UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2023/2024

COURSE NAME	:	STRUCTURAL ANALYSIS
COURSE CODE	:	BPD 20403
PROGRAMME CODE	:	BPC
EXAMINATION DATE	:	JULY 2024
DURATION	:	3 HOURS
INSTRUCTIONS	:	1. ANSWER ALL QUESTIONS
		2. THIS FINAL EXAMINATION IS CONDUCTED VIA
		☐ Open book
		☒ Closed book
		3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

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Q1 A plane truss as shown in **Figure Q1** is supported with a pin and roller at points A and B. The point loads imposed are 10 kN at point D and 10 kN at point F.
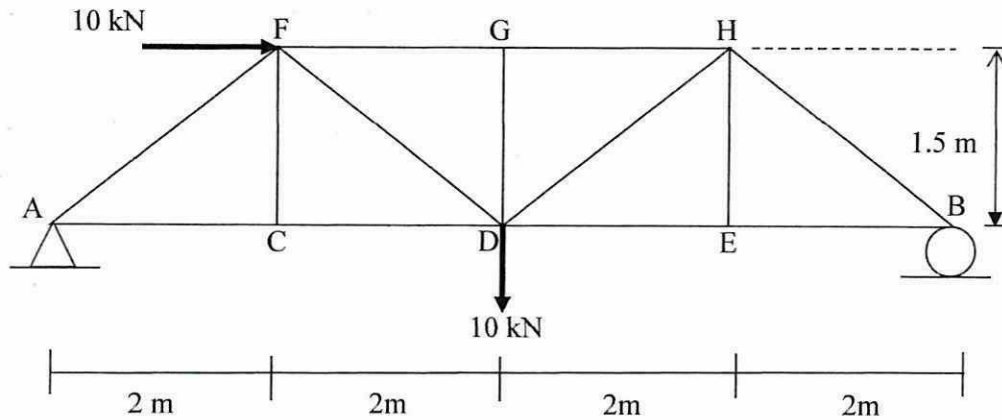

Figure Q1: Plane Truss

(a) Calculate the reaction forces at points A and B.

(6 marks)

(b) Calculate the internal forces of member GH, HE, and DE by using the method of section.

(14 marks)

Q2 A three-member frame as shown in **Figure Q2** is loaded with uniform distributed loads of 15 kN/m at points A to B and 30 kN/m at points B to C. The frame is pinned support at point A and roller support at point D.
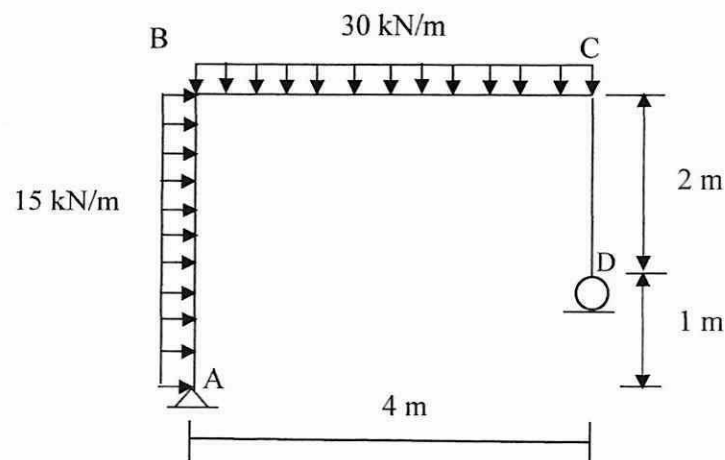

Figure Q2: A Three-Member Frame

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(a)   Identify the stability of the three-member frame.

(5 marks)

(b)   Calculate the reaction forces at points A and D.

(15 marks)

Q3   A simply supported beam as shown in **Figure Q3** is subjected to point loads of 10 kN and 7 kN at points C and D. There is a uniform distributed load (UDL) of 4 kN/m imposed on the beam from points C to D. Given the value of elastic modulus, $E = 200$ kN/mm^2 and moment inertia, $I = 10^8$ mm^4.
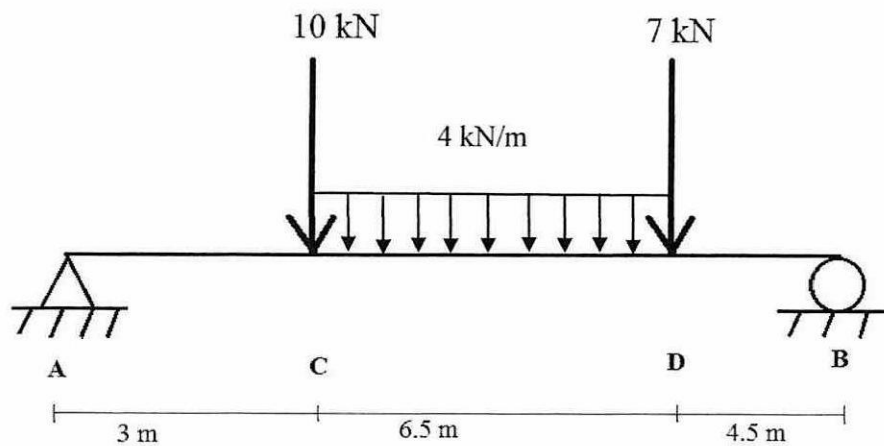

