UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2017/2018

COURSE NAME	:	STRUCTURAL ANALYSIS
COURSE CODE	:	BPD 20403
PROGRAMME CODE	:	BPC
EXAMINATION DATE	:	JUNE / JULY 2018
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

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

Q1   A frame as shown in **Figure Q1** as in **Appendix** has been imposed 10kN and 20kN loads at point B. The structure frame is pinned support at point A and roller support at point D.

(a)   Describe structure frame stability.

(4 marks)

(b)   Analyse the stability of the structure frame.

(6 marks)

(c)   Calculate the internal forces of member AB, BC and CD by using the method of section.

(15 marks)

Q2   A plane truss as shown in **Figure Q2** as in **Appendix** has been imposed by axial loads at B and C. The axial loads imposed are 20kN and 24kN at point B and 18kN at point C.

(a)   Explain the differences between method of joint and method of section.

(4 marks)

(b)   Analyse the stability of the plane truss.

(6 marks)

(c)   Calculate the internal forces of each member of the plane truss using the method of joints.

(15 marks)

Q3   A cantilevered beam as shown in **Figure Q3** as in **Appendix** is loaded with uniformly distributed load of 10kN/m along 8m. The cantilevered beam also loaded with axial loads of 20kN and 10kN at point C and point D respectively.

(a)   Draw Shear Force Diagram (SFD) at point A, B, C and D.

(15 marks)

(b)   Draw Bending Moment Diagram (BMD) at point A, B, C and D.

(10 marks)

Q4   A simply supported beam as shown in **Figure Q4** as in **Appendix** is subjected to axial loads of 20kN at point C. The beam also loaded with uniformly distributed load of 10kN/m along 5m from point A to B. Given the value of elastic modulus, $E = 200kN/mm^2$ and moment inertia, $I = 10^8 mm^4$.

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

(10 marks)

    (b)   Analyse the deflection at points B and C using Macaulay method.

(15 marks)

- END OF QUESTIONS -

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COURSE NAME   : STRUCTURAL ANALYSIS   COURSE CODE   : BPD 20403
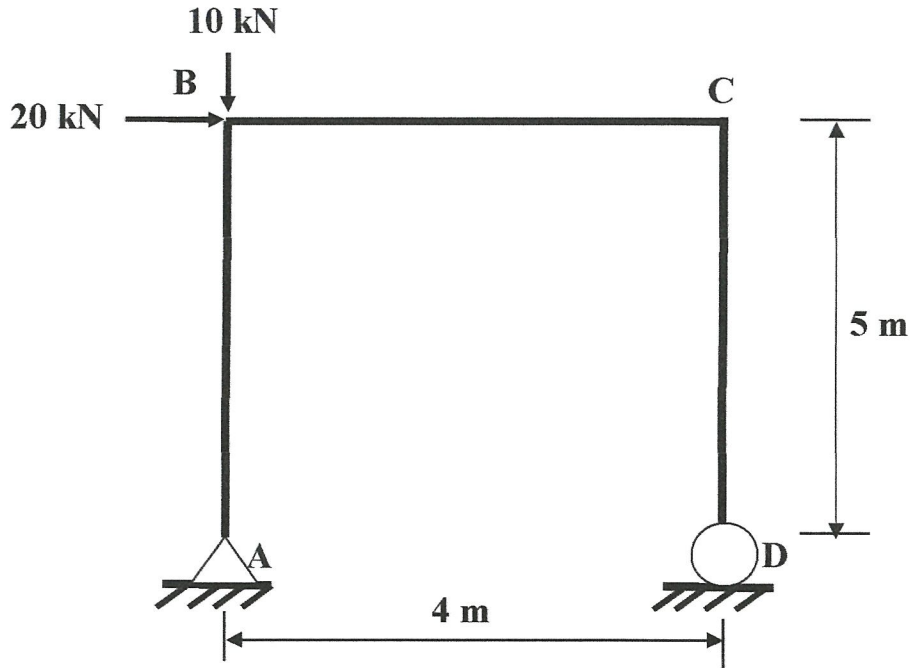
Figure Q1 : A Frame Structure
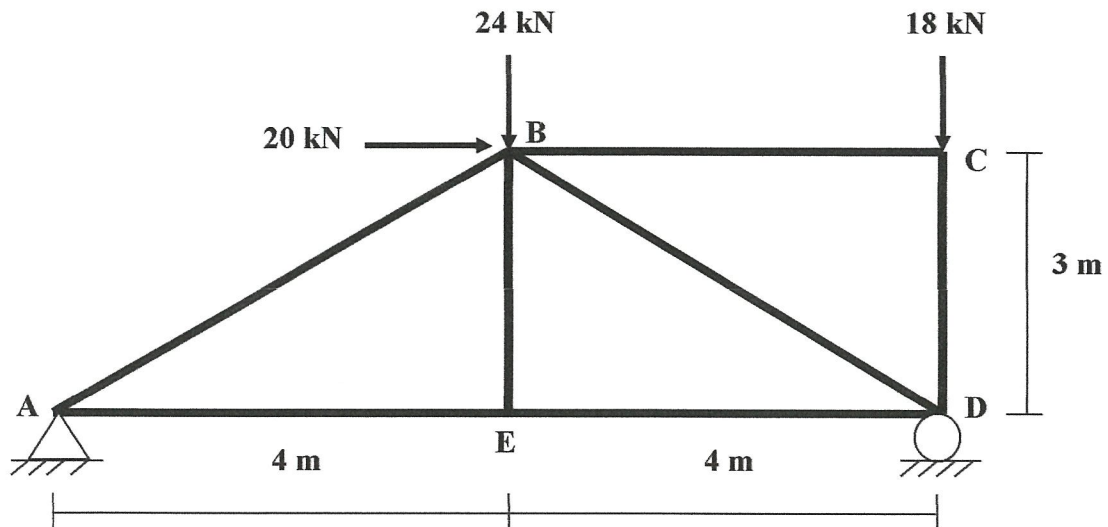
Figure Q2 : A Plane Truss

