(*University of Choice*)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITRY REGULAR EXAMINATIONS
2020/2021 ACADEMIC YEAR

SECOND YEAR FIRST SEMESTER EXAMINATIONS

FOR THE DEGREE
OF
BACHELOR OF TECHNOLOGY EDUCATION (CIVIL AND STRUCTURAL ENGINEERING)

COURSE CODE: TEB 211

COURSE TITLE: THEORY OF STRUCTURES I

DATE: MONDAY 8TH FEBRUARY 2021 TIME: 9.00 – 11.00 AM

INSTRUCTIONS:

1. This paper contains Five questions
2. Answer Any four **Questions**
3. Marks for each question are indicated in the parenthesis.
4. Examination duration is 2 **Hours**

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 4 Printed Pages. Please Turn Over.

QUESTION ONE

(a) Determine the degree of static indeterminacy of the structures in Figure Q1 (a) (4 Marks)
(b) For the arch shown in Figure Q1 (b) determine the:-
(i) Arch profile (3 Marks)
(ii) Reactions at the supports (4 Marks)
(iii) Moment, shear and Axial force at point E (6.5 Marks)

QUESTION TWO

a) Identify key differences between cable and arch structures (3 Marks)
(b) For the cable shown in Figure Q2, Determine the:-
(i) Vertical and horizontal force components in the cable at A and B (6 Marks)
(ii) Maximum tension in the cable (2 Marks)
(iii) Reactions at the top of the highest tower with a roller support system (6.5 Marks)
(neglect the self-weight of the cable in the analysis)

QUESTION THREE

(a) Show that the truss in Figure Q3 is statically determinate. (2.5 Marks)
(b) Determine the reactions at the supports (3 Marks)
(c)Determine the member forces (12 Marks)

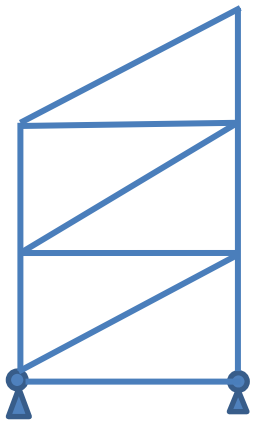
QUESTION FOUR

a) Define the terms 'free body' and 'influence line' as used in analysis of structures. (2.5Marks)

b) For the Frame shown in Figure Q4, determine
(i) the reactions at the supports (9 Marks)
(ii) Draw shear force, axial force and bending moment diagrams. (6 Marks)

QUESTION FIVE

a) Explain with example the relationship between loading, shear force and bending moment distribution on a beam. (2.5 Marks)
b) A beam carries the load as shown Figure Q5
(i) Analyze the beam for reactions at the supports (9 Marks)
(ii)Draw the Shear force and Bending moment diagrams (6 Marks)



Truss

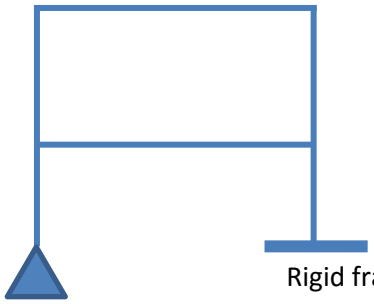


Figure Q1 (a)

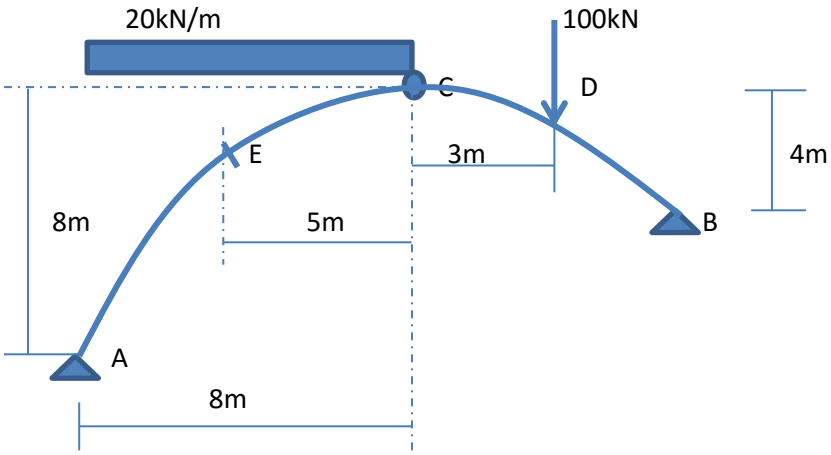


Figure Q1 (b)

