Please read each question carefully.

For the following questions, please circle ◯ the correct answer to the nearest number for the quantitative ones.

Part 1. (1 point each)

1. The pressure at the bottom of a jug filled with water does **NOT** depend on

A) the acceleration due to the gravity B) water density
C) the height of the liquid D) surface area of the water E)none of the above.

2. A rock suspended by a weighing scale weighs **5 N** out of water and **3 N** when submerges in water. What is the buoyant force of the rock?

A) 8 N B) 5 N C) 3 N D) 2 N E) none of the above

3. Ice cubes submerged at the bottom of a liquid mixture indicate that the mixture

A) fails to produce a buoyant force on the ice. B) has dissolved air in a liquid state.
C) is composed of open-structured crystals. D) is less dense than ice.
E) is not displaced by a submerged ice.

4. The air in this room has

A) mass B) weight C) energy D) all of the above E) none of the above.

5. When **100 J** of heat is added to a system that performs **60 J** of work, the thermal energy change of the system is.

A) 0 J B) 40 J C) 60 J D) 100 J E) 160 J

6. If a loaf of bread is compressed, its

A) surface tension becomes less. B) molecules become harder
C) density decreases D) density increases E) none of the above.

7. The moderate temperatures of the islands throughout the world has much to do with

A) poor conductivity B) vast supply of thermal energy
C) high specific heat capacity D) high evaporation rate
E) Absorption of solar energy.

8. The pressure in a liquid depends on liquid

A) density B) depth C) color D) both A and B E) none of the above.

9. A liter sized block of ordinary wood floats in water. The amount of water displaced is

A) zero B) 1 L C) more than 1 L D) depends on water density
E) none of the above

10. A completely submerged object always displaces its own

A) weight of fluid B) volume of fluid C) density of fluid
D) all of the above D) none of the above

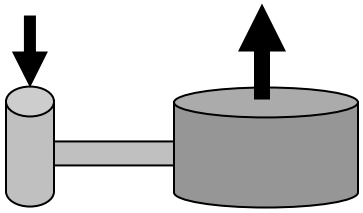
Part 2: ***(2 points each)***

Please read each question carefully and write your answer in the space provided with the appropriate units.

P.1 A PSU student wants to cool **0.25 kg** of Diet Omni-Cola (mostly water), initially at **25^0C** by adding ice initially at **-20^0C.** How much ice should he add so that the final temperature will be **0^0C** with all the ice melted if the heat capacity of the container may be neglected?

***Answer*_____**

P.2. In a hydraulic pistons shown below, the small piston has a diameter of **2 cm** and the large piston has a diameter of **6** cm. How much more force can the larger piston exert compared with the force applied to the smaller piston?



***Answer*_____**

P. 3. You use a steel measuring tape that is exactly **50.00 m** long at a temperature of **20 ^{0}C**. If you measure a distance of **35.79 m** when the temperature is **95 ^{0}F.** What is the actual distance?

***Answer*_____**

Some Useful Constants:

g=10 m/s^2 ρ_{water} **= 1 gm/cm^3**

c $_{water}$ = 4190 J/ kg. K = 1.0 cal/g.^{0}C = 4.186 J/g.^{0}C.

α_{steel} = 1.2 x 10^{-5} / K

L $_{fusion}$ = 80 cal/g = 334 J/g

L $_{vaporization}$ = 540 cal/g = 2256 J/g

Good Luck