UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION
JANUARY 2014 SESSION

SUBJECT CODE	:	**FVB 21503**
SUBJECT TITLE	:	**ENGINEERING SCIENCE 2**
LEVEL	:	**BACHELOR**
TIME / DURATION	:	**2.5 HOURS** 3.30 pm - 6.00 pm
DATE	:	0 2 JUN 2014

INSTRUCTIONS TO CANDIDATES

1. This is an OPEN BOOK examination.

2. Please read the instructions given in the question paper CAREFULLY.

3. This question paper is printed on both sides of the paper.

4. Please write your answers in the answer booklet provided.

5. Answer should be written in blue or black ink except for sketching, graphic and illustration.

6. This question paper consists of SIX (6) questions. Answer FIVE (5) questions only.

THERE ARE 5 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

INSTRUCTION: Answer FIVE (5) questions only.

Total Marks = 100

Question 1

(a) In the figure 1, a beam of 3m long weighing 400N is suspended in a horizontal position by two vertical strings, each of which can withstand a maximum tension of 350 N only. Calculate how far a body of 200N weight can be placed on the beam, so that one of the strings may just break.
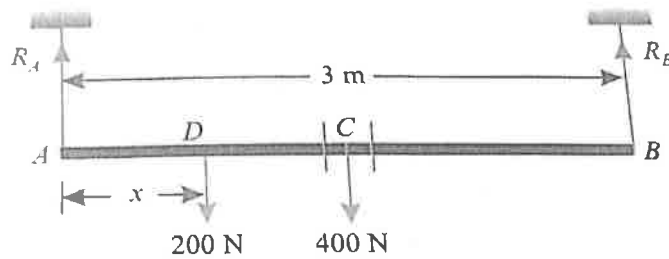

FIGURE 1

(5 marks)

(b) Three forces of 2P, 3P and 4P act along the three sides of an equilateral triangle of side 100mm taken in order as shown in figure 2. Find the magnitude and position of the resultant force.
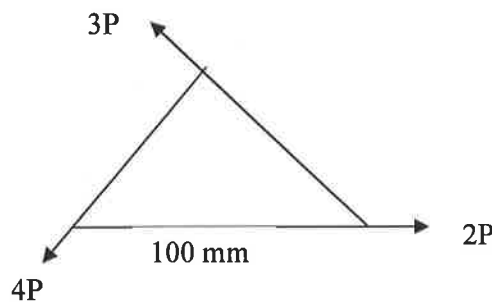

FIGURE 2

(15 marks)

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Question 2

(a) Determine the moment at point A for the forces as shown in figure 3.

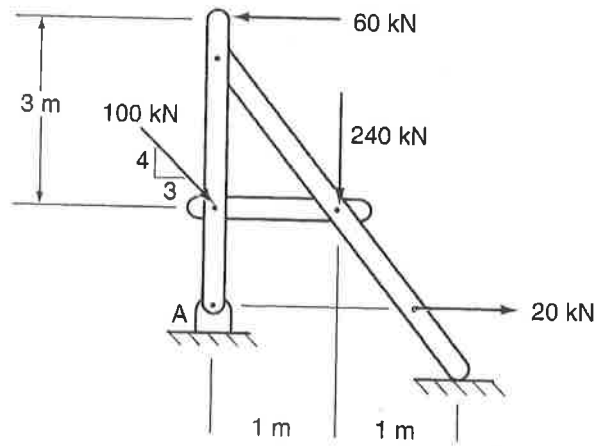

FIGURE 3

(5 marks)

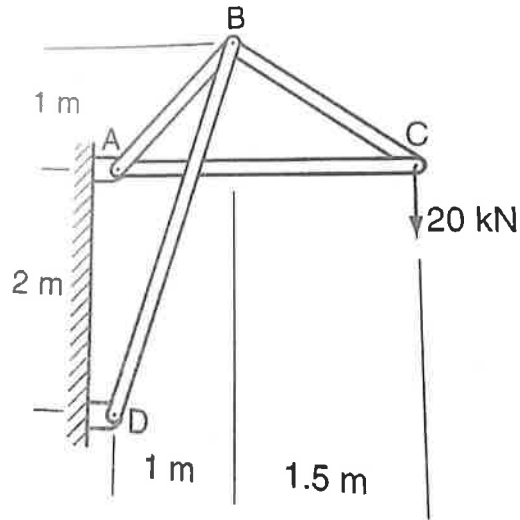(b) Determine the force in each member of the truss as shown in figure 4.

