Projectile - lab report example

Science, Physics

Projectile

September 8, Projectile Lab Introduction Projectile motion refers to a form of motion in which a body referred to as a projectile is catapulted obliquely near the surface of the earth. Using equations of motion, this motion can then be analyzed to find the distance, time and the speed the object moves with. This experiment’s main objective is to determine the velocity with which a projectile is launched with.

Methodology

Part A

The projectile was positioned in such a way that it launches the ball horizontally. The height where the ball leaves was then recorded. The ball was then pushed into the back making sure it does not move forward. A test shot was then made to determine where the ball lands after which a carbon paper was placed on the white sheet. The ball was then fired 6 different times and the distance travelled by the ball from where the ball leaves the launcher recorded.

Part B

The position of the launcher was made in such a way that the launcher launches the ball at 200 the steps in part A were then repeated and data recorded in table 2

Results and Calculations

Part A

Table 1 Distance traveled by ball (m)

3. 13

3. 24

3. 28

3. 35

3. 35

3. 40

Height of launcher = _____

Average Distance traveled by ball = ___3. 29_____

Part B

Table 2 Distance traveled by ball (m)

4. 69

4. 58

4. 70

4. 74

4. 76

4. 79

Average Distance traveled by ball = __4. 71_

Discussion and Answer to the questions

(1) Using your data in part A, calculate how fast the ball comes out of the launcher. SHOW YOUR WORK.

The initial Velocity= 0,

Therefore,

= 0. 82 seconds

Since the motion was in a horizontal direction, the

Thus the velocity of the ball was

= 8. 03 m/s

(2) The velocity of the ball out of the launcher is the same regardless of the

angle. Calculate how far the ball should travel in part B. SHOW YOUR WORK. Determine the percent error from the measured value of the distance traveled.

Solution

= 0. 97 S

Distance travelled by the ball is given by

Thus the distance is

= 26. 68 m

Percentage error =

(3) If the velocity in Part A is increased, will the ball reach the ground in a time greater than, equal to, or less than the time you calculated? Explain your answer with no calculations.

Solution

If the velocity is increased, the time taken for the ball to reach the ground will be more than the calculated speed. Considering the velocity equation, it’s clear that velocity is directly proportional to time thus an increase in velocity consequently increases the time.

(4) If this experiment is taken to the moon (g = 1. 6 m/s2), calculate how far the ball would go in Part B using the velocity from Part A.

Solution

V= 32. 27

a= 1. 6 m/s2

t= 0. 97 S

The distance travelled by the ball = (32. 27*0. 97) + (0. 5*-1. 6*0. 97)

= 31. 3019 + -8. 56928

= 30. 54918 m

Thus the distance the ball will travel on the moon is 30. 54918 meters.

(5) Look at the trajectories below. Which trajectory has the longest hang time? Explain clearly.

ABC

Solution

Trajectory labeled C has the longest hang time. This is because the distance travelled by the projectile is longer as compared to the other two i. e. A & B since distance travelled is directly proportional to hang time.

Conclusion

The experiment was successful since from the measured distance, it was possible to calculate the both the time and the velocity of the projectile.