**The National Orthodox School /Shmaisani**

**Subject: Physics Title: Collision HW**

**Name: Mark: \_\_\_/10**

1. A bullet of mass 0.1 kg traveling horizontally at a speed of 300 m/s embeds itself in a block of mass 3.5 kg that is sitting at rest on a nearly frictionless surface.
   1. What is the speed of the block after the bullet embeds itself in the block?

M1+m2xv

300(0.1+3.5)=1080m/s

* 1. Calculate the kinetic energy of the bullet and the block before the collision.

Ke=1/2(0.1+3.5) 1080^2

=4500j

* 1. Calculate the kinetic energy of the bullet and the block after the collision.

KE= ½(0.2+3.5)1080^2

2099520j

* 1. Was this collision elastic or inelastic? Explain your answer.

The collision was inelastic as the bullet went inside the block so it is inelastic

1. A 4500.0 kg pickup truck is moving at 15.0 m/s. A 2500.0 kg Tesla Model X is sitting at rest at a stop sign. The pickup truck collides with the Tesla and the cars DO NOT stick together. After the collision, the Tesla is moving at 12.0 m/s.
   1. What is the final velocity of the truck?

4500xv-2500x12=4500x15+2500x0

4500v-30000=67500

Velocity of the truck= 22.67m/s

* 1. What is the total initial kinetic energy of the two-car system?

Ke=1/2mv^2

=1/2(4500) 15^2

=506250

* 1. What is the total final kinetic energy of the two-car system?

Ke=1/2mv^2+1/2mv^2=1/2(4500)21.67+1/2(2500)12

Ke=3236575.025 J

* 1. What type of collision is this? Explain your answer.

It is elastic because they didn’t stick with each other