FIGURE 4

(15 marks)

Question 3

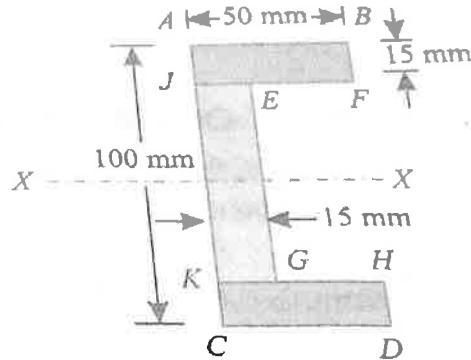(a) Determine the centre of gravity of a channel section 100mm x 50 mm x 15mm as shown in Figure 5.

FIGURE 5

(5 marks)

(b) Determine what load can be lifted by an effort of 120 N, if the velocity ratio is 18 and efficiency of the machine at this load is 60%.

(15 marks)

Question 4

(a) A canned-goods dispenser has a vertical column of 10 cans, each having a mass of 1 kg as shown in figure 6. The cans fit loosely in the vertical slot, and the coefficient of friction is 0.2 for all surfaces. Calculate the force P that is required to pull the bottom can out.
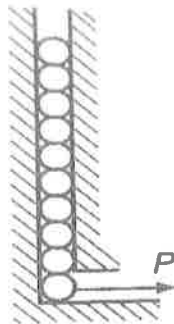

FIGURE 6

(5 marks)

(b) A car travelling at 120km/h passes by a parked police car. If it takes 5 seconds to start the police car, which then accelerates at 3 m/s² to a maximum speed of 150km/h, calculate how far does the police car travel in overtaking the speeding car, which maintains a speed of 120km/h?

(15 marks)

Question 5

(a) A rotating drive shaft decelerates uniformly from 900 rpm to 650 rpm in 6 seconds. Determine the angular deceleration and the total number of revolutions in the 6-second interval.

(5 marks)

(b) Determine the acceleration of block B as shown in figure 7 if the system is released from rest. Assume cylinder A does not slip.
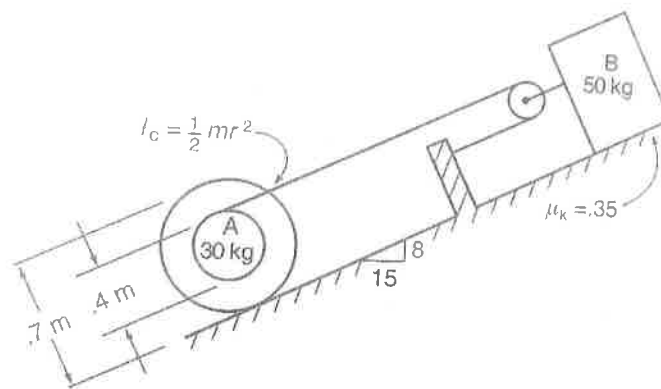

FIGURE 7

(15 marks)

Question 6

(a) Starting from rest, car A accelerates at 2.5m/s² to the east. Starting at the same point at the same time, car B accelerates at 2 m/s² to the north. At t = 10 seconds, determine the distance, velocity and acceleration of B with respect to A.

(5 marks)

(b) Determine the velocity of the cart as shown in figure 8 if, starting from rest, it has moved 2 m down the slope. Neglect the weight of the pulley and cable.
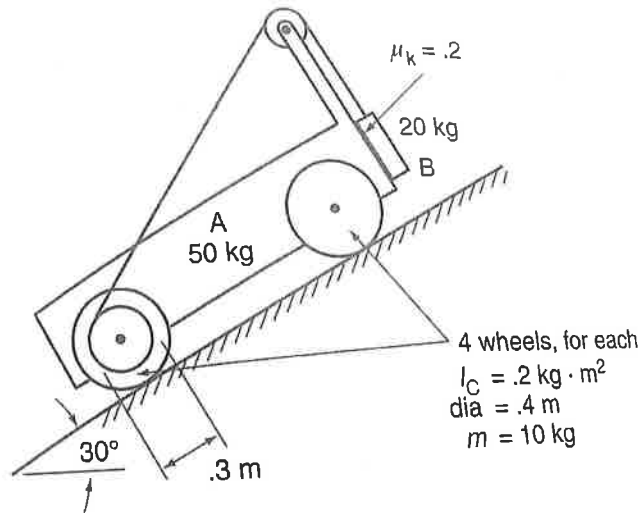

FIGURE 8

(15 marks)

END OF QUESTION