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**NATIONAL UNIVERSITY OF SCIENCES AND TECHNOLOGY**

**Applied Physics (PHY-102)**

**Instructor: Muhammad Imran Malik**

**Lab 6: Projectile Motion**

**Class: BEE-12C**

**Dated: 24/01/2021**

**Group 2**

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**Assignment**

**Question 1:**

Calculate the time of flight of a projectile.

**Answer:**

We can drive the time of flight of a projectile using the 2nd equation of motion.

Since the projectile is reaching the same vertical displacement; S = 0.

Which is the time taken by projectile to cover entire trajectory on a level surface.

Now if the projectile were to start at a different initial height;

Vertically,

Assuming is parallel to the ground and y = 0,

Which is the time taken by the projectile launched from an initial height parallel to the ground.

**Question 2:**

A ball is launched from a mini-launcher making an angle of 40 from the ground.

1. How much initial velocity it requires so that it hits the ground which is 20 meters away at height of 2 meters.
2. How much time does the ball need to reach the target?

**Answer:**

We will be dividing the ball’s motion into two different parts; horizontal motion and vertical motion.

Horizontal Motion:

***(i)***

Vertical Motion:

***(ii)***

**Given:**

Using these values in ***(i)*** and ***(ii)***;

Substituting ***t*** in ***(ii)***:

Which is the initial velocity of the ball, substituting this velocity in ***(i)***;