**Forces and Motion Test—Study Guide**

1. What is motion? Define it. How do we describe motion?
2. How do we measure motion?
   1. What is velocity?
   2. What is acceleration?
3. What is the formula for velocity?
   1. If an object travels 875 meters in 50 seconds what is its velocity?
   2. A car is traveling at 225 m/s in 60 seconds, how far did it travel?
   3. A dirt bike rider is traveling at 75 m/s and travelled a distance of 5 meters, how long would it take to travel that distance?
4. What is the formula for acceleration?
   1. A plane passes over Point A with a velocity of 8,000 m/s north. Forty seconds later, it passes over Point B with a velocity of 10,000 m/s north. What was the acceleration of the plane between point A and B?
5. By definition, what is a force?
   1. What does it mean when forces are balanced?
   2. What does it mean when forces are unbalanced?
6. Calculate the net force of the following situations.

35 N

5 N

a.

+

30 N

15 N

b. +

1. Explain what the universal law of gravity is.
2. How does mass affect the gravitational pull exerted by an object? i.e. what is the relationship between mass and gravitational pulls
3. How does distance affect the gravitational pull exerted by an object?
4. Who is credited with theorizing the existence of gravity?
5. What is the difference between weight and mass?
6. What is the acceleration of objects due to gravity on Earth?
7. What does it mean for an object to be in free fall?
   1. What does it mean for an object to be in free fall. Give an example
8. How does air resistance affect free fall?
   1. What is terminal velocity?
9. What is an orbiting object?
   1. Explain how orbiting occurs**. Be able to apply it to specific examples and situations.**
10. What is projectile motion? Explain it. What two types of motion are involved in projectile motion? Be able to apply it to specific examples and situations.
11. What is friction?
    1. What are the different types of friction?
    2. What are some ways we can increase friction?
    3. What are some ways we can decrease friction?
12. What are Newton’s Three Laws of Motion? Be able to explain it in detail and give specific examples and real-life applications of these laws.
    1. Law of Inertia. Explain it and give some specific examples of its applications in real life.
       1. What is inertia?
    2. Newton’s Second Law. Explain it and give specific examples of its applications in real life. What is the formula? What might be some ways to test this law?
       1. Calculate the force produced by a mass of 45 kg accelerating at a rate of 2 m/s.
       2. What is the acceleration of a 10 kg mass that exerts a force of 35 N?
    3. Newton’s Third Law. Explain it and give specific examples of its applications in real life.
13. What is momentum?
    1. What does it mean to say that momentum is conserved?
    2. What is the formula for momentum?
    3. Calculate the momentum for an object with a mass of 85 kg moving at a velocity of 70 m/s west.