Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2019/2020

COURSE NAME	:	STATICS
COURSE CODE	:	DAM 10703 / DAM 10103
PROGRAMME CODE	:	DAM
EXAMINATION DATE	:	DECEMBER 2019 / JANUARY 2020
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWERS **FIVE (5)** QUESTIONS ONLY

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

Q1 (a) Describe resultant force.

(2 marks)

(b) Determine the magnitude of the resultant force and its direction measured counter clockwise from the positive x axis based from **Figure Q1(b)**.

(6 marks)

(c) **Figure Q1(c)** shows two tugboats acting on the load C. If the resultant force of the two tugboats is 3 kN, directed along the x positive axis, determine:

(i) The required magnitude of force F_B.
(ii) The direction, θ of force F_B.

(12 marks)

Q2 (a) Explain the polygon law of forces.

(4 marks)

(b) **Figure Q2(b)** shows the supporting cables of chandelier. If the tension developed in each of the four wires is not allowed to exceed 600 N, determine the maximum mass of the chandelier that can be supported.

(16 marks)

Q3 (a) Define moment.

(2 marks)

(b) Explain the application of moment in real life. Use a simple illustration to support your answer.

(4 marks)

(c) A T-Shaped structure is acted with forces and distributed loads as shown in **Figure Q3(c)**. By applying the method of reduction force system to a single force, determine:

(i) The total moment of the system from point D.
(ii) The equivalent resultant force and its direction.
(iii) The location of resultant force along beam BD that measured from D.

(14 marks)

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Q4 (a) Describe and explain structural analysis of frames and machines.

(6 marks)

(b) **Figure Q4(b)** shows the Howe truss members. By using method section, determine the force in members:

(i) DF
(ii) DG
(iii) EG

(14 marks)

Q5 (a) Briefly state center of gravity.

(4 marks)

(b) Determine the area and centroid of the shaded area in **Figure Q5(b)**.

(16 marks)

Q6 (a) Describe the static and kinetic friction.

(4 marks)

(b) Explain why kinetic friction is less than static friction.

(4 marks)

(c) As shown in **Figure Q6(c)**, two blocks each weighing 20 kN and resting on a horizontal surface, are to be pushed apart by a 30° wedge. The angle of friction is 15° for all contact surfaces. Determine the force, P required to start movement of the blocks.

(12 marks)

-END OF QUESTIONS –

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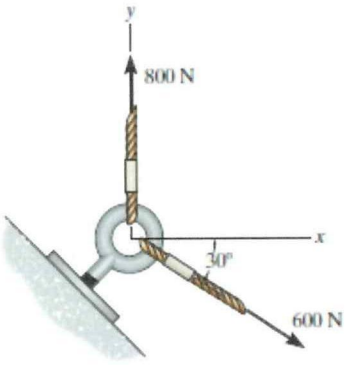

Figure Q1(b)

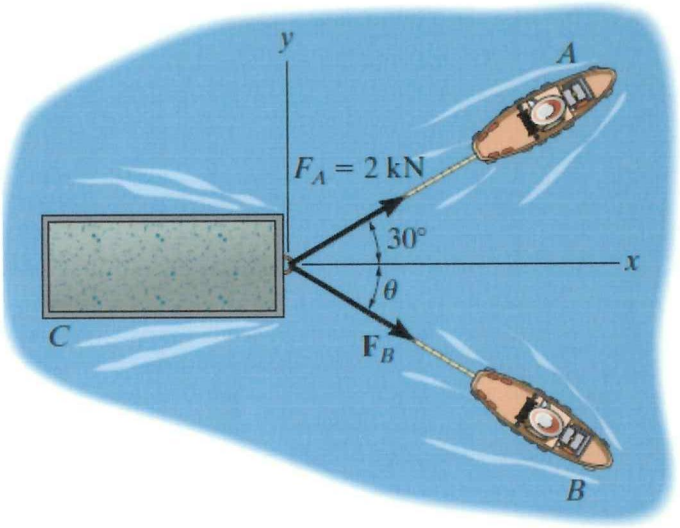

Figure Q1(c)

