

Problem #1: [43 points] Short answers (a) through (o)

[22] For parts a through i, choose true or false and write T or F on the line.

- a. [2] F In a completely inelastic collision, the final mechanical energy is zero.
- b. [2] T The gage pressure of a substance can be negative.
- c. [2] F The absolute pressure of a substance can be negative.
- d. [2] F The work done by a tension force is always zero.
- e. [2] T The speed of the air passing beneath a Frisbee in level flight is lower than the speed of the air passing above it.
- f. [2] F An object at 300K must radiate less energy than an object at 400K over the same time period.
- g. [2] T The elastic potential energy of a spring is always positive.
- h. [2] T If an iron ball is immersed in water, the net buoyant force on it is upwards.
- i. [2] F The rotational inertia of an object is greatest if the axis of rotation passes through the center of mass of the object.
- j. [2] F If several blocks are placed on an incline in contact with each other, the magnitude of the acceleration of the smallest block can exceed g .
- k. [2] F Increasing the temperature of an ideal pendulum will decrease its period.

- l. [8] For each symbol given, write the [name] of the quantity it represents, and the (SI units).

$\beta =$ [volumetric coefficient of thermal expansion] ($1/^\circ\text{C}$ or $1/\text{K}$)

$\tau =$ [torque] ($\text{N}\cdot\text{m}$)

$\vec{J} =$ [impulse] ($\text{N}\cdot\text{s}$ or $\text{kg}\cdot\text{m}/\text{s}$)

$Y =$ [Young's modulus] (Pa or N/m^2)

- m. [4] Name the four fundamental forces:

<u>Strong</u>	<u>Weak</u>
<u>Gravity</u>	<u>Electromagnetic</u>

- n. [3] name the three kinds of heat transfer:

conduction convection radiation

- o. [4] Name the four conservation principles we studies this semester:

<u>mass</u>	<u>energy</u>
<u>momentum</u>	<u>angular momentum</u>

no credit given for "kinetic energy" or "potential energy"