

UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF MARINE ENGINEERING TECHNOLOGY

FINAL EXAMINATION
JANUARY 2016 SEMESTER

COURSE CODE : LGB 21703

COURSE NAME : STATICS

PROGRAMME NAME : BACHELOR OF ENGINEERING TECHNOLOGY(HONS) IN
(FOR MPU: PROGRAMME LEVEL) MARINE ENGINEERING

DATE : 18 MAY 2016

TIME : 02.00 PM – 05.00 PM

DURATION : 3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
 2. This question paper is printed on both sides of the paper.
 3. Please write your answers on the answer booklet provided.
 4. Answer should be written in blue or black ink except for sketching, graphic and illustration.
 5. This question paper consists of TWO (2) sections. Section A and B. Answer all questions in Section A. For Section B, answer THREE (3) questions only.
 6. Answer all questions in English.
 7. Formulae sheet has been appended for your reference.
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THERE ARE 6 PAGES OF QUESTIONS, INCLUDING THIS PAGE.

SECTION A (Total: 40 marks)

INSTRUCTION: Answer all questions.

Please use the answer booklet provided.

Question 1

A steel tank as shown in Figure 1 is to be positioned in an excavation. Knowing that the angle of $\alpha = 20^\circ$, and the force P are applied to lift-up the tank.

- (a) Determine the required magnitude of the force P if the resultant R of the two forces applied at A is to be vertical,

(10 marks)

- (b) The corresponding magnitude of R ,

(2 marks)

- (c) The smallest force P for which the resultant R is vertical and the corresponding magnitude of R .

(8 marks)

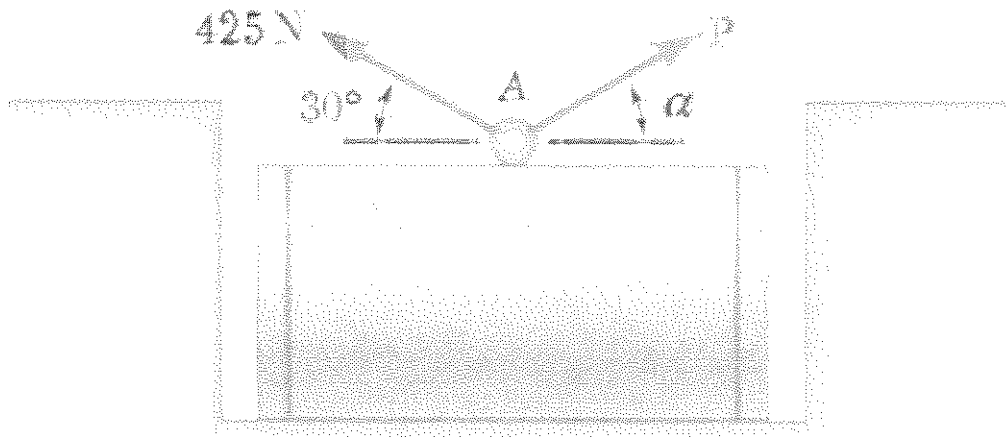


Figure 1

Question 2

A T-shaped bracket supports the four loads shown in Figure 2 and pressed a roller at A. Point B is a smooth pin connection.

(a) draw a free body diagram,

(4 marks)

(b) Determine the reactions at A and B, if $a = 10\text{cm}$,

(10 marks)

(c) Determine the smallest distance a if the bracket is not to move.

(6 marks)

