Physics 1 Unit 3 – Forces Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

IB 2.2 Forces - Friction Problems

1. A 15.0 kg block lying on a table is pulled by a horizontal cord. μs =0.27 and μd =0.15
	1. What is the force of friction if a 25.0 N tension is applied? Does the block move? If it does move, find its acceleration. Is this a static or dynamic friction?
	2. What is the maximum tension that can be applied without moving the block? Is this a static or dynamic friction?
	3. What is the tension in the cord if the block is being pulled at a constant velocity? Is this a static or dynamic friction?
	4. What is the force of friction if a 50.0 N tension is applied? Does the block move? If it does move, find its acceleration. Is this a static or dynamic friction?
2. A wooden pallet carrying a load of 600 kg rests on a wooden floor. The coefficient of static friction is 0.28 and the coefficient of dynamic friction is 0.17.
	1. A forklift driver decides to push it without lifting it. What force must be applied to just get the pallet moving?
	2. After a bit of time, the pallet begins to slide. How fast is the pallet moving after 0.50 seconds of sliding under the same force you calculated in part a?
	3. If the forklift stops pushing, how far does the pallet slide before coming to a stop?
3. A 1.35 kg beer mug is sliding across a bar initially at 0.850 m/s.
	1. What is the coefficient of dynamic friction between the mug and the bar if it comes to a stop directly in front of a customer 2.45 m away?
	2. What is the coefficient of static friction between the mug and the bar if the customer needs to apply a 1.10 N force to get the mug to start sliding toward them?
4. A worker drags a 75.0 kg crate across a factory floor by pulling on a rope tied to the crate. The worker exerts a force of 450. N on the rope, which is inclined at 38° to the horizontal.
	1. If the coefficients of friction are μs = 0.42 and μd = 0.21, does the worker move the crate? If he doesn’t, what is the force of friction? If he does, what is the acceleration of the crate?
	2. What force does he need to use to just get the crate to begin to move?
	3. What force does he need to use to keep the crate moving at a constant velocity?

