Part 1. *(1.0 point each)*

Please circle ◯ the correct answer, to the nearest number for quantitative questions, for each of the following:

1. One object that has twice as much mass as another object also has twice as much

A) inertia. B) velocity. C) gravitational acceleration. D) volume.
E) all of the above.

2. An object weighs **30 N** on Earth. A second object weighs **30 N** on the Moon. Which has the greater mass?

A) the one on Earth. B) the one on Moon. C) They have the same mass.
D) all of the above. E) not enough information to say.

3. If you drop a ball from the edge of Kingdom Tower and air resistance is not ignored, while the ball is falling,

A) its speed and acceleration both increase.
B) its speed increases and its acceleration decreases.
C) its speed and acceleration both decrease.
D) its speed decreases and its acceleration increases.
E) its speed increases and its acceleration remains constant.

4. If you push a crate across a level floor at an increasing velocity, the friction between the crate and the floor is

A) less than the your pushing force. B) more than the your pushing force.
C) the same amount as your pushing force. D) none of the above.
E) all of the above.

5. Disregarding air resistance, an object falls at

A) constant speed. B) constant velocity. C) equal distance each second.
D) constant acceleration. E) decreasing acceleration.

6. 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
(***2***) the force of the horse pushing on the road
(***3***) 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) *3* and *4* C) *2* and *3* D) *1* and *2* E)*2* and *4*

7. Suppose that the horse and cart in **Question 6,** have started from rest; and as time goes on, their speed increases in the same direction. Which one of the following conclusions is correct concerning the magnitudes of the forces mentioned above?

(A) Force *1* exceeds force *2*.
(B) Force *3* exceeds force *4*.
(C) Force *3* is less than force *2*.
(D) Forces *1* and *2* have equal magnitudes.
(E) Force *2* exceeds force *4*.

8. Disregarding air resistance, how fast must you through a ball straight upward in order to remain in the air for a total time of **2 s**?

A) 5 m/s. B) 7.5 m/s C) 10 m/s. D) 15 m/s. E) 20 m/s.

9. A force of **120 N** is applied to an object whose mass is **30 kg**. The object's acceleration (in $\mathbf{m/s^2}$) is

A) 3600 B) 150 C) 4.0 D) 2.0 E) 0.25.

10. When a **10 kg** falling object encounters **10 N** of air resistance, its acceleration is

A) less than g . B) g. C) more than g. D) zero.
E) there is not enough information.

11. When the net force that acts on a hockey puck is **10 N**, the puck accelerates at a rate of $\mathbf{50\ m/s^2}$. The mass of the puck is

A) 0.2 kg B) 5 kg C) 50 kg D) 1.0 kg E) 10 kg

Part 2:

Please read each of the following questions carefully and show your work in the space provided. Include the appropriate units with your answer. ***(3 points each)***

P1. 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?

Answer (with Units)_____

P2. 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?

Answer (with Units)_____

Good Luck

Some useful constants:

$g=10\ m/s^2$ $g_{Moon}=(1/6)\ g_{Earth}$