TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF BUILDING & CIVIL ENGINEERING
UNIVERSITY EXAMINATION FOR:
BACHELOR OF TECHNOLOGY IN CIVIL ENGINEERING

TCV 4213: ANALYSIS OF STRUCTURES I
SPECIAL/SUPPLEMENTARY EXAMINATION
SERIES: SEPTEMBER 2018
TIME: 2 HOURS

Instructions to Candidates
You should have the following for this examination
  -*Answer Booklet, examination pass and student ID*
  -*Drawing instruments.*
This paper contains **FIVE** questions
Answer question **ONE** and any **TWO** questions.
Marks for each question are indicated in the parenthesis.
Do not write on the question paper.

QUESTION ONE (COMPUSORY 20 MARKS)

a) Figure Q1(a) illustrates the shear force diagram derived from a loaded beam. Generate a loaded beam, bending moment diagram as well as the reactions at supports; HENCE determine the point and value of the maximum bending moment
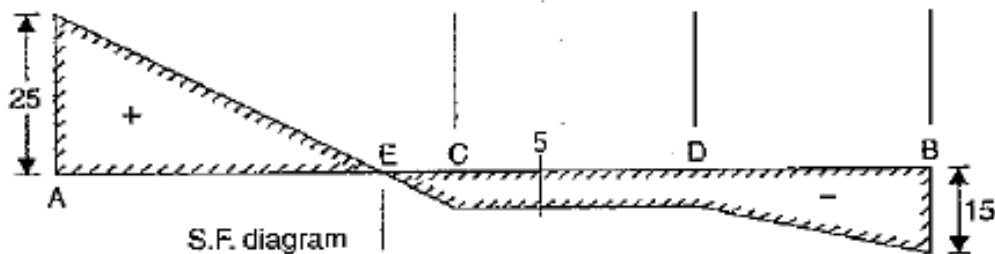

Figure 1(a): Shear force diagram

(15 Marks)

b) Define the term 'structure ' and briefly explain the two classes of structures (3 marks)

c) Differentiate between **braced frame** and **moment resistant frames** (2 marks)

QUESTION TWO (20 Marks)

a) Figure Q2 (a) illustrates a loaded truss. Using method of joint resolution, analyze the truss indicating the nature of the forces and draw the force diagram
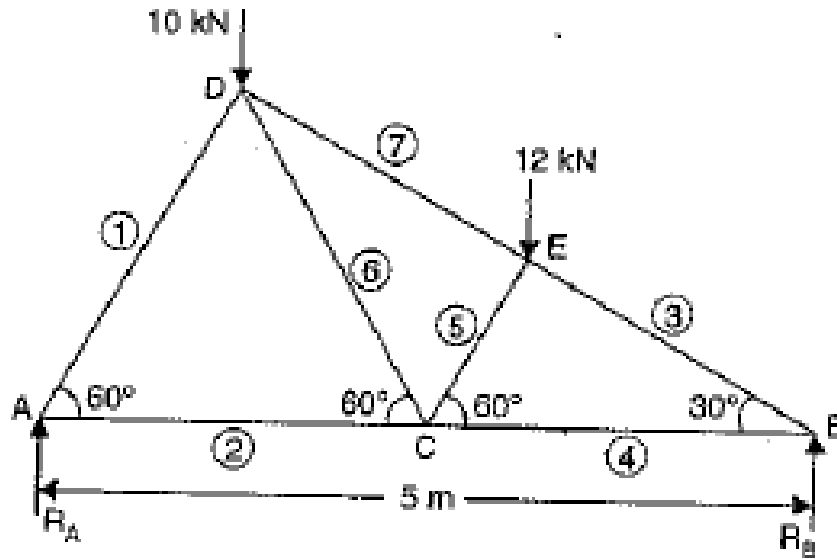

Figure Q2 (a)

Figure Q2 b) illustrates a loaded truss. Using method of section, analyze the truss and determine forces of member 1,2 and 3 indicating the nature of their forces
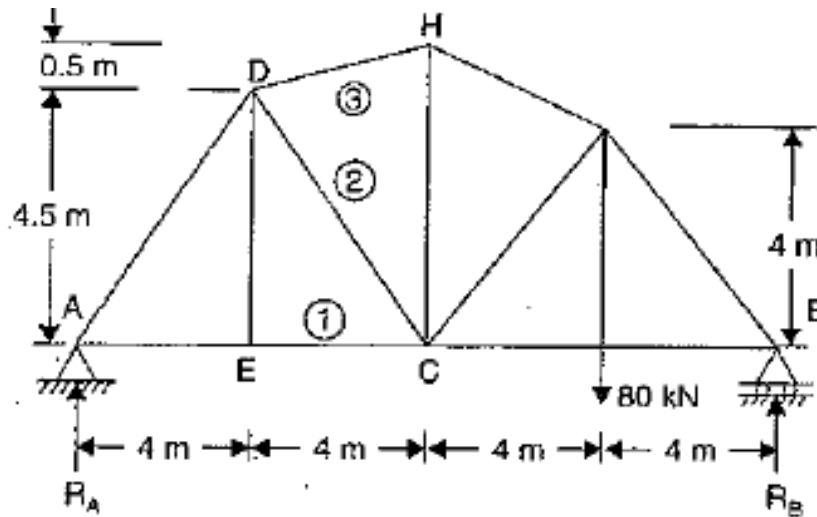

Figure Q2 (b)

QUESTION THREE (20 Marks)

a) Explain the following classes of structural members using clear sketches (*where necessary*) and give an example for each.

  i)   Tension members
  ii) Compression members
  iii) Flexural members
  iv) Members subjected to combined loading

(13 marks)

b) From the first principles of beams; show that the maximum bending moment of a simply supported beam loaded with a udl is given $\dfrac{wl^2}{8}$ (7 Marks)

QUESTION FOUR (20 Marks)

a) Using clear sketches outline the procedure of finding the shear force and maximum bending moment of a simply supported beam with a gradually varying load from zero at one end to w per metre at the other end.   (10 Marks)

b) A simply supported beam of length5.0m carries a uniformly varying load of 800N/m run at one end to 1600N/m run at the other end. Draw the shear force and bending moment diagram

(10 Marks)

QUESTION FIVE (20 Marks)

A horizontal beam 10m long is carrying a uniformly distributed load of KN/m. the beam is supported on two supports 6m apart. Find the position of supports so that the bending moments of the beam is as small as possible. Also draw the *SF and BM* diagrams

(20 marks)