



**MASINDE MULIRO UNIVERSITY OF SCIENCE AND  
TECHNOLOGY  
(MMUST)**

**MAIN CAMPUS**

**UNIVERSITY MAIN EXAMINATIONS  
2023/2024 ACADEMIC YEAR**

**SECOND YEAR FIRST SEMESTER EXAMINATIONS**

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

**COURSE CODE: TEB 211/CSE 211**

**COURSE TITLE: ANALYSIS OF STATICALLY DETERMINATE  
STRUCTURES**

**DATE: 5<sup>TH</sup> DECEMBER 2023**

**TIME: 3 P.M – 5 P.M**

**INSTRUCTIONS:**

1. This paper contains FOUR questions.
2. **Question ONE (1) is Compulsory**
3. **Attempt a total of THREE questions in this booklet.**
4. Marks for each question are indicated in the parenthesis.

Examination duration is **2 Hours**.

MMUST observes ZERO tolerance to examination cheating.

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

**Question 1** **COMPULSORY** **(30 marks)**

- (a) Describe **FOUR** Types of loads that can act on a structure (4 mks)
- (b) Illustrate the difference between:
- Pinned and Fixed support.
  - Statically determinate and statically indeterminate beam (4 mks)
- (c) A pin-jointed truss supported by a pinned support at A and roller support at G carries three loads at joints C, D, and E, as shown in **Figure Q1c**. Show that the structure is statically determinate and determine the support reactions. (5 mks)
- (d) For the pinned jointed truss in **Figure Q1c**. Determine the magnitude and sense of the forces induced in members.
- DC, CI, and JI using method of section. (6 mks)
  - AB, BC, and BJ using method of tension coefficient. (6 mks)
- (e) Consider the beam shown in **Figure Q1e**. Draw the influence lines for the vertical reaction at C and the shear at D. (5 mks)

**Question 2** **(20 marks)**

Consider a beam supported and loaded as shown in **Figure Q2**. Carryout the following:

- Determine the reactions at the supports A and C. (4Mks)
- Draw the shear force and bending moment diagrams indicating all the peak values. (16Mks)

**Question 3** **(20 marks)**

Consider a cable suspended from support A to support B spanning 40 m apart and loaded at points C, D and E as shown in **Figure Q3**. For the analysis of the cable, carryout the following:

- Calculate the reactions at the supports A and B. (5Mks)
- Calculate the sag at points D and E. (2Mks)
- Calculate the total length of the cable. (3Mks)
- Calculate cable tension in sections AC, CD, DE, and EB. (8Mks)
- Calculate the cable tension at supports A and B (2Mks)

**Question 4** **(20 marks)**

A pin-connected truss is loaded by both vertical and horizontal forces as shown in **Figure Q4**. You are required to:

- Determine the support reactions. (4Mks)
- Using method of joints, determine all the member forces in the truss. (16Mks)

