SPH3U0 Dynamics Discussion/Application Review Questions:

1. Discuss how Newton’s Laws can be used to explain the introduction of transportation features such as:
2. Head Rests in Cars (\*Provide a full explanation on a separate page!)
3. Seat Belts in Cars
4. Air Bags in Cars
5. Speed limits on Curved Ramps
6. You are prospecting for gold in the mountains of Northern British Columbia and are paid by the weight of gold that you find. Should you have your gold weighed on the top of the mountain or at the bottom of the mountain? Explain which location would be most advantageous of you if you would like to earn maximum profit.
7. Two students wish to move a desk (mass 37.0 kg) across a flat horizontal floor. They need to apply a force of 105 N [ Forward] to ***just start*** the desk moving.
8. Draw a free body diagram showing all forces acting on the desk as they try to put it into motion. Remember to include a directional compass!
9. Determine the coefficient of static friction between the desk and the floor.
10. If they continue to apply a force of 105 N [F] once the desk is moving, would the desk maintain a constant velocity or would it accelerate? Explain your answer.
11. Coyote and Roadrunner are taking a break from their chase to play a game of ice hockey out on a frozen pond. Coyote shoots the puck (mass 0.18 kg) at Roadrunner giving it an initial velocity of

15.5 m/s [F]. It slides along rough ice. Assume that the coefficient of kinetic friction between the puck and the rough ice is 0.42.

a) Draw a free body diagram of the puck as it slides along.

b) Find the force of kinetic friction acting on the puck.

c)Determine the average acceleration of the puck while on rough ice.

d)Find the final velocity of the puck when it reaches Roadrunner after travelling 23.0 m along the rough ice.

1. Coyote and Roadrunner get into an argument at the end of the game over who won! Roadrunner (mass 15.0 kg) pushes Coyote (mass 21.0 kg) with a force of 35.0 N [East]. Assume that they are initially at rest and are standing on a smooth patch of ice.
2. Draw a fully labelled diagram showing the action –reaction forces between Coyote and Roadrunner.
3. Calculate the acceleration of each cartoon character.
4. If the force was applied for a time of 0.25 seconds, find the final velocity of each character at the end of the 0.25 seconds.