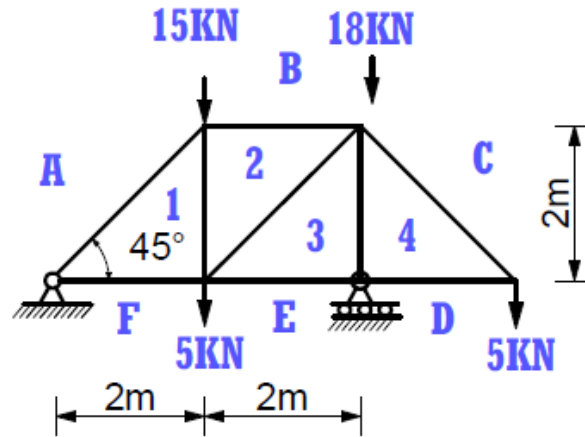


Fig 5