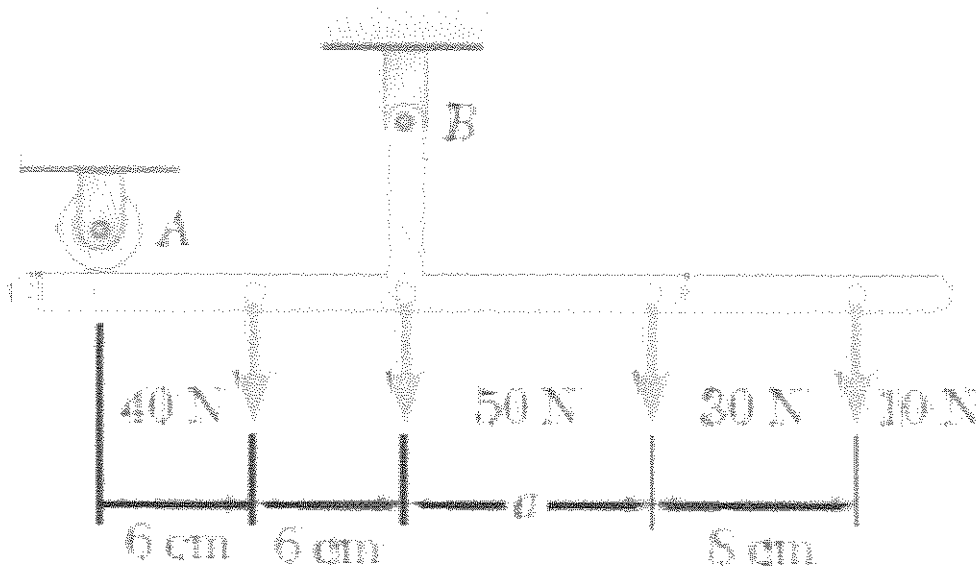


Figure 2

SECTION B (Total: 60 marks)

INSTRUCTION: Select THREE (3) Questions.

Please use the answer booklet provided.

Question 3

Figure 3 shows a building structure to be built. Using the method of joints, determine the force in each member of the truss shown. State whether each member is in tension or compression.

(20 marks)

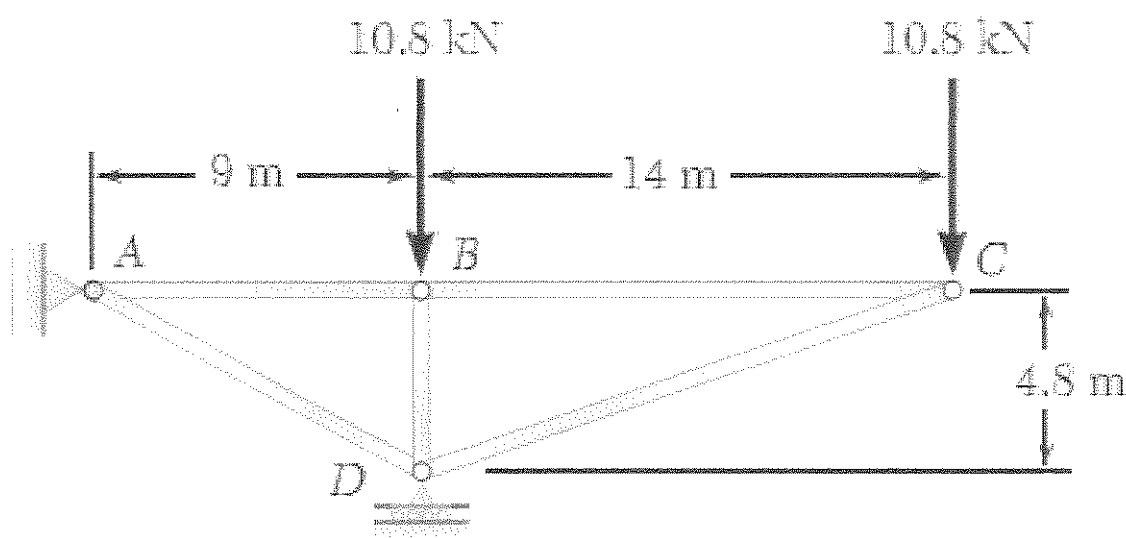


Figure 3

Question 4

The project has shown in Figure 4 is fabricated by joining two hemispheres at the end of a hollow cylinder. Determine the surface area and volume of the body formed by applying the Pappus and Guldinus theorems.

(20 marks)

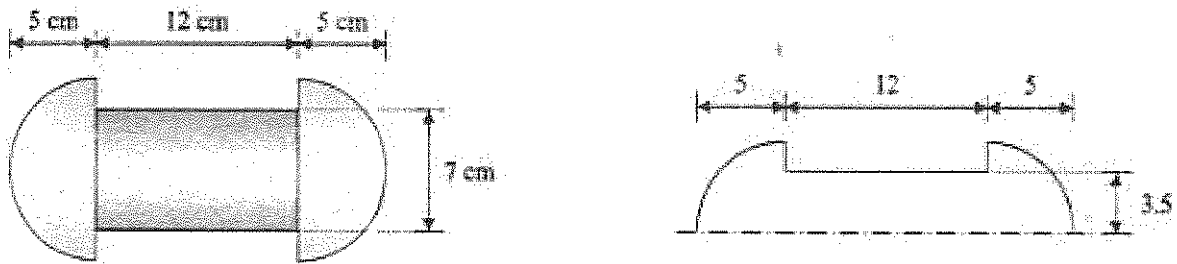


Figure 4

Question 5

Four tugboats are used to bring an ocean liner to its pier. Each tugboat exerts a 25kN force in the direction shown in Figure 5.

