UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
(TAKE HOME)
SEMESTER II
SESSION 2019/2020

COURSE NAME	:	STRUCTURAL ANALYSIS
COURSE CODE	:	BPD 20403
PROGRAMME CODE	:	BPC
EXAMINATION DATE	:	JULY 2020
DURATION	:	24 HOURS
INSTRUCTION	:	ANSWER ALL QUESTIONS **(OPEN BOOK EXAMINATION)**

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

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Q1   A truss is a span of a structure which required being large and its depth is not an important criterion for design and consists of a slender element with a triangular fashion arrangement. Trusses are supported by compression and tension forces in the members. One of the advantages of using truss compared to the beam is that it uses less material to support a given load. Trusses are constructed from long and slender elements which can be arranged in various methods to support the load. The truss spans are economically ranging from 9 m to 122 m and greater lengths. Trusses can be classified into plane trusses and space trusses. Plane trusses are composed of members that lie in the same plane and commonly used for bridge and roof support. On the other hand, space trusses are composed of members extending in three dimensions and are suitable for derricks and towers. One modern house plan is required plane truss for roof design as shown in **Figure Q1** as in **APPENDIX I**. The plane truss is supported with pin and roller at points A and G respectively. The point loads imposed are 100 kN at point B, 150 kN at point D, and 50 kN at point F.

Propose internal forces of each member either in tension or compression strength by using the method of joint for the plane truss. Support the answer with further justification about the tension and compression strength generated at each member due to reaction forces imposed at both supports A and B, and also external forces at points B, D, and F.

(25 marks)

Q2   A heavy storage warehouse building is made of 200 mm thick stone concrete floor. The floor slab having a length of 9 m and width of 4 m is directly over the top of the simply supported beam as shown in **Figure Q2** as in **APPENDIX II**. The beam is made from reinforcement concrete with the size 250 mm x 300 mm. The combination of dead load and live load will be provided with the resultant force, P at point C. The beam is supported with roller support at both ends A and B. Given the value of elastic modulus, $E = 200$ kN/mm^2.

Evaluate the slope and deflection at point D using the Macaulay method.

(25 marks)

- END OF QUESTIONS –

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FINAL EXAMINATION   **APPENDIX I**

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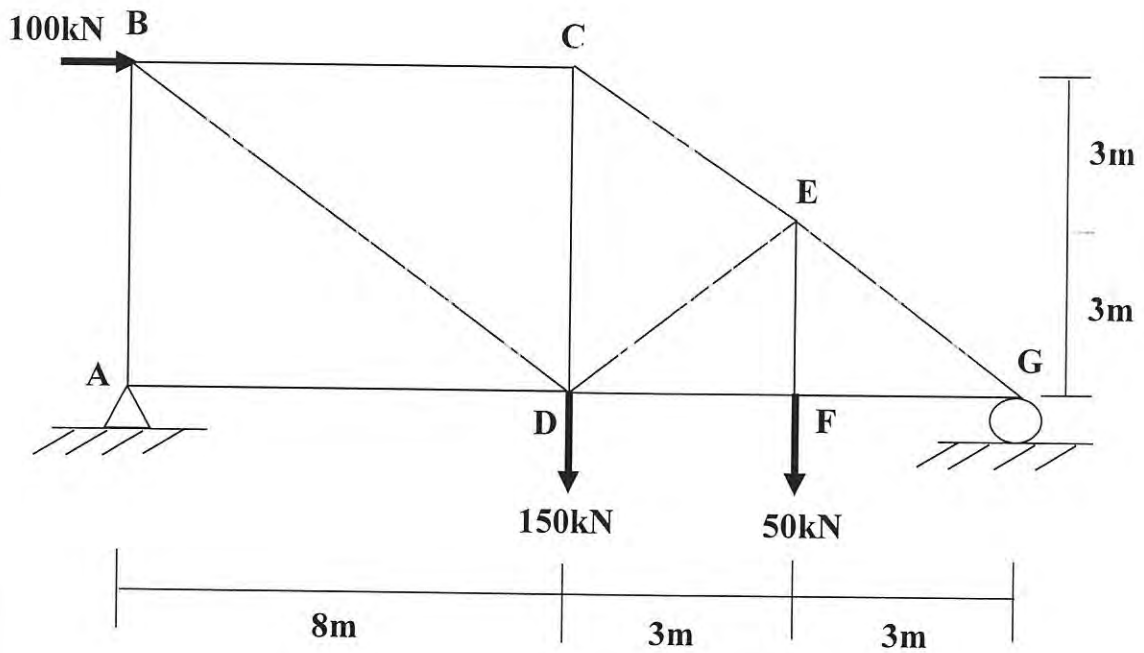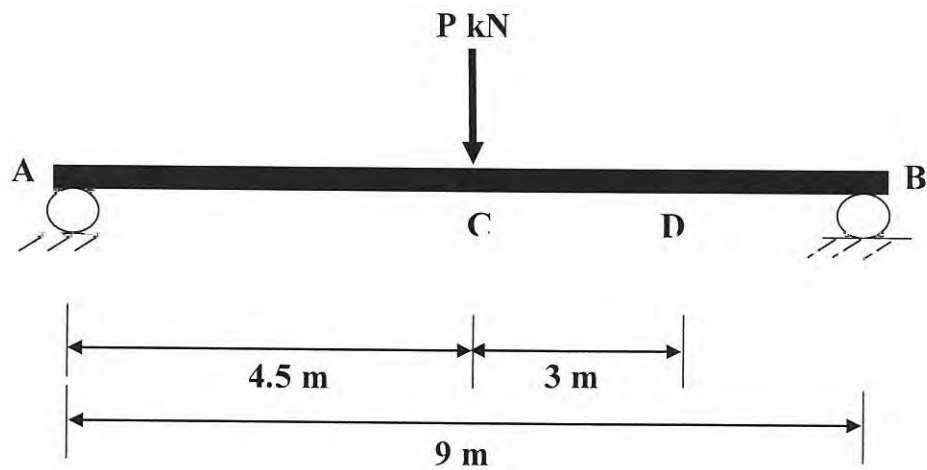COURSE NAME   : STRUCTURAL ANALYSIS   COURSE CODE   : BPD 20403

Figure Q1: A Plane Truss

Figure Q2: A Simply Supported Beam

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