UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF MARINE ENGINERING TECHNOLOGY

FINAL EXAMINATION
JANUARY 2016 SEMESTER

COURSE CODE	:	LGD 20503
COURSE NAME	:	STATIC & DYNAMICS
PROGRAMME NAME	:	DIPLOMA OF ENGINEERING TECHNOLOGY IN SHIP DESIGN
DATE	:	23 MAY 2016
TIME	:	09.00 AM – 12.00 PM
DURATION	:	3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please CAREFULLY read the instructions given in the question paper.
2. This question paper has information printed on both sides of the paper.
3. This question paper consists of TWO (2) sections; Section A and Section B.
4. Answer ALL THREE (3) questions in Section A. For Section B, answer TWO (2) questions ONLY.
5. Please write your answers on answer sheet provided.
6. Answer all questions in English language ONLY.
7. FORMULA has been appended for your reference.

THERE ARE 6 PAGES OF QUESTIONS, INCLUDING THIS PAGE.

SECTION A (Total: 60 marks)

INSTRUCTION: Answer ALL questions.
Please use the answer booklet provided.

Question 1

(a) Define scalar quantity and vector quantities and give TWO (2) example each.

(6 marks)

(b) Determine the x and y components of each of the forces shown in Figure 1.

(14 marks)

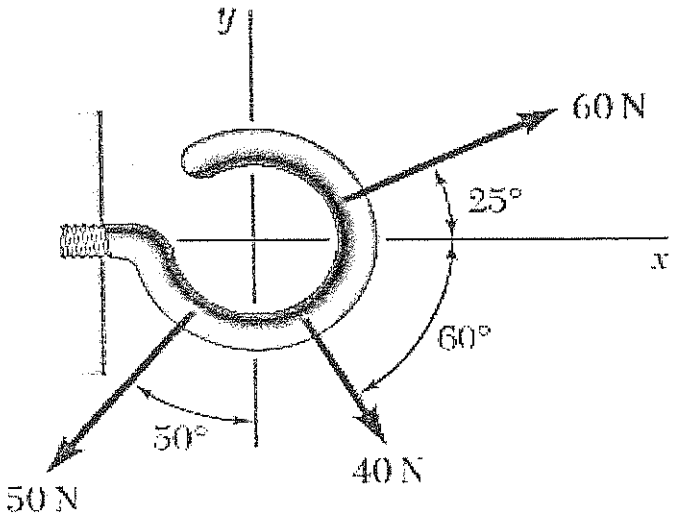

Figure 1

Question 2

The undeformed length of the spring AB in Figure 2 is l'_{AB} = 0.4 m, and the spring has a stiffness of k_{AB} = 300 N/m.

(a) Draw free body diagram

(2 marks)

(b) determine tension in cable AB and AC, and

(6 marks)

(c) determine the required length of the cord AC so that the 8kg lamp is suspended.

(12 marks)

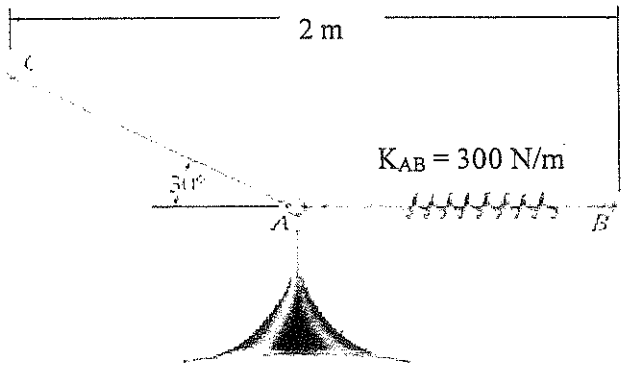

Figure 2

Question 3

(a) Define velocity and acceleration.

(4 marks)

(b) A boat travels along a straight line to the right with a velocity of $v = (4t - 3t^2)$ m/s where t is in seconds. Also, s = 0 when t = 0. When t = 4 s, Find ;

I. the position of the boat When t = 4 s, and

(8 marks)

II. the acceleration of the boat When t = 4 s.

(8 marks)

SECTION B (Total: 40 marks)

INSTRUCTION: Answer only TWO (2) questions.
Please use the answer booklet provided.

Question 4

Determine the location of the centroid of the composite plate area as shown in Figure 3.

