



UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION
JANUARY 2011 SESSION

SUBJECT CODE : FMB 15203
SUBJECT TITLE : STATICS
LEVEL : BACHELOR
TIME / DURATION : 3.30pm – 6.30pm
(3 HOURS)
DATE : 11 MAY 2011

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 FIVE questions. Answer four (4) questions only. Show the works.
6. Answer all questions in English.

THERE ARE 6 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

INSTRUCTION: Answer FOUR (4) questions only.

Please use the answer booklet provided.

Question 1

- (a) With the aid of a diagram and/or equation, explain the meaning of 'equilibrium of particle' and the condition to maintain it.

(3 marks)

(b)

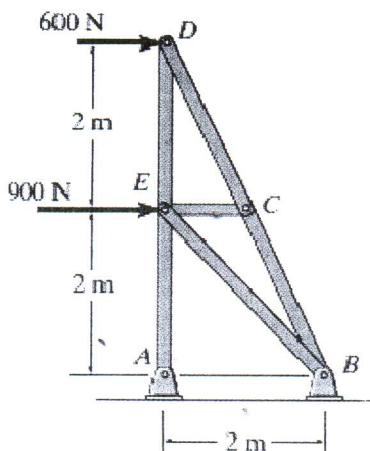


Figure 1(b)(i)

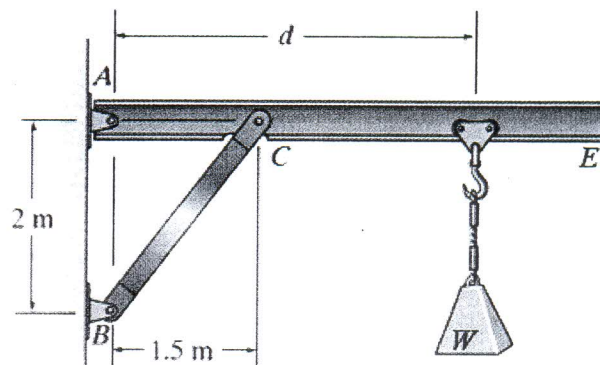


Figure 1(b)(ii)

- Figure 1(b)(i) shows a plane truss ABCED supported at A and B. The truss is subjected to horizontal loads of 600 N and 900 N at points D and E respectively. Draw the Free Body Diagram of member AED and label all the appropriate forces.
- Figure 1(b)(ii) shows a cantilever beam ACE attached to a wall at A and supported by a link BC at C. A load W, hangs at a distance d from point A. Draw the Free Body Diagram of member ACE and label all the appropriate forces.

(6 marks)

(6 marks)

- (c) Figure 1(c) shows a simply supported beam ABC with a total span of 6 m supported by a pin at A and a roller at B. Span AB is subjected to a distributed loading varying from 0 kN/m at A to 8 kN/m at B, while span BC is subjected to a distributed loading varying from 8 kN/m at B to 4 kN/m at C. In addition, a moment of 900 Nm in an anti-clockwise direction acts at A. Calculate the reactions at A and B.

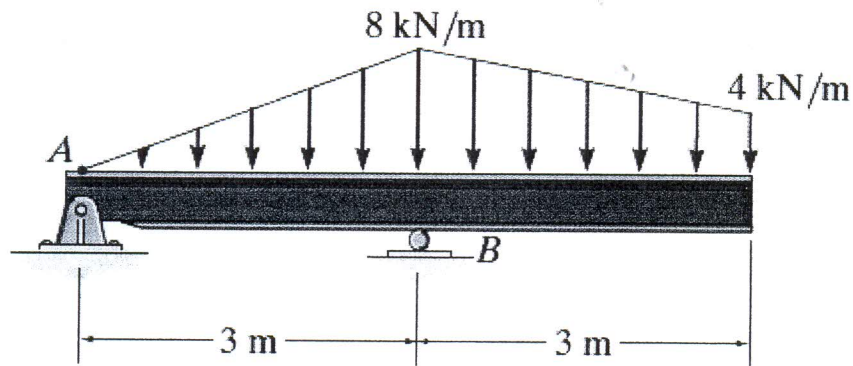


Figure 1(c)

(10 marks)

Question 2

- (a) Discuss the advantages of using the Cartesian vector notation as compared to scalar notation to solve a three dimensional force system.

