UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2014/2015

COURSE NAME : STRUCTURAL ANALYSIS

COURSE CODE : BPD 20403

PROGRAMME : 2 BPC

EXAMINATION DATE : JUNE 2015 / JULY 2015

DURATION : 3 HOURS

INSTRUCTION : ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **SEVEN (7)** PAGES

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

    (a)   Analyse the stability of this frame.

(15 marks)

    (b)   Calculate the internal forces of member BC by using the method of section.

(10 marks)

Q2   A cantilever beam as shown in **Figure Q2** is loaded with uniformly distributed load of 12kN/m and 5kN/m along 6m and 2m respectively. The cantilever beam also loaded with point loads of 20kN and 10kN at point C and D respectively.

    (a)   Calculate the reaction forces at A (R_{Ay}) and bending moment (M_A).

(5 marks)

    (b)   Draw shear force diagram (SFD) at point A, B, C and D.

(10 marks)

    (c)   Draw bending moment diagram (BMD) at point A, B, C and D.

(10 marks)

Q3   A beam as shown in **Figure Q3** is subjected to point loads of 10kN and 7kN at points C and D.

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

(5 marks)

    (b)   Compare with examples the Macaulay method and the Double Integration method for the calculation of deflection of this beam.

(10 marks)

    (c)   Calculate the deflection at points C and D using Macaulay method in EI form.

(10 marks)

Q4 A plane-truss as shown in **Figure Q4** have been imposed loads at two points, namely B and C. The loads imposed are 10kN and 25kN at point B and 5kN at point C.
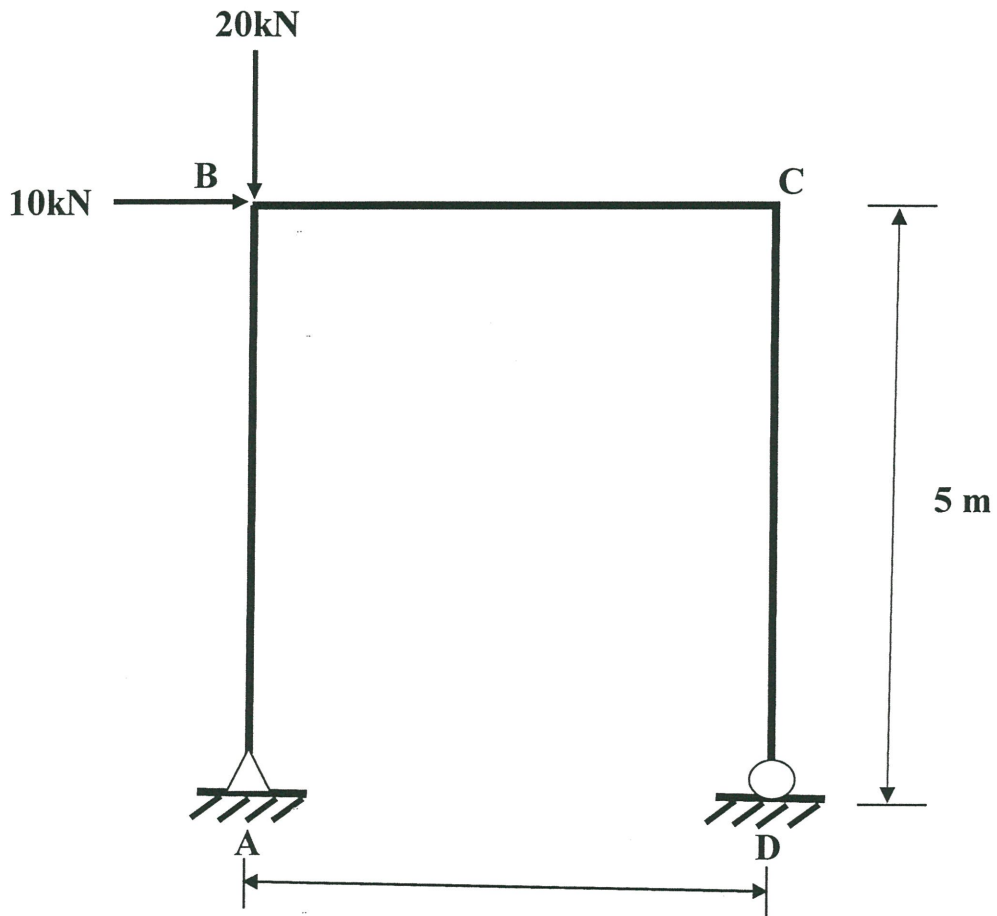
    (a) Analyse the stability of the plane-truss.

                               (15 marks)

    (b) Calculate the internal forces of each member of the plane-truss using the method of section.

