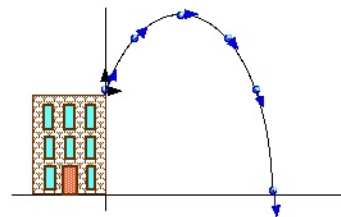


**Physics 3204
Projectile Motion**



Worksheet 5: Projectile Motion -Putting It Altogether

Student Name: _____

PART A: MULTIPLE CHOICE

Instructions: Shade the letter of the correct answer on the computer scorable answer sheet provided

1. Which expression represents the time it takes for a projectile, with initial velocity v_1 , at angle θ above the horizontal, to reach its maximum height?

- (A) $v_1 g \cos \theta$
 (B) $v_1 g \sin \theta$
 (C) $\frac{v_1 \cos \theta}{g}$
 (D) $\frac{v_1 \sin \theta}{g}$

2. What is the vertical speed component of a projectile that is launched at an angle of 20.0° to the horizontal with an initial speed of 30.0 m/s?

- (A) $30.0 (\cos 20.0^\circ)$
 (B) $30.0 (\sin 20.0^\circ)$
 (C) $\frac{30.0}{\sin 20.0^\circ}$
 (D) $\frac{30.0}{\cos 20.0^\circ}$

3. Which represents the range for a projectile launched horizontally with velocity, v , from height, h ?

(A)

$$v \sin \theta \sqrt{\frac{h}{4.9}}$$

(B)

$$-v \cos \theta \sqrt{\frac{h}{4.9}}$$

(C)

$$v \sqrt{\frac{h}{4.9}}$$

(D)

$$v \left(\frac{h}{4.9} \right)$$

4. A stone is thrown upward from the top of a building at an angle of 30.0° to the horizontal with an initial speed of 20.0 m/s. If the stone lands on the ground 4.22 s later, how tall is the building?

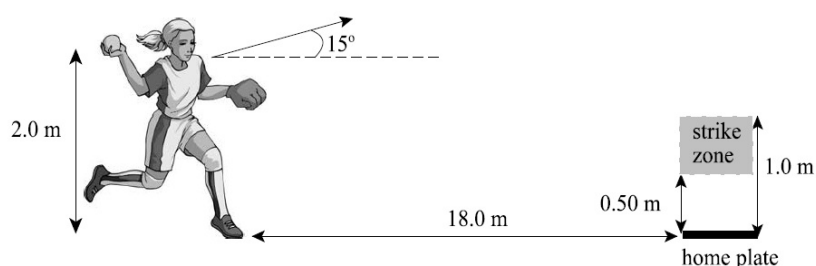
- (A) 14.2 m
 (B) 21.5 m
 (C) 45.1 m
 (D) 129 m

5. A golf ball is launched with an initial velocity, v_0 , at an angle θ above the ground. Which expression describes the time required for the golf ball to land on the ground?

- (A) $\frac{-2v_0}{a}$
- (B) $\frac{-2v_0 \cos \theta}{a}$
- (C) $\frac{-2v_0 \sin \theta}{a}$
- (D) $\frac{-v_0 \sin \theta}{a}$

PART B: WRITTEN RESPONSE

1. A strike in baseball occurs between 0.50 m and 1.0 m directly above home plate. A pitcher, 18.0 m from home plate, throws a ball with an initial velocity of 17.0 m/s at 15° above the horizontal. If the ball is released 2.0 m above the ground, will the pitch be a strike? Show workings. **JUNE 2006**



2. A fish sees a bug on a tree branch that is 4.1 m above the water, and tries to knock it down by shooting a jet of water with an initial velocity of 11.7 m/s at an angle of 35° to the surface of the water. With the aid of a diagram, calculate whether it is possible for the angler fish to hit the bug. **JUNE 2008**