UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF MARINE ENGINEERING TECHNOLOGY

FINAL EXAMINATION
JANUARY 2016 SEMESTER

COURSE CODE	:	LMD22703
COURSE NAME	:	STATIC AND DYNAMICS
PROGRAMME NAME (FOR MPU: PROGRAMME LEVEL)	:	DIPLOMA OF ENGINEERING TECHNOLOGY IN MARINE ENGINEERING
DATE	:	23 MAY 2016
TIME	:	09.00 AM – 11.30 AM
DURATION	:	2 HOURS 30 MINUTES

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 questions in Section A. For Section B, answer TWO (2) questions only.

5. Please write your answers on the answer booklet provided.

6. Answer all questions in English language ONLY.

THERE ARE 4 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 60 marks)

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

Question 1

One box had lifted by three ropes as shown in the Figure 1. If the value of α is 50° and the resultant force is in y-positive direction;

(a)   Draw the Vector diagram to show the force acting to the box.

(8 marks)

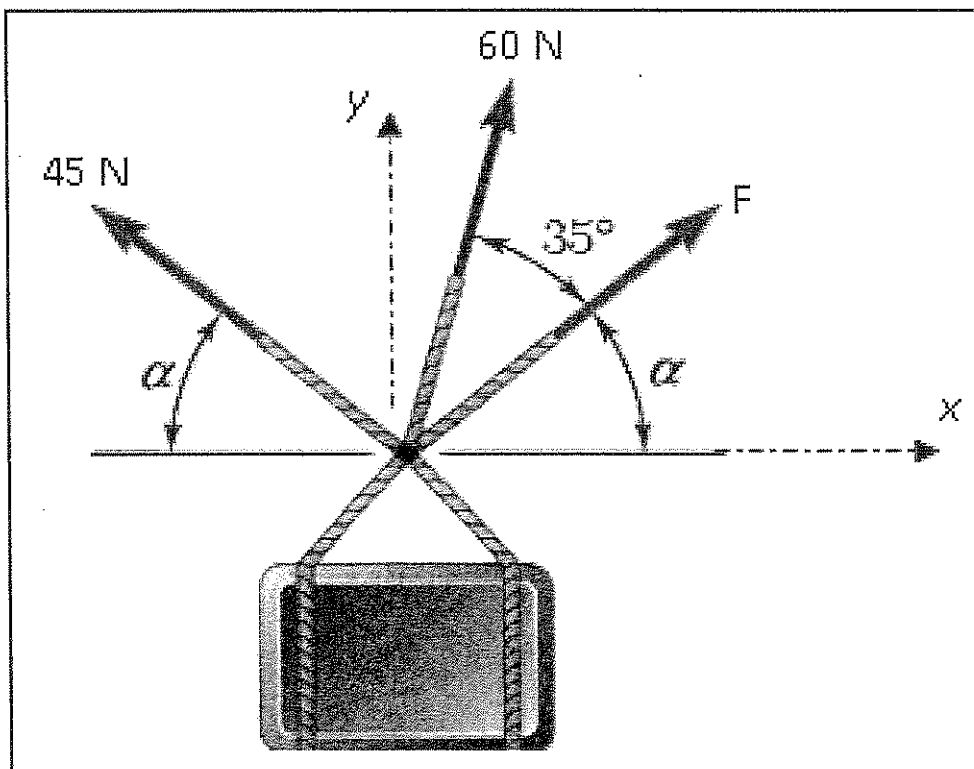(b)   From the diagram, determine the magnitude force of Resultant Force and F.

(12 marks)

Figure 1

Question 2

A particle move along the X axis with an initial velocity, $Vx = 50$ m/s at the origin when $t = 0$. For the first 4s it has no acceleration and thereafter it is acted upon by a retarding force which gives it a constant acceleration $ax = -10$ m/s².

(a)   Calculate the velocity and the X coordinate of the particle for the conditions of t = 8s
        and t = 12s.

(16 marks)

(b)   Find the maximum positive X coordinate reached by the particle.

(4 marks)

Question 3

The simple truss as shown in the Figure 3 is exerted by the vertical force 500N. The forces
members is need to be calculated so that the structure are rigid in the right position.

