



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECE 2205: THEORY OF STRUCTURES I

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

DATE: 15 Dec 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

-Drawing instruments.

This paper consists of five questions.

Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question **ONE** is Compulsory. Answer any other **TWO** questions from the remaining four questions.

1. a). The solution to a problem of statically determinate structure involves the setting up of equilibrium equations. Summarize the three basic steps to follow in formulating equations from which unknowns can be determined. (3 Marks)

b). In determining the unknowns of a statically determinate structure, it is necessary to know the material properties of the structure, true or false? Explain. (3 Marks)

c) What is a statically determinate structural form in analysis of Structures (3 Marks)

d) Determine the degree of static indeterminacy for each of the structures shown in Figure 1(a)-(c) (9 Marks)

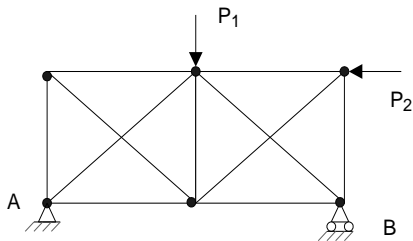


Figure 1 (a)

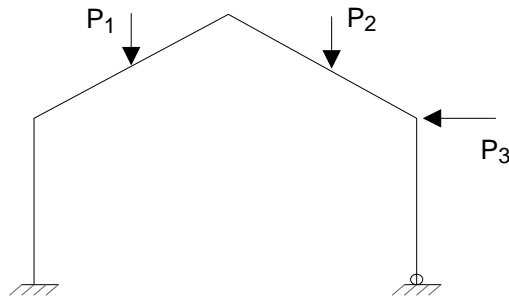


Figure 1 (b)

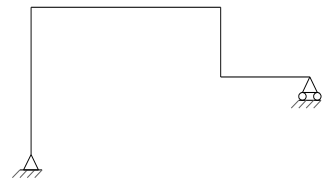


Figure 1 (c)

e). Two smooth circular cylinders of $W=250\text{N}$. and radius $r=100\text{mm}$ are connected at their centres by a string AB of length $L=300\text{ mm}$ and rest upon a horizontal plane, supporting above them a third cylinder of weight $Q=500\text{N}$ and radius $r=150\text{m}$. Figure 1 (e). Find the force S in the string AB and the reactions produced on the floor at the points of contact D and E.

(7 Marks)

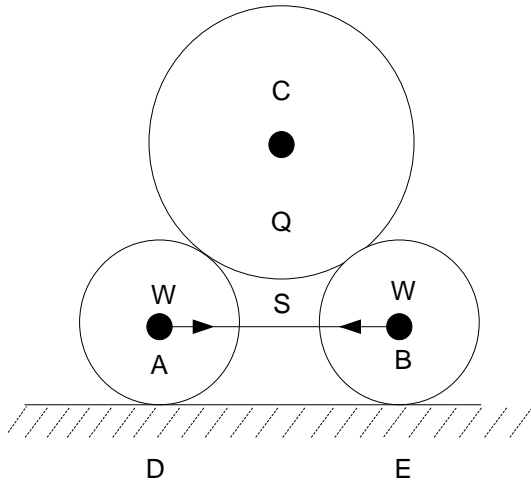


Figure Q1. (e)

2. A truss of 12m span is loaded as shown in Figure 2. Find the force in members AB, AE and BE of the truss by method of joints. (20 Marks)

3. Find the reactions at the supports of the beam loaded as shown in Figure 3. Draw the shear force diagram (SFD) and bending moment diagrams (BMD) (20 marks)

