THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

FACULTY OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF MECHANICAL AND AUTOMOTIVE ENGINEERING

BACHELOR OF ENGINEERING IN MECHANICAL ENGINEERING

EME 2203 ENGINEERING MECHANICS I –STATICS
SPECIAL/SUPPLEMENTARY EXAMINATIONS
SERIES: MAY 2011
TIME: 2 HOURS

INSTRUCTION TO CANDIDATES

You should have the following for this examination
- ➢ Drawing instruments
- ➢ Scientific Calculator

This paper consists of **FIVE** questions in, question **ONE** is compulsory,
Answer question **ONE** and any other **TWO** question ,
Maximum marks for each part of a question are as shown.

Question 1

a) Define the following:
  i.   Mechanics

(1 mark)

  ii.   Concentrated force

(1 mark)

b)
  i.   Determine the magnitude and orientation, measured counter-clockwise from the positive y-axis, of the resultant force acting on the bracket in figure 1, if F_B=600N and θ=20 °.

(8 marks)

    ii.   Determine the magnitude and direction of F1 required to keep the concurrent force system in figure 2 in equilibrium.

(10 marks)

c) The wrench in figure 3 is used to loosen the bolt. Determine the moment of each force about the bolts axis passing through point O.

(10 marks)

Question 2

    a) The block in figure 4 has a weight of 20N. Determine the angle θ for equilibrium and the required force in each cord.

(20 marks)

Question 3

Determine the force in each member of the truss in figure 5 and determine whether the members are in tension or compression

(20 marks)

Question 4

    a) Locate the centroid (x, ý) of the uniform wire bent in the shape shown in figure 6.

(20 marks)

