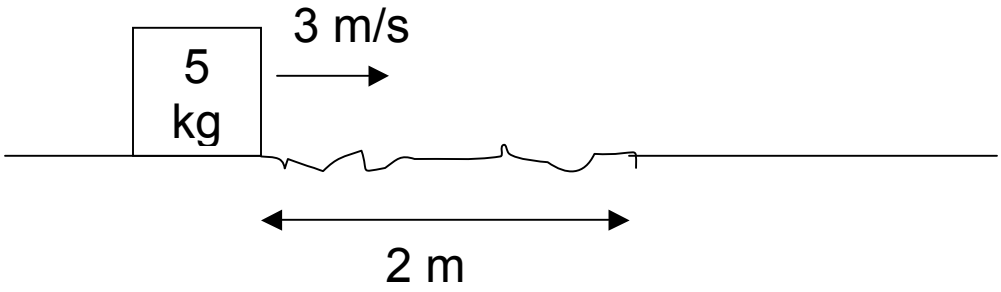
Physics 213 **Quiz 1-2 [20 points]** Name_____

1. [11 points]



A block of 5 kg moving at 3 m/s enters a rough terrain spanning 2 m, traverses its length, and exits with a velocity of 1 m/s.

i) [3 points] What are the kinetic energies of the block before entering the rough terrain and after exiting it?

ii) [4 points] What is the thermal energy released in traversing the rough terrain?

iii) [4 points] What is the force due to friction in this region?

2. [9 points]

a) [3 points] The pressure of an ideal diatomic gas is isothermally increased by 50%. By what factor does the average rotational energy of a molecule increase? Explain your reasoning.

b) [3 points] Which of the following equations is always correct for an *isothermal* process of an ideal gas? (Circle the correct statements.)

i) $(PV)_{before} = (PV)_{after}$ ii) $Q = C_V \Delta T$ iii) $Q = 0$
iv) $P_{before} = P_{after}$ v) $U_{before} = U_{after}$ vi) $Q = W_{on}$

c) [3 points] Which of the following equations is always correct for an *adiabatic* process of an ideal gas? (Circle the correct statements.)

i) $(PV)_{before} = (PV)_{after}$ ii) $Q = C_V \Delta T$ iii) $Q = 0$
iv) $P_{before} = P_{after}$ v) $U_{before} = U_{after}$ vi) $Q = W_{on}$