**Static Friction Problems**

1. The coefficient of static friction between an athlete’s shoe and the ground is 0.70. Determine the maximum magnitude of acceleration if the athlete has an mass of 62 Kg and starts sprinting from rest.
2. A 4.0Kg block of wood sits on a table. A string is tied to the wood block, running over a pulley and down to a hanging object. The greatest mass that can be hung from the string without moving the block is 1.8Kg. Calculate the coefficient of static friction between the block of wood and the table.
3. Two people start running from rest. The first person has a mass of 59Kg and is wearing dress shoes with a coefficient of static friction of 0.52. The second person is wearing running shoes with a coefficient of static friction of 0.66.
   1. Calculate the maximum possible initial acceleration of the first person wearing dress shoes.
   2. Calculate the maximum possible initial acceleration of the second person wearing running shoes. Explain why it is not necessary to know the person’s mass when answering this question.

**Kinetic Friction Problems**

1. A 0.170 Kg hockey puck is initially moving at 21.2 m/s [W] along the ice. The coefficient of kinetic friction for the puck and the ice is 0.005.
   1. What is the force of friction on the puck?
   2. What is the speed of the puck after travelling 58.5 m?
   3. Half way through the period the ice becomes rougher and the coefficient of kinetic friction increases to 0.047. How far will the puck travel if its initial and final speeds are the same as before?
2. A snowmobile is used to pull two sleds across the ice. The mass of the snowmobile and rider is 320Kg. The mass of the first sled behind the snowmobile is 120Kg and the mass of the second sled is 140Kg. The snowmobile engine exerts a force of 1500 N [F] on the snowmobile. The coefficient of friction for the snowmobile and sleds on the ice is 0.15. Calculate the acceleration of the snowmobile and sleds.
3. An electric motor is used to pull a 125Kg box across a floor using a long cable. The tension in the cable is 350 N and the box accelerates at 1.2 m/s2 [F] for 5.0 s. The cable breaks and the box slows down and stops.
   1. Calculate the coefficient of kinetic friction.
   2. How far does the box travel up to the moment the cable breaks?
   3. How far does the box travel from the moment the cable breaks until it stops?

**Answers**

1.(6.9 m/s2) 2. (0.45) 3a. (5.1 m/s2) 4a. 4b. (21.1 m/s) 4c. (6.24 m) 5. (1.9 m/s2) 6a. (0.16) 6b. (15 m) 6c. (11 m)