**Exam 1 study guide**

**Chapter 1**

1. Given the following equation, solve for q in terms of F and E. F = q E

2. Solve the following for W in terms of P and t. P = W / t

3. Solve the following for a in terms of x and t. x = 1/2 (a t2)

4. One inch equals 2.54 centimeters. How many inches are equivalent to 7.00 centimeters?

5.

1. How many centimeters are there in one yard?
2. How many meters are there in one yard?
3. How many millimeters are there in one yard?

6. An object has a mass of 2.61 megagrams. Convert this to a) kilograms and to b) grams.

7. Solve the following for v in terms of K and m. K = 1/2(mv2)

8. A recipe calls for 200 milligrams of sugar to produce enough cake to feed 8 people. How much sugar is required if you want to produce enough cake to feed 10 people?

9. How many kilometers are there in one mile?

10. How many millimeters are there in 26.34 m?

**Chapter 2**

1. A person covers a distance of 320 miles in a travel time of 8 hours. What is the speed for this trip?

2. A car travels with an average speed of 55 miles/hr. What is this speed in

1. km/hr?
2. km/s?
3. m/s?

3. The velocity of a car moving in a straight line increases from 8 m/s to 22 m/s in 7 seconds. What is the average acceleration of the car during this period?

4. Starting from rest and moving in a straight line, a runner achieves a speed of 7.0 m /s in a time of 4.5 seconds. Determine the average acceleration of the runner.

5. The velocity of a car decreases from 25 m/ s to 12 m / s in a time of 4.2 seconds. What is the average acceleration of the car?

6. A car initially at rest accelerates at the constant rate of 2.0 m / s2 for a time of 5.0 seconds. Determine:

1. the velocity of the car after 5.0 seconds.
2. the distance the car traveled during this process.

**Chapter 3**

1. A rock is dropped from the edge of a cliff. If the initial velocity of the rock was zero and if air resistance can be neglected, calculate the velocity of the rock two seconds after it is released.

2. Calculate the displacement of the rock in Problem 1 two seconds after it is released.

3. If the rock in Problem 1 had been thrown downward with an initial speed of 5 m/s calculate its velocity two seconds after it was released.

4. Calculate the displacement of the rock in Problem 3 two seconds after it is released.

5. If the rock in Problem 1 had been thrown upward with an initial speed of 5 m/s calculate its velocity two seconds after it was released.

6. Calculate the displacement of the rock in Problem 5 two seconds after it is released.

7. A car starts from rest with a constant acceleration of 2 m/s2. Calculate its speed after 3 seconds.

8. Calculate the displacement of the car in Problem 7 after 3 seconds.

9. A car moving with an initial velocity of 20 m/s slows down at a rate of 3 m/s2. Calculate its speed after 4 seconds.

10. A major league pitcher can throw a baseball at a speed of 90 miles/hour (40.2 m/s). Home plate is located 60 feet 6 inches (18.44 m) from the pitcher's mound. A baseball announcer claims that the pitch traveled on a straight-line path to home plate because it was thrown so fast. Show that his claim is wrong by calculating how far the ball drops in its trip to home plate.

**Chapter 4**

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| 1. A force of 20 N acts upon a 5 kg block. Calculate the acceleration of the object.   2. An object of mass 300 kg is observed to accelerate at the rate of 4 m/s2. Calculate the force required to produce this acceleration.    3. A 5 kg block is pulled across a table by a horizontal force of 40 N with a frictional force of 8 N opposing the motion. Calculate the acceleration of the object.    4. An object of mass 30 kg is in free fall in a vacuum where there is no air resistance. Determine the acceleration of the object.    5. An object of mass 30 kg is falling in air and experiences a force due to air resistance of 50 newtons.1. Determine the net force acting on the object and
2. calculate the acceleration of the object.

6. A student pushes on a crate with a force of 100 N directed to the right. What force does the crate exert on the student?    7. A force of 200 N is exerted on an object of mass 40 kg that is located on a sheet of perfectly smooth ice.1. Calculate the acceleration of the object.
2. If a second object identical to the first object is placed on top of the first object, what acceleration would the 200 N force produce?

8. Just before opening her parachute a skydiver of mass 50 kg reaches terminal velocity. Calculate the force of air resistance.    9. For a person who has a mass 60 kg, calculate the weight in newtons and in pounds.    10. An object of mass 10 kg is accelerated upward at 2 m/s2. What force is required?     |

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