(a)   Determine the force in members of AB, BC and AC of the structure.

(11 marks)

(b)   Determine the reaction forces at A and D.

(6 marks)

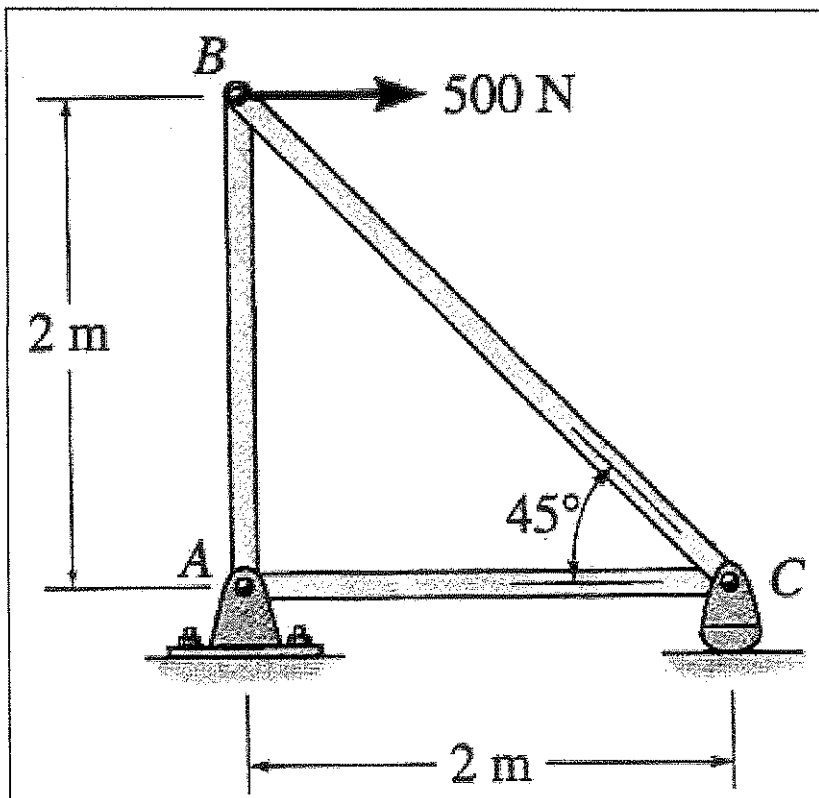(c)   Identify the members whether they are in tension or compression.

(3 marks)

Figure 2

SECTION B (Total: 40 marks)

INSTRUCTION: Select Two (2) Questions.
Please use the answer booklet provided.

Question 4

The composite plate area shown in Figure 3 is composed from steel materials with homogenous thickness. Locate the centroid of the plane area and shows the center point by redraw the area.
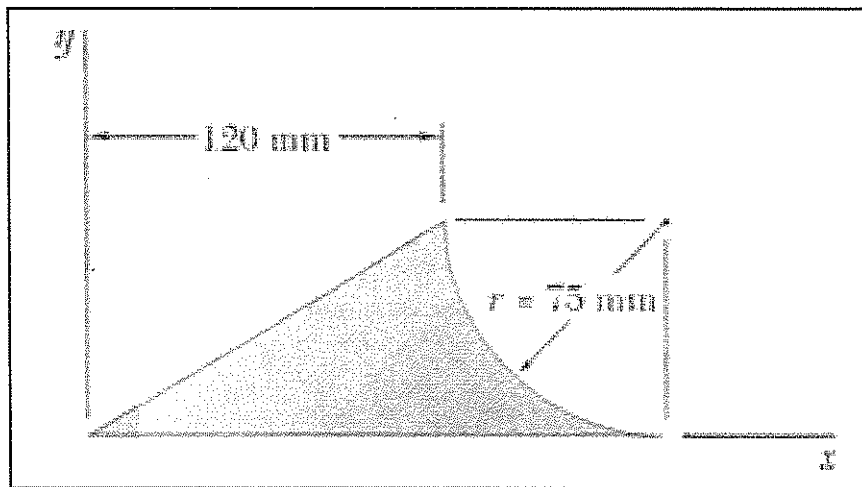

Figure 3

(20 marks)

Question 5

The man and his bicycle has shown in Figure 4 have a combined mass of 110 kg. He started to riding from rest up a 5 percent grade and achieved the speed of 20 km/h within 5 seconds, after that he maintained the speed until end of the grade and required 2 minutes.