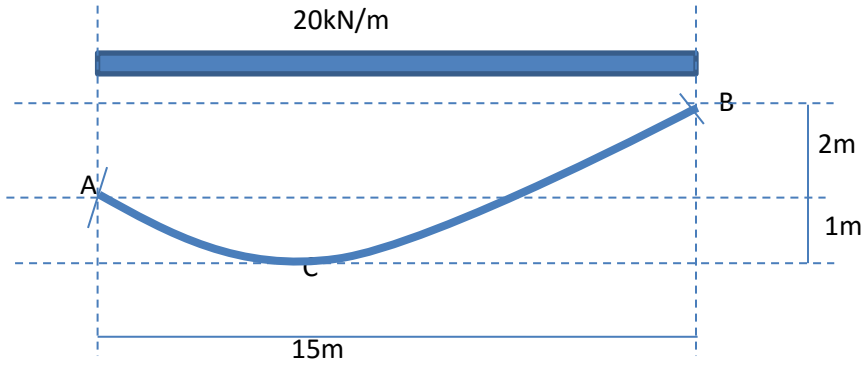


Figure Q2

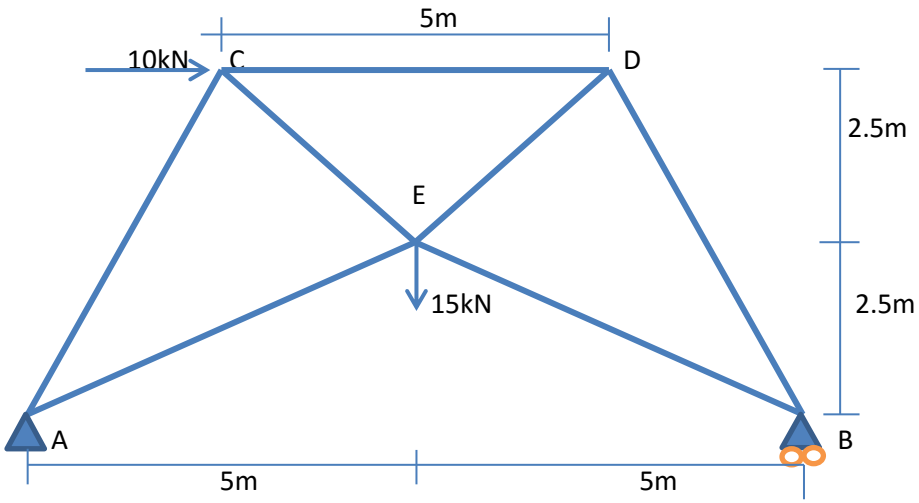


Figure Q3

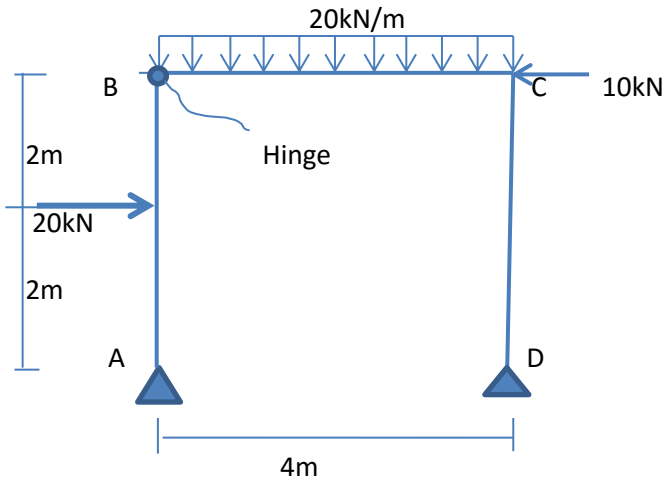


Figure Q4

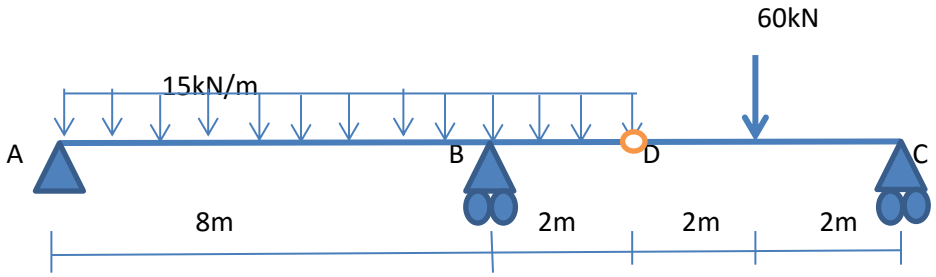


Figure Q5