Figure Q3: A Simply Supported Beam

(a)   Calculate the reaction forces at points A and B.

(6 marks)

(b)   Calculate the deflection at points C and D using the Macaulay Method.

(14 marks)

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Q4   A plane truss as shown in **Figure Q4** is supported with pin and roller at point A and D respectively. The point loads imposed are 12 kN and 24 kN at point B and 18 kN at point C.
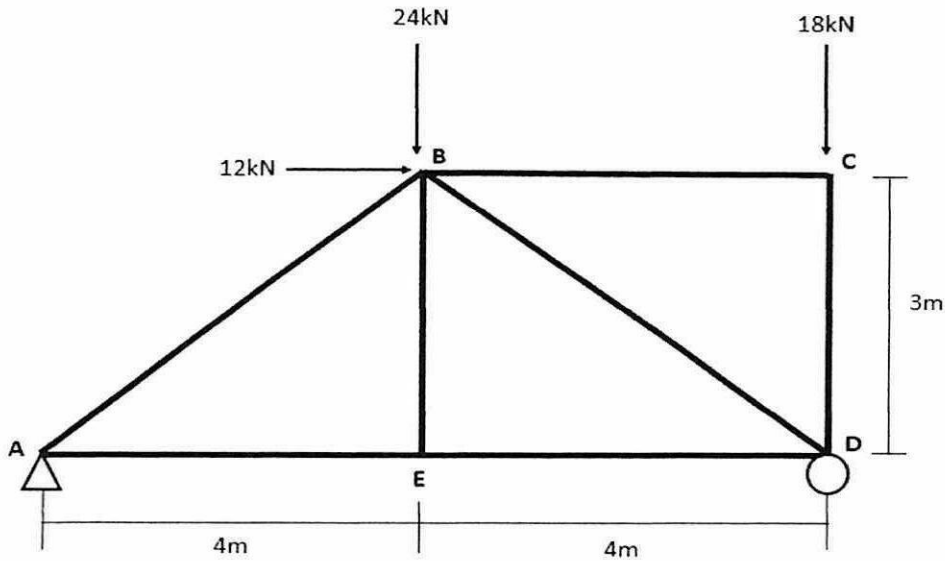

24kN

18kN

12kN →

B

C

3m

A

E

D

4m   4m

Figure Q4: Plane Truss

(a)   Identify the stability of the plane truss.

(5 marks)

(b)   Calculate the internal forces of each member by using the method of joint.

(15 marks)

Q5   A beam as shown in **Figure Q5** is loaded with 50 kN/m uniformed distributed load at points A to B and 20 kN concentrated load at point C. The beam is supported at point A and point D.
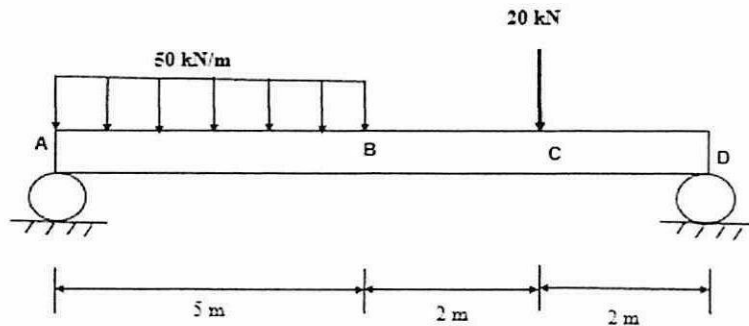

20 kN

50 kN/m

A   B   C   D

5 m   2 m   2 m

Figure Q5: Simply Supported Beam

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(a)   Calculate the reaction forces at points A and D.

(6 marks)

(b)   Analyse the Shear Force Diagram (SFD) and Bending Moment Diagram (BMD) at points A, B, C, and D.

(14 marks)

- END OF QUESTIONS -

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