(a)   Sketch the free body diagram of the subject.

(3 marks)

(b)   Determine the maximum acceleration and the total length of riding?

(13 marks)

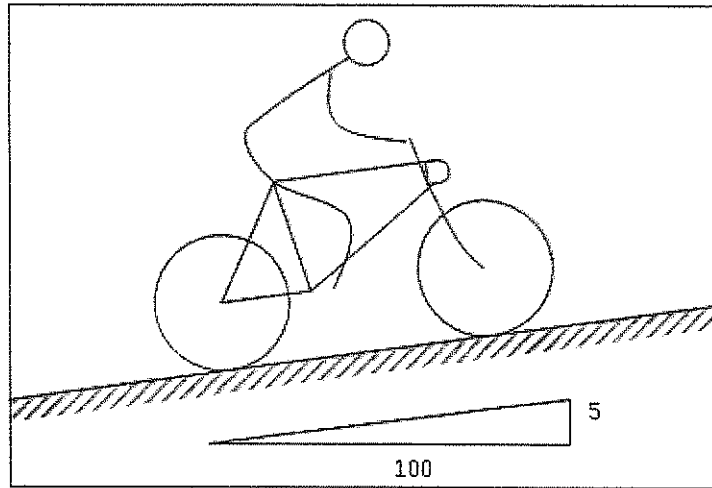(c)   Calculate the total power P generated by the men?

(4 marks)

Figure 4

(20 marks)

Question 6

At an intersection, car B was traveling south and car A was traveling 30^0 north of east when they slammed into each other. Upon investigation, it was found that after the crash, the two cars got stuck and skidded off at an angle of 10^0 north of east. Each driver claimed that he was going at the speed limit of 50 km/h and that he tried to slow down but couldn't avoid the crash because the other driver was going a lot faster. Knowing that the masses of car A and B were 1500 kg and 1200 kg, respectively, determine;

(a)   Which car was going faster?

(16 marks)

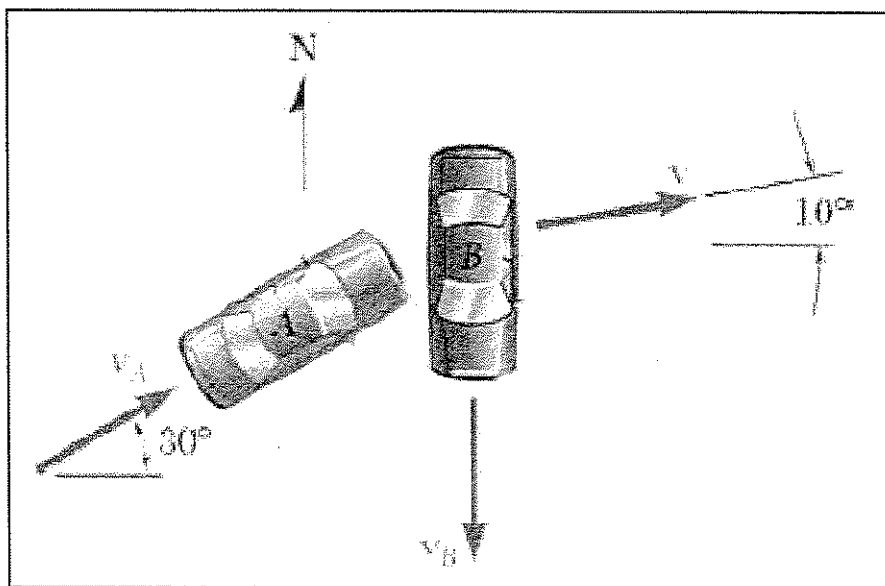(b)   The speed of the faster cars if the slower car was traveling at the speed limit.

(4 marks)

Figure 5

END OF EXAMINATION PAPER