(a) Determine the equivalent force-couple system at the foremast O, (12 marks)

(b) The point on the hull where a single, more powerful tugboat should push to produce the same effect as the original four tugboats. (8 marks)

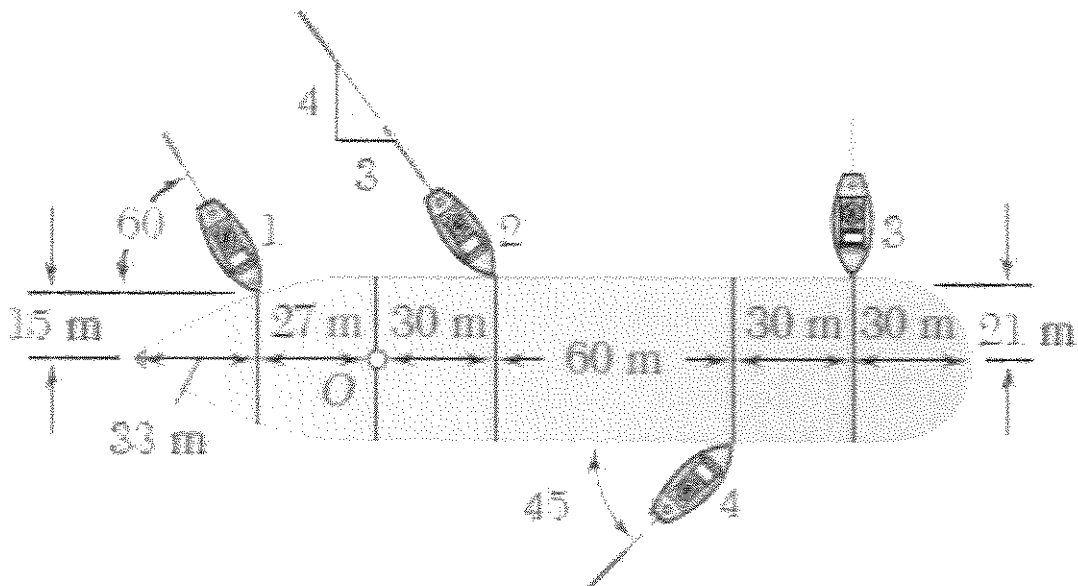


Figure 5

Question 6

For the beam has shown in figure 6, draw the shear and bending-moment diagrams, and determine the magnitude and location of the maximum absolute value of the bending moment, knowing that $P = 6\text{kN}$.

(20 marks)

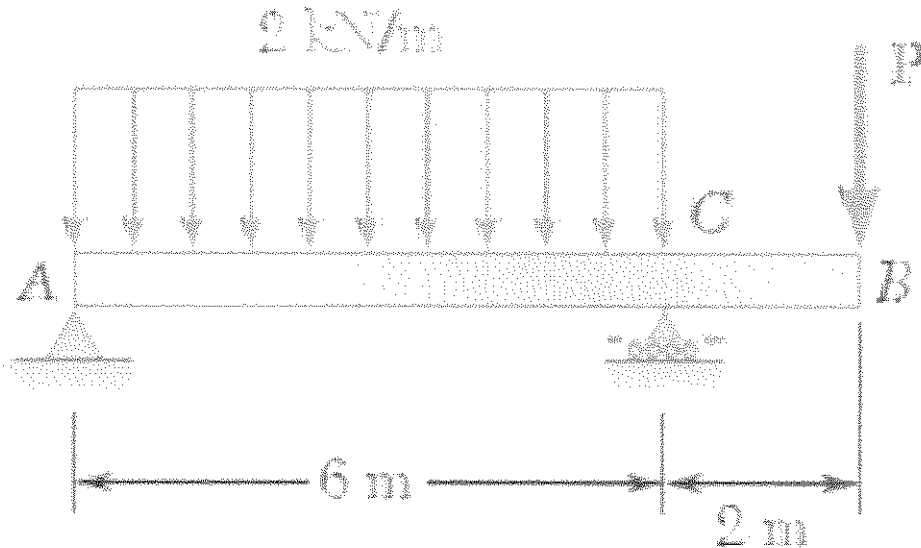


Figure 6

END OF QUESTION