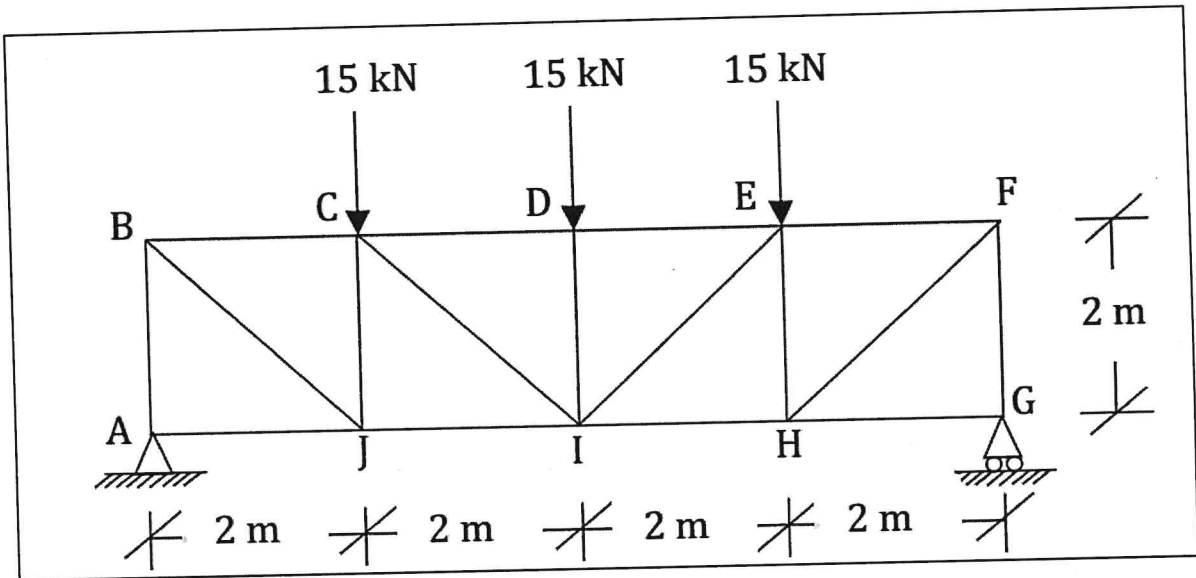


Figure Q1c

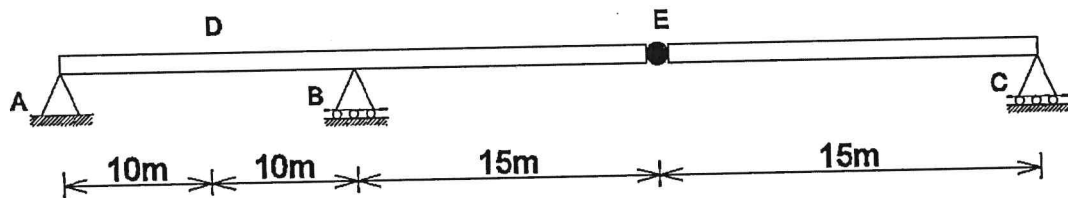


Figure Q1e

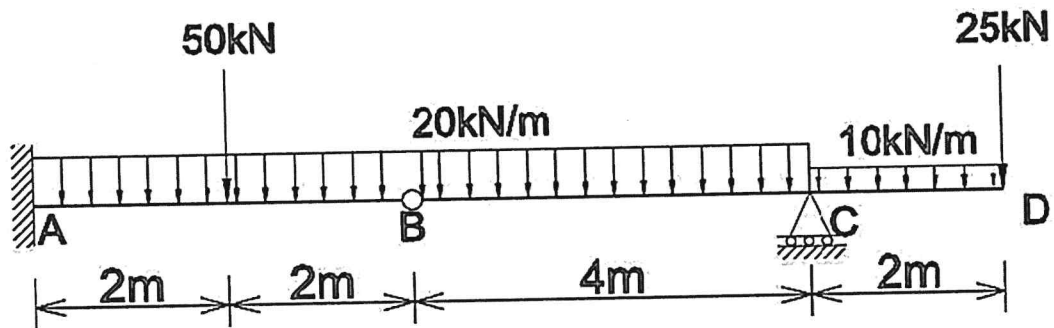


Figure Q2

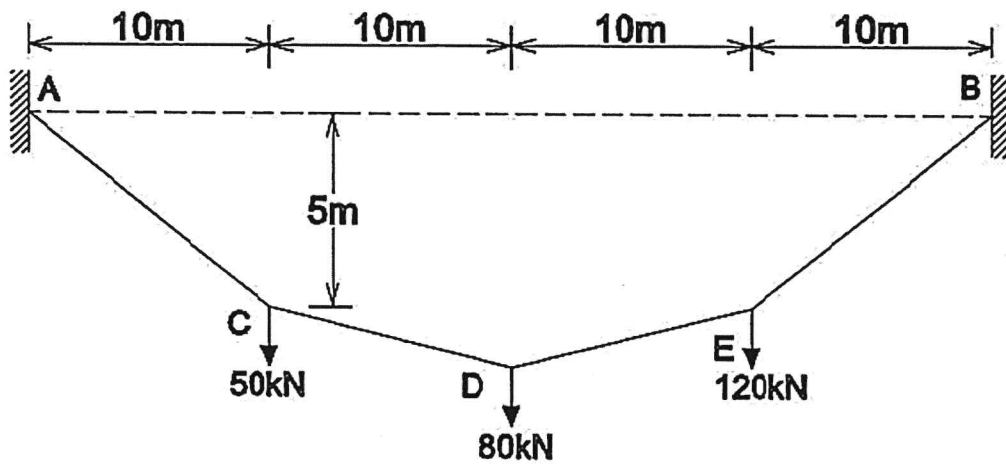


Figure Q3

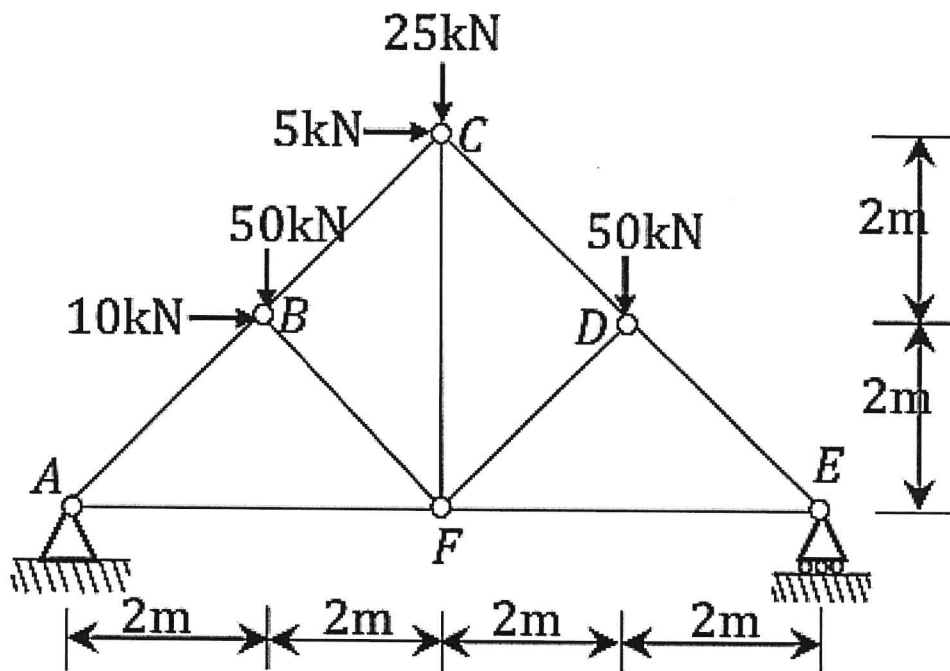


Figure Q4

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