**Choose the best answer**

1. What value is constant for both the horizontal and vertical components of a projectiles motion?
   1. Displacement
   2. Acceleration
   3. Velocity
   4. Time
2. The acceleration due to gravity acts:
   1. Upward
   2. Downward
   3. Depends on the motion of the object
   4. Towards outer space
3. A bullet is fired at an angle of 450. Neglecting air resistance, what is the direction of acceleration during the flight of the bullet?
   1. Upward
   2. Downward
   3. Depends on the motion of the object
   4. At an angle of 450
4. A rocket is fired at 300. If the initial horizontal velocity is 326 m/s, what is the initial vertical velocity?
   1. 188 m/s
   2. 330 m/s
   3. 380 m/s
   4. 250 m/s
5. A golfer drives her golf ball from the tee down the fairway in a high arcing shot. When the ball is at the highest point of its flight
   1. The velocity and acceleration are both zero
   2. The x-velocity is zero and the y-velocity is zero
   3. The x-velocity is non-zero and the y-velocity is zero
   4. The velocity is non-zero and the acceleration is zero
6. A soccer ball is kicked at a 550 angle with an initial velocity of 8.0 m/s. What is the vertical velocity of the ball as it hits the ground?
   1. 8.0 m/s
   2. -6.6 m/s
   3. -8.0 m/s
   4. cannot be determined from given information
7. For a projectile, what is the acceleration in the x-direction?
   1. Depends on initial velocity
   2. 0 m/s2
   3. Depends on how long it is in the air
   4. Depends on the y-acceleration
8. A bullet is fired horizontally from a gun. At the same time a similar bullet is dropped from the same height. The fired bullet will:
   1. Hit the ground first
   2. Hit the ground second
   3. Hit at the same time as the dropped bullet
   4. Never hit the ground
9. A 10-kg weight and a 100-kg weight of the same size are dropped from the roof of a building. Which will hit first? (Ignore air resistance)
   1. They will hit at the same time
   2. The 100-kg weight
   3. The 10-kg weight
   4. Cannot be determined from the given information

**Show all work on a separate piece of paper**:

Answer each question as completely as possible. Neglect air resistance. Show all work, including a drawing (with positive/negative direction indicated), and an x-y table. Start with equations in general form (without numbers!), include the correct units and **box your final answer**. (assume unlimited Sig Figs for angles)

1. An egg is thrown horizontally off the roof of SI, which is 20. meters high, with an initial velocity of 6.5 m/s. How far from the base of the building does the egg land?
2. A car drives horizontally off a cliff 80. meters high. The car lands 100. meters from the base of the cliff. How fast was the car traveling when it left the cliff?
3. A cannonball is fired from the ground at an angle of 600 with an initial velocity of 200.0 m/s. What is the maximum height reached by the cannonball? How far will the cannonball travel before returning to the ground?
4. A ball is thrown from a height of 2.0 meters at an angle of 300 with an initial velocity of 30. m/s toward a building 65 meters away. How high from the base of the building does the ball hit? Is the ball rising or falling as it hits the building?