Part 1: 11 Multiple Choice Questions (1 mark each)

1) What is the average speed of a car that travels a distance of 10 km in 30 min?

a) 20 km/h. b) 30 km/h. c) 10 km/h. d) 40 km/h. e) 50 km/h.

2) Which has zero acceleration? An object

a) in mechanical equilibrium. b) moving at constant velocity.

c) at rest. d) all of the above e) None of the above.

3) A sheet of paper can be withdrawn from under a container of milk without toppling it if the paper is jerked quickly. This best demonstrates that

a) there is an action-reaction pair of forces.

b) gravity tends to hold the milk carton secure.

c) the milk carton has inertia.

d) the milk carton has no acceleration.

e) none of these.

4) An object is in a downward free-fall. At one instant, it travels at a speed of 37 m/s. Exactly 2 s later, its speed is about

a) 37 m.s. b) 10 m.s c) 57 m.s d) 17 m.s e) 20 m.s

5) A ball is thrown upwards and caught when it comes back down. In the presence of air resistance, the speed with which it is caught is
a) less than the speed it had when thrown upwards..
b) more than the speed it had when thrown upwards.
c) the same as the speed it had when thrown upwards.
d) anything is possible.
e) depends on air speed.

6) An object following a straight-line path at constant speed
a) must be moving in a vacuum or in the absence of air drag.
b) has zero acceleration.
c) has no forces acting on it.
d) has a net force acting upon it in the direction of motion.
e) none of the above.

7) A 7-kg ball is thrown at 10 m/s straight upward. Neglecting air resistance, the net force that acts on the ball when it is half way to the top of its path is about

a) 10 N. b) 5 N. c) 35 N. d) 70 N. e) None of the above.

8) Consider two objects A and B. Object A is a 3 kg iron block and Object B is a 6 kg iron block. Which of the following is true?

a) Object A has the same inertia as object B.

b) Object A has twice as much inertia as object B.

c) Object B has twice as much inertia as object A.

d) Object A has twice as much weight as object B.

e) There is not enough information.

9) A skydiver steps from a helicopter and falls for 5 s before reaching his terminal velocity. During this 5-s interval, his acceleration
a) is zero.
b) is constant.
c) increases.
d) decreases.
e) None of the above.

10) A rock is thrown vertically into the air. At the top of its path, its acceleration in m/s^2 is about
a) 10 .
b) zero.
c) between 0 and 10..
d) greater than 10.
e) None of the above.

11) An object travels 8 m in the first second of travel, 8 m again during the second second of travel, and 8 m again during the third second. Its acceleration in m/s^2 is
a) 5 b) 10 c) 0 d) 8 e) more than 10

Part 2: Solve the following three problems in the space provided in between showing all your steps (3 marks each)

Problem 1: A 2000-kg car experiences a braking force of 10,000 N which brought it to a stop in 6 s. Calculate the speed of the car just before the brakes were applied.

Problem 2: A 3 kg block is accelerating to the right at 6 m/s^2 under the effect of three forces as shown in the figure. What is the value of the unknown force F2?