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20 kN   **10 kN**

10 kN/m

A   B   C   D

8 m   **2 m**   **2 m**
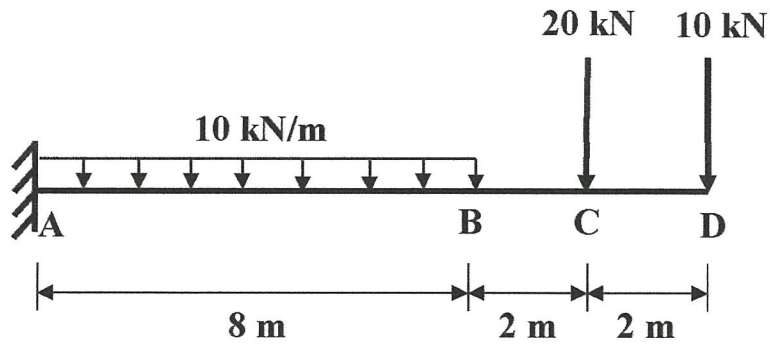
Figure Q3 : A Cantilevered Beam

20 kN

10 kN/m

A   D

B   C

5 m   **2 m**   **3 m**
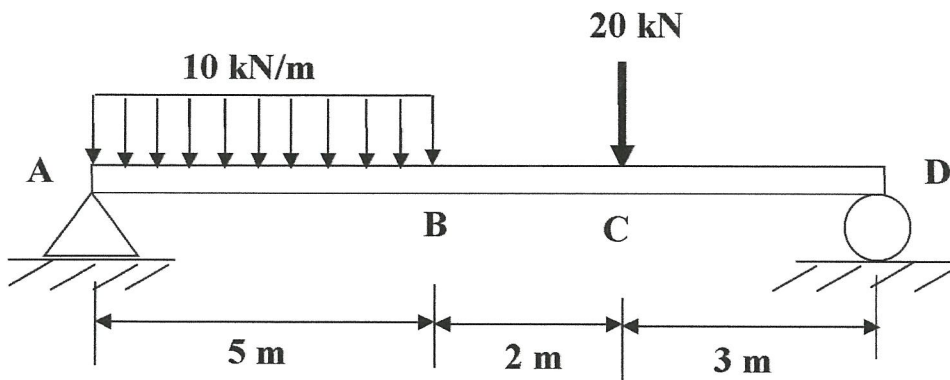
Figure Q4 : A Simply Supported Beam