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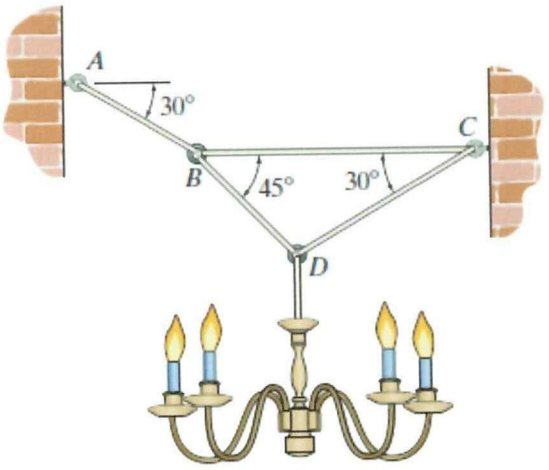

Figure Q2(b)

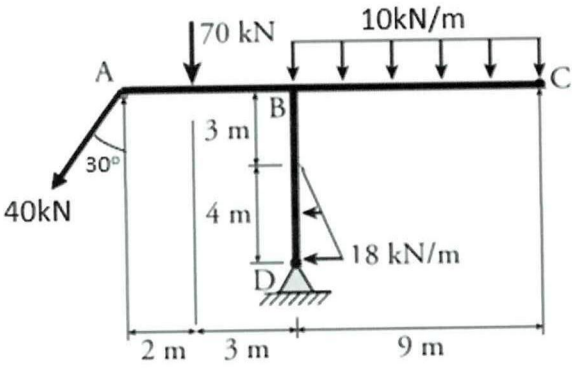

Figure Q3(c)

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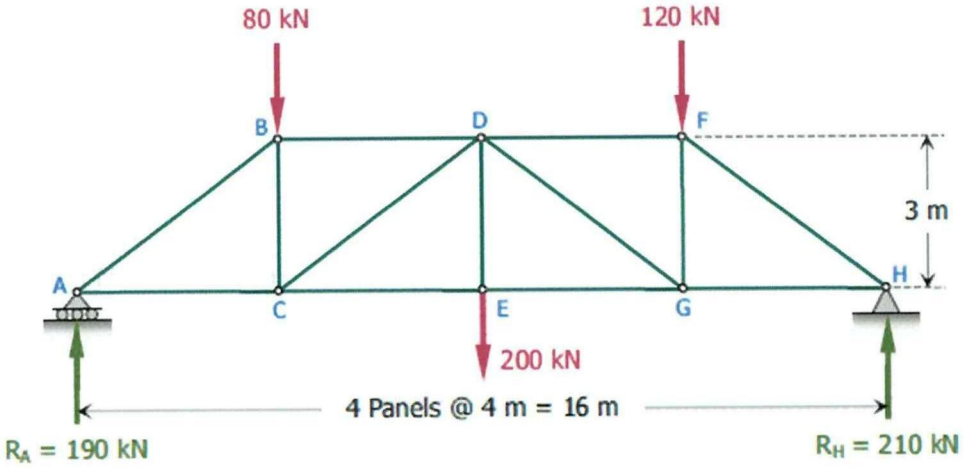

Figure Q4(b)

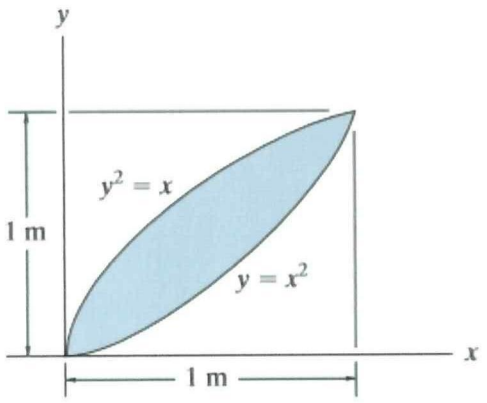

Figure Q5(b)

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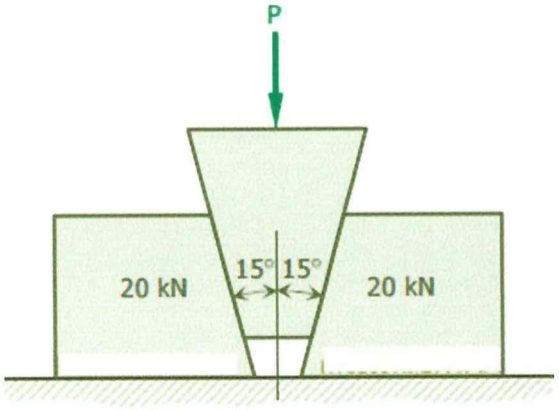

Figure Q6(c)

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