Formula's: Use the issued formula sheet.

Directions: Show ALL of your work and Label all of your answers!!! Circle final answers!!

1. A 17.0 kg package is dragged along the floor with a force of 90 N force applied at an angle of 45^0 above the horizontal floor.

   a. Draw the free-body diagram showing all forces!! Don't need to calculate, label them appropriately!! (2 pts) (Own diagram)

   b. Calculate the acceleration of the package, assuming no friction. (2 pts) (3.74 m/s^2)

   c. Calculate the magnitude of the upward force F_{Normal} exerted by the floor on the package (4 pts) (103N)

   d. Re-calculate the acceleration of the package assuming a coefficient of kinetic friction equal to 0.50 (4pts). (0.712 m/s^2)

2. In the below diagram two objects are connected by a rope running over a pulley. The coefficient of kinetic friction between object I and the table is 0.15 (we ignore the mass of the rope and the pulley and any friction in the pulley). We wish to find the acceleration of the system, which will be the same for both objects if the rope doesn't stretch. (10 pts) (0.245 m/s^2)

I = 20.0 kg
II = 3.5 kg

I

II
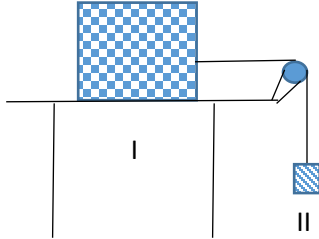
3. A box is given a push so that it slides across the floor. How far will it go, given that the coefficient of kinetic friction is 0.15 and the push imparts an initial speed of 7.0 m/s? (10 pts) (16.7 m)

4. What is the maximum acceleration a car can undergo on level ground if the static coefficient of friction between the tires and the ground is 0.25 ? (3 pts) (2.45 m/s^2)