



UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION
JANUARY 2011 SESSION

SUBJECT CODE : FMB 10202
SUBJECT TITLE : DYNAMICS
LEVEL : BACHELOR
TIME / DURATION : 2.00pm – 4.30pm
(2.5 HOURS)
DATE : 03 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 (5) questions. Answer FOUR (4) questions only.
6. Answer all questions in English ONLY.

THERE ARE 2 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

INSTRUCTION: Answer ANY four (4) questions.

Please use the answer booklet provided.

Question 1

- (a) Explain the fundamental differences between the following terms:-
- i. distance and displacement
(5 marks)
 - ii. speed and velocity
(5 marks)
- (b) An object moves in a linear path from rest to 100 km / hr in 25 s. It then slows down to a complete stop in 15 s.
- i. Sketch the graph of velocity versus time for the object.
(5 marks)
 - ii. Determine the acceleration for the object in 25 s and 40 s of motion.
(5 marks)
 - iii. Calculate the displacement for the entire motion of the object.
(5 marks)

Question 2

- (a) A particle moves along a vertical straight line with an acceleration $a = 2s^2$. When $t = 4$ s, its displacement is 44 m, and its velocity is 88 m / s. Determine the velocity and acceleration of the particle when $t = 8$ s.
(15 marks)
- (b) A kite flying in the wind rises with a velocity of 10 m / s when it is cut loose. Assuming its height from the ground at the time of release is 100 m; find the time taken for the kite to reach half a kilometer above the ground.

(10 marks)

Question 3

- (a) An object's path is $y = 25x^2$ with speed as a constant, and x and y in units of meters. Find the tangential component of acceleration for the object.

(10 marks)

- (b) A particle's path is given by $7x^2$ with its velocity having a constant horizontal component of 100 m / s. The particle begins motion at the origin. Find (in terms of time), the components for acceleration, velocity and displacement.

(15 marks)

Question 4

A vehicle moves on a path given by the velocity vector of $v = (22t^2 \mathbf{i} + 44t \mathbf{j} - 88\mathbf{k})$ m / s.

- (a) After 10s have elapsed, find the coordinates of its position.

(8 marks)

- (b) Calculate the equation of its path.

(8 marks)

- (c) When $t = 10$ s, calculate the projection of the velocity vector in the direction of the vector $n = (2\mathbf{i} + 4\mathbf{j} + 6\mathbf{k})$.

(9 marks)

Question 5

- (a) Define and explain the following terms: - energy, work, and power.

(12 marks)

- (b) A 100 kg concrete block is dropped 100 m onto a spring-like mechanism, with a stiffness (modulus) value of 2 kN / cm. Find the speed of the block when the spring deforms 0.75 m and 1.25 m.

(13 marks)

END OF QUESTION