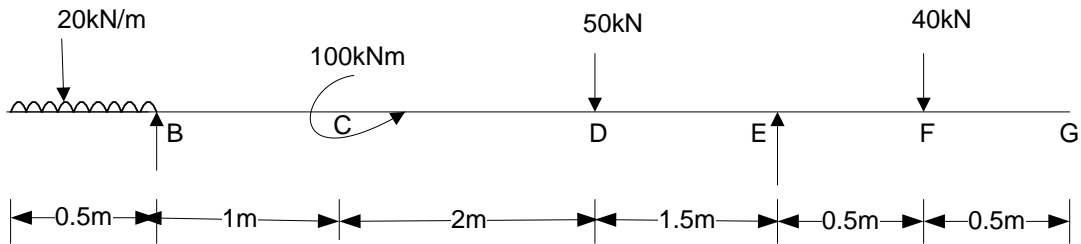


Figure 3

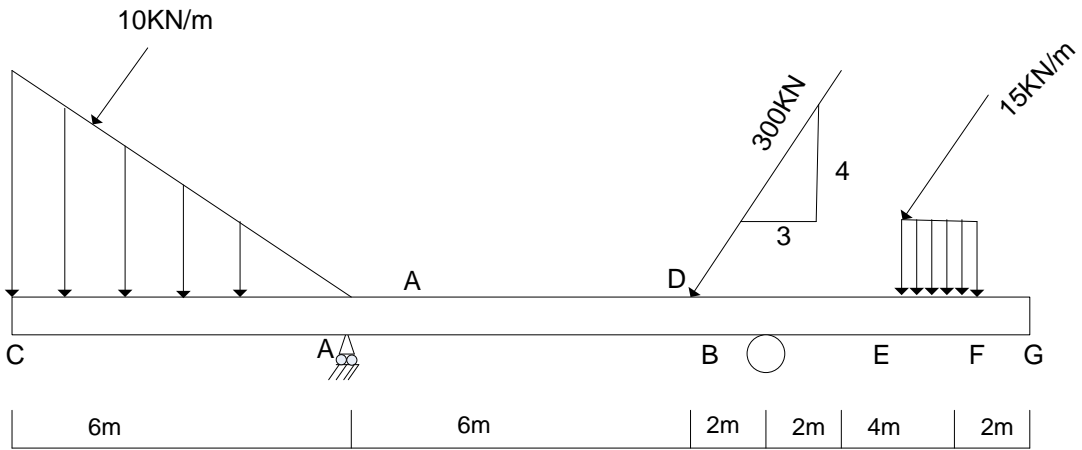


Figure 4

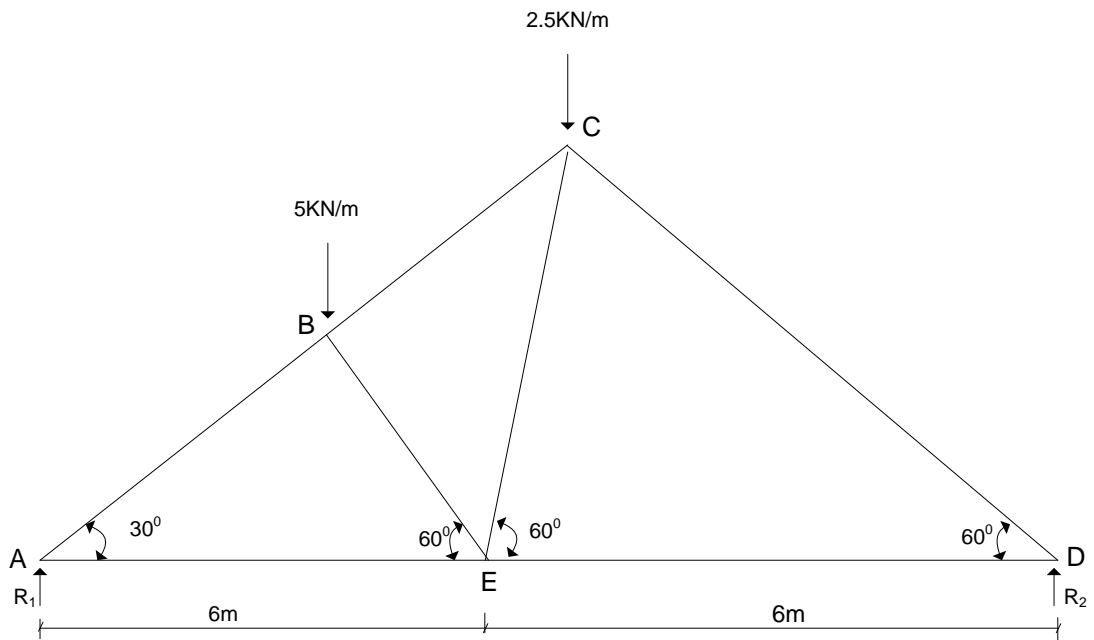


Figure 2

4. Construct shear force and bending moment diagram for the beam loaded as shown in Figure 4. Also find the location of the inflexion for the beam (20 Marks)

5 The frame structure shown in Figure 5 has hinges at A, D and F. Determine the components of the reactions at supports A and F and hence sketch the deflected shape, shear force diagram (SFD) and bending moment diagram (BMD) (20 marks)

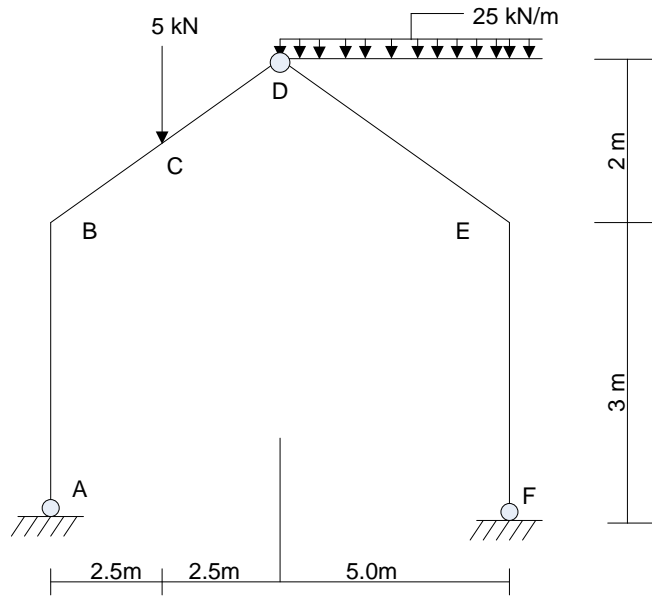


Figure.Q.5.