Question 5

    a) The spring in figure 7 has an unstretched length of 0.3 m. Using the principle of virtual work, determine the angle θ for equilibrium if the uniform links AC and CE each have a mass of 5 kg.
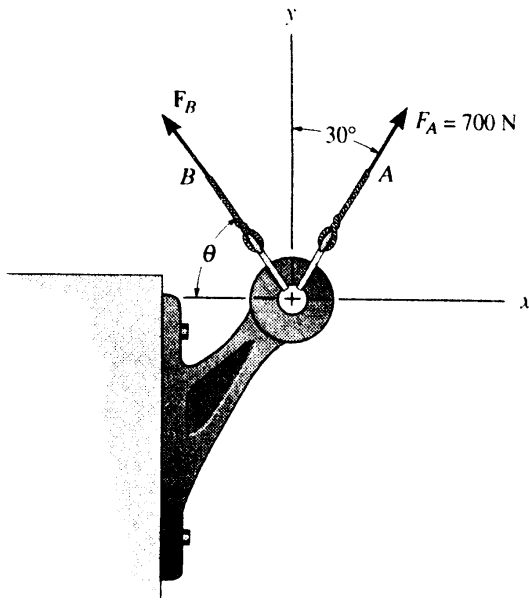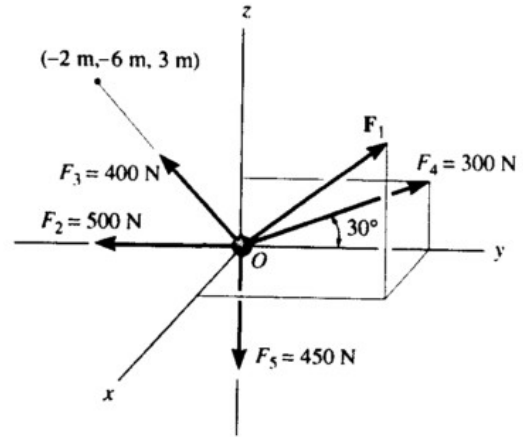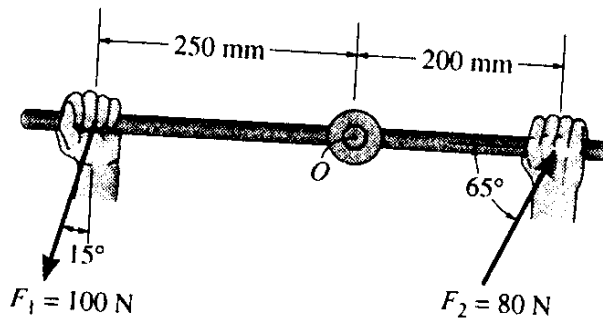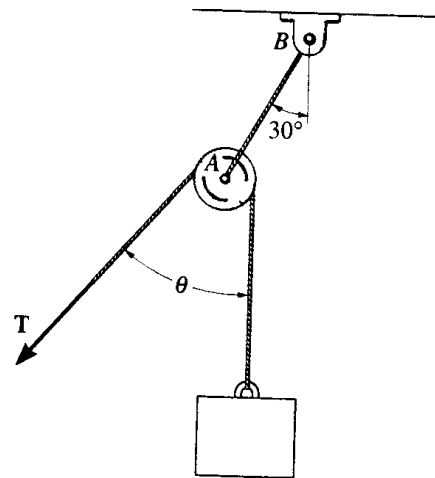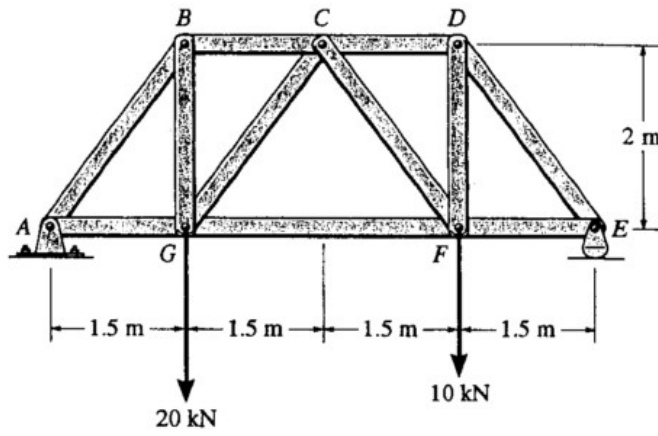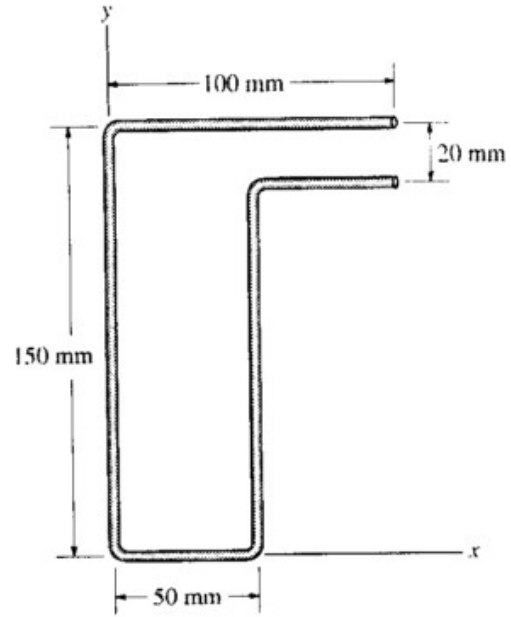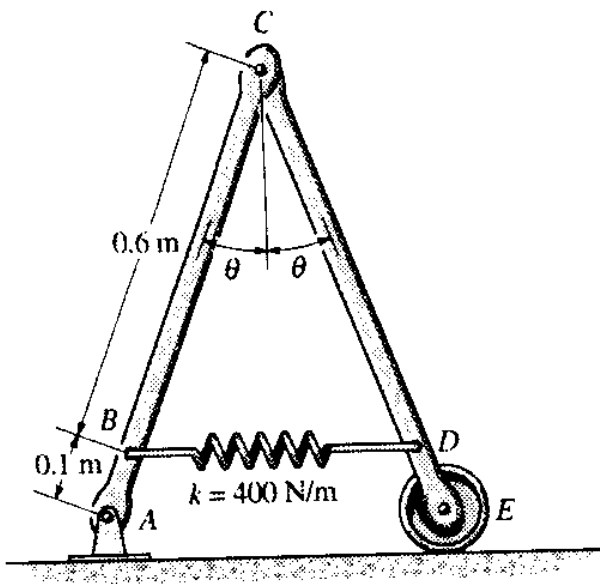
(20 marks)

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6

Figure 7