Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_

**TEST 2: PROJECTILE MOTION**

**I. Answer the following problems. Include all the work to receive full credit. Use a=g=±10m/s2.**

1. A football is kicked at an angle θo=20˚ with a velocity of 40.0 m/s. Calculate:
2. The time of travel before the football hits the ground \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. The maximum height \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. How far away it hits the ground \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Velocity of the projectile 2sec after being kicked \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Position (coordinate) of the projectile 2sec after being kicked (xx,xy) (\_\_\_\_\_\_\_ , \_\_\_\_\_\_\_)

2. A cannon releases a cannonball with a velocity of 200m/s at a certain angle

a. What angle must a cannonball be fired at in order to have a time of flight of 12s? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

b. What is the horizontal range? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Pirate monkeys on a boat are positioned at rest *100.0 m* from the base of a *40.0 m* high cliff. A cannon sits on the cliff and fires horizontally at the boat.

a. What must the horizontal velocity of the cannonball be to hit the boat? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

b. What is the velocity of the cannonball at the instant before it hits the boa t? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

c. Consider the boat moving with a constant speed of 5.00 m/s toward the cliff. At what velocity must the cannon be fired to hit the boat? (The cannon is fired when the boat is at *x=100.0 m*. \_\_\_\_\_\_\_\_\_\_\_\_\_





4. During volcanic eruptions, chunks of solid rock can be blasted out of the volcano; these projectiles are called volcanic bombs. The initial velocity of a volcanic bomb is 82.0 m/s at 35.0 degrees. Point A is 33,000m above point B.

1. How long does it take for the volcanic bomb to hit the ground? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Find the bomb’s velocity before it hits the ground (resultant) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Find the horizontal range of the bomb \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