                               (10 marks)

- END OF QUESTIONS -

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FIGURE Q1

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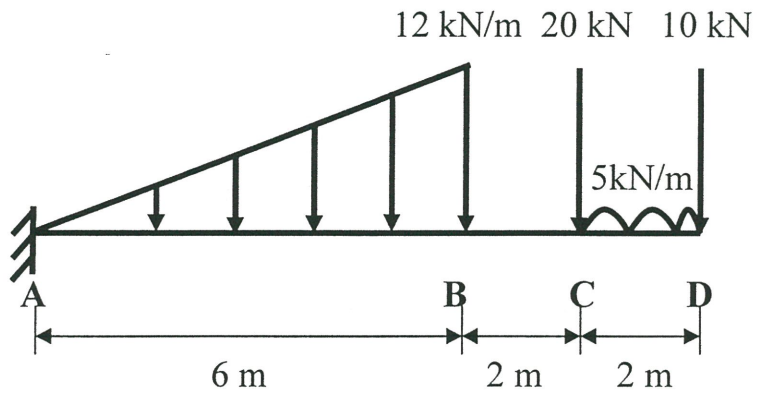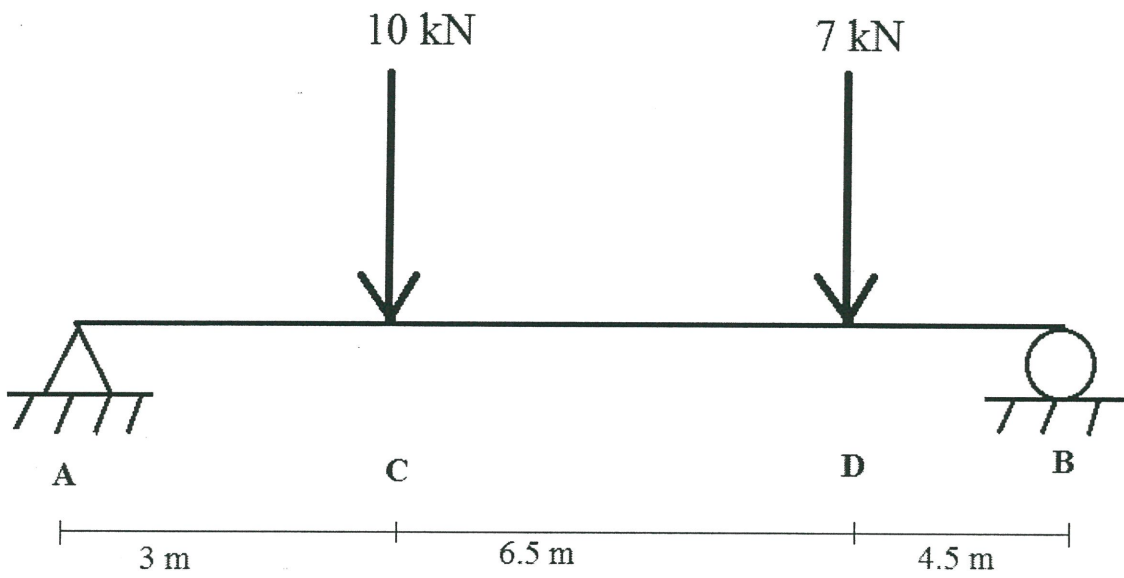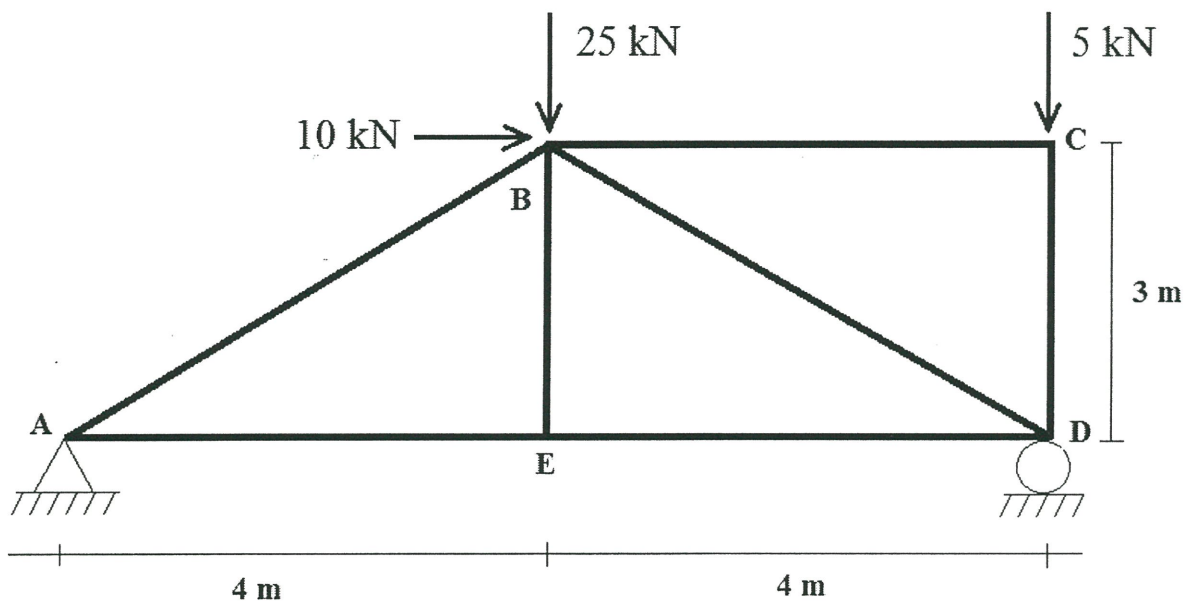COURSE NAME   : STRUCTURAL ANALYSIS   COURSE CODE : BPD 20403

12 kN/m 20 kN 10 kN

5kN/m

A   B   C   D

6 m   2 m   2 m

FIGURE Q2

10 kN   7 kN

A   C   D   B

| 3 m | 6.5 m | 4.5 m |

FIGURE Q3

FIGURE Q4