(20 marks)

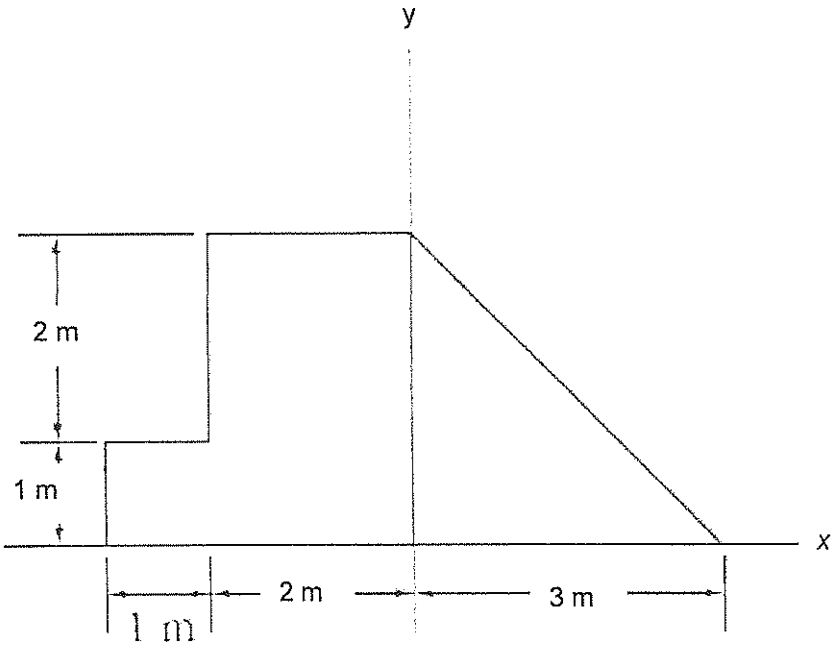

Figure 3

Question 5

Two blocks are joined by a cable as shown in Figure 4 below. If the system is released from rest, determine the velocity of block *A* after it has moved 2 m. Assume that the coefficient of friction between block *A* and the plane is $\mu_k = 0.25$ and that the pulley is weightless and frictionless.

(20 marks)

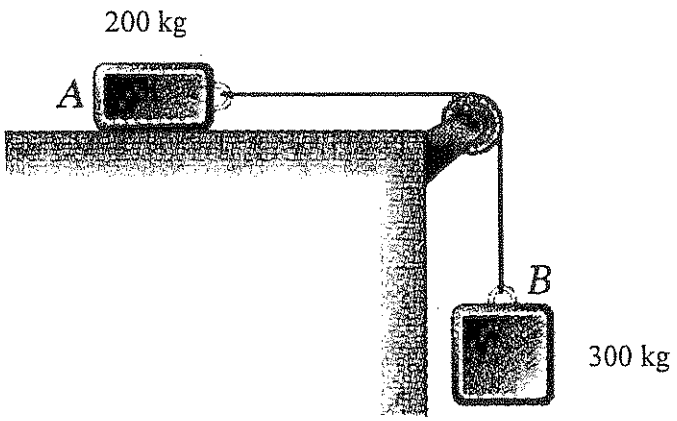

Figure 4: Two blocks are joined by a cable

Question 6

a) Describe the meaning of impact.

(4 marks)

b) Small model Boat A in Figure 5 has a mass of 3 kg and is sliding on a rough horizontal surface with a velocity $(v_A)_1 = 2\ \mathrm{m/s}$ when it makes a direct collision with boat B, which has a mass of 2 kg and is originally at rest. If the collision is perfectly elastic (e = 1) and the coefficient of kinetic friction between the blocks and the plane is $\mu_k = 0.3$, determine

i. the velocity of each boat just after collision

(6 marks)

ii. the distance of each boat A and boat B slides after collision, and

(6 marks)

iii. the distance between the boat after collision (when they stop sliding).

(4 marks)

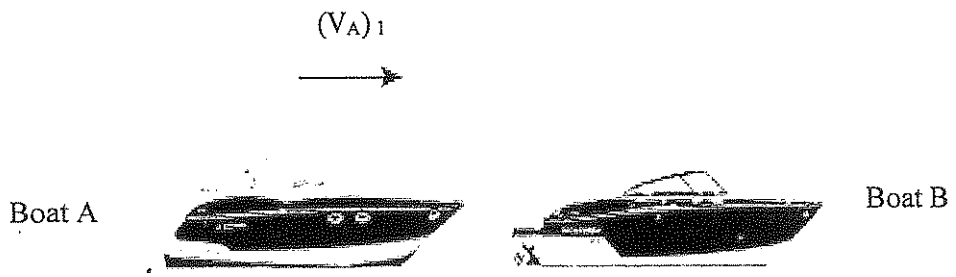

Figure 5: The small boat model A slides on horizontal surface and collides with boat B

END OF EXAMINATION QUESTIONS