1) During the first 18 minutes of a 1.0-hour trip, a car has an average speed of 11 m/s. What must the average speed of the car be during the last 42 minutes of the trip be if the car is to have an average speed of 21 m/s for the entire trip?

(a) 21 m/s

(b) 25 m/s

(c) 29 m/s

(d) 23 m/s

(e) 27 m/s

2) A delivery truck leaves a warehouse and travels 2.60 km north. The truck makes a right turn and travels 1.33 km east before making another right turn and then travels 1.45 km south to arrive at its destination. What is the magnitude and direction of the truck’s displacement from the warehouse?

(a) 1.76 km, 40.8° north of east

(b) 1.15 km, 59.8° north of east

(c) 1.33 km, 30.2° north of east

(d) 2.40 km, 45.0° north of east  
(e) 5.37 km, 49.2° north of east

3) Which one of the following terms is used to indicate the natural tendency of an object to remain at rest or in motion at a constant speed along a straight line?

(a) velocity  
(b) force   
(c) acceleration  
(d) equilibrium  
(e) inertia

4) A 15-N net force is applied for 6.0 s to a 12-kg box initially at rest. What is the speed of the box at the end of the 6.0-s interval?

(a) 1.8 m/s (b) 15 m/s (c) 3.0 m/s (d) 7.5 m/s (e) 30 m/s

5) A horse pulls a cart along a flat road. Consider the following four forces that arise in this situation.

(*1*) the force of the horse pulling on the cart (*3*) the force of the horse pushing on the road

(*2*) the force of the cart pulling on the horse (*4*) the force of the road pushing on the horse

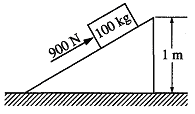
Which two forces form an "action-reaction" pair that obeys Newton's third law?

(a) *1* and *4*

(b) *1* and *3*(c) *2* and *4*(d) *3* and *4*(e) *2* and *3*

6) A new planet is discovered that has twice the Earth’s mass and twice the Earth's radius. On the surface of this new planet, a person who weighs 500 N on Earth would experience a gravitational force of

(A) l25 N (B) 250 N (C) 500 N (D) 1000 N (E) 2000 N

7) A constant force of 900 N pushes a 100 kg mass up the inclined plane shown above at a uniform speed of 4 m/s. The power developed by the 900 N force is most nearly

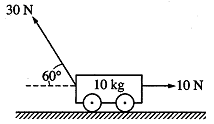
(A) 400 W  
(B) 800 W  
(C) 900 W  
(D) 1000 W  
(E) 3600 W

8) Two objects, A and B, initially at rest, are "exploded" apart by the release of a coiled spring that was compressed between them. As they move apart, the velocity of object A is 5 m/s and the velocity of object B is -2 m/s. The ratio of the mass of object A to the mass object B, mA/mB, is

(A) 4/25 (B) 2/5 (C) 1/1 (D) 5/2 (E) 25/4

9) How does an air mattress protect a stunt person landing on the ground after a stunt?

(A) It reduces the kinetic energy loss of the stunt person.  
(B) It reduces the momentum change of the stunt person.  
(C) It increases the momentum change of the stunt person  
(D) It shortens the stopping time of the stunt person and increases the force applied during the landing.  
(E) It lengthens the stopping time of the stunt person and reduces the force applied during the landing

10) The cart of mass 10 kg shown to the right moves without frictional loss on a level table. A 10 N force pulls on the cart horizontally to the right. At the same time, a 30 N force at an angle of 600 above the horizontal pulls on the cart to the left. What is the magnitude of the horizontal acceleration of the cart?

(A) 0.5 m/s2  
(B) 1.6 m/s2  
(C) 2.0 m/s2  
(D) 2.5 m/s2  
(E) 2.6 m/s2