Review for Final 2nd Installment

1. A punter accelerates a football from rest to a speed of 15 m/s in 0.2 seconds. Assuming the football is regulation and has a mass of 0.5 kg, what average force did she exert on the ball?

2. What average force is required to accelerate a 9.5 **gram** bullet from rest to 600 m/s over a distance of 0.9 m along the barrel of a rifle?

3. A shopper in a supermarket pushes a loaded cart with a horizontal force of 15 N. If the cart has a mass of 30 kg, what is the acceleration of the cart? (Ignore friction)

4. Two crates of masses 3 kg and 7 kg, are pulled across the frictionless surface of a frozen pond by an ice fisherman. If he exerts a force of 30 N on the first crate as shown, determine the acceleration of the system and the tension in the cord connecting the crates.

30 N
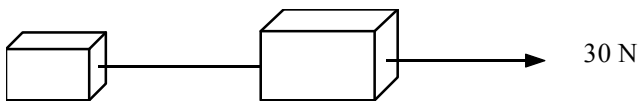
5. Two blocks are fastened to the ceiling of an elevator as shown. If the acceleration of the system is 2.7 m/s/s find T_1 and T_2.

T_1

40 kg

T_2

80 kg
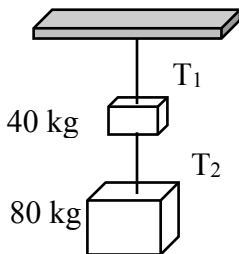
6. A 60 kg block slides with an acceleration of .3 m/s² under the action of a 80 N force as shown in the picture. What is the coefficient of friction between the block and the floor?

$80 N$

$30°$

60kg
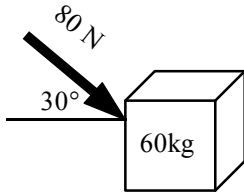
7. A tennis ball weighing 0.8 N initially rolling at 6 m/s rolls to a stop in 5 seconds. What is the coefficient of friction between the tennis ball and the floor?

8. A flatbed truck with a crate of baby gazelles on it is speeding carelessly along the highway at 25/s! The μ_s between the truck bed and the crate is 0.3. What is maximum acceleration in which the truck can come to a complete stop without the crate moving?

9. A box with a mass of 15 kg is pushed horizontally with a force of 100 N. What is the acceleration of the box? The coefficient of static friction is 0.6 and the coefficient of kinetic friction is 0.3.