(5 marks)

- (b) A 75 kg cylinder is suspended from a ring via a cable as shown in Figure 2(b). The ring is connected to cables AB, AC and AD which are tied to point B, C and D, respectively. Point D is located on the XY-plane, whereas point B and C lie in the left and right quadrants on the ZY-plane. Using the equilibrium equations, determine the tension developed in cables AB, AC, and AD.

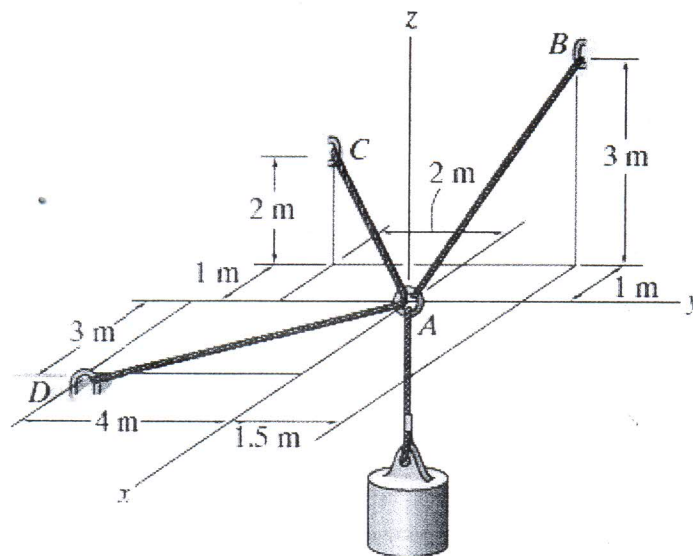


Figure 2(b)

(20 marks)

Question 3

- (a) Refer to Figure 3(a). The suspender bar supports the 600 N engine. Draw the shear and moment diagrams for the bar.

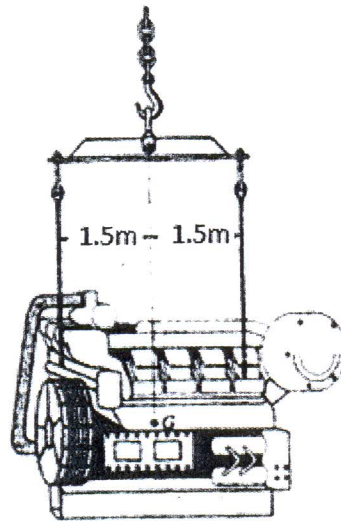


Figure 3(a)

(13 marks)

- (b) Refer to Figure 3(b). The shaft is supported by a thrust bearing at A and a journal bearing at B. if $L = 10$ m the shaft will fail when the maximum moment is $M_{\max} = 5$ kN.m. Determine the largest uniform distributed load w the shaft will support.

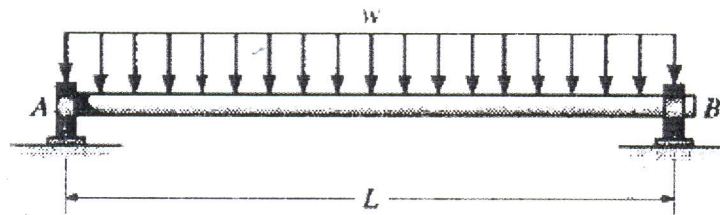


Figure 3(b)

(12 marks)

Question 4

- (a) With the aid of a diagram and/or equation, explain the meaning of Moment of a Force, Bending Moment, Area Moment of Inertia and Shear force.

(5 marks)

- (b) Referring to Figure 4(b), using the method of joint, determine the force in each member of the truss shown, state whether each member is in tension or compression?

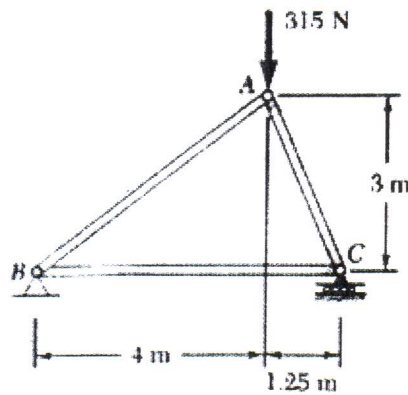


Figure 4(b)

(20 marks)