Quiz 1 Version A

1)

An aerosol of whipped cream is pressurized at 300 kPa when it's refrigerated at 3 degree Celsius. The can warns against temperature in excess of 60 degree Celsius. What is the maximum safe pressure for the can?

a) 400 kPa b) 600 kPa c) 800 kPa d) 1000 kPa e) 2000 kPa

2) Which of the following statements is most correct ?

a) Radiation can transfer heat through the vacuum.
b) Two identical systems that are in the same macroscopic state must also be in the same microscopic state.
c) Two identical cylinders at the same temperature that both contain H_2 must also have the same pressure.
d) All of the above are correct.
e) None of the above are correct.

3) We learn from experience that we can loosen a metal lid that is stuck on a glass jar by pouring hot water over the lid. Why does this work?

A) The glass contracts, making it easier for the lid to open.
B) The metal lid contracts, making it easier for the lid to open.
C) The metal lid expands, while the glass contracts, making it easier for the lid to open.
D) Both glass and metal expand. However metals expand more versus temperature than glass, thus making it easier for the lid to open.
E) Both glass and metal contract. However, glass contracts more versus temperature, making it easier for the lid to open.

4) It is necessary to determine the specific heat of an unknown object. The mass of the object is 227.0 g. It is determined experimentally that it takes 16.0 J to raise the temperature 10.0° C. Find the specific heat of the object.

A) 0.001,40 J/kg • K
B) 3,630,000 J/kg • K
C) 7.05 J/kg • K
D) 1600 J/kg • K

5) How long will it take a 500W microwave oven to vaporize completely a 700g block of ice that is initially at zero degree Celsius? (Lf = 334 kJ/kg; cw = 4.184 kJ/(kg*K), Lv = 2257 kJ/kg)

A) 1 min B) 10 min C) 1 hour D) 1 day

6) How much ice can a 625 W microwave melt in 1min if the ice is initially at 0 degree Celsius? (Lf = 334 J/gram)

A) 0.1 kg B) 0.5 kg C) 1kg D) 5 kg E) 10 kg

7) Assume you increase the temperature of a liquid at constant pressure slightly below the critical point, then increase the pressure above the critical point, and cool the liquid back down, then decrease the pressure to return to the starting point. What phase transitions are you encountering?

A) First liquid to gas, then gas to liquid on the way back.
B) First liquid to solid, then solid to liquid on the way back.
C) Only liquid to gas.
D) Only liquid to solid.
E) First liquid to gas, then gas to solid.

8) What happens to the volume of a balloon filled with an ideal gass if you put the baloon into the freezer ?

a) It increases b) it decreases c) it does not change
d) the answer depends on the amount of gas in the balloon.

9) Three gases of 1mol each have the same amount of internal energy. The gases have 3,5,7 degrees of freedom. Which will have the largest average velocity for each molecule?

A) the gas with 3 degrees of freedom
B) the gas with 5 degrees of freedom
C) the gas with 7 degrees of freedom
D) same, because the average velocity depends only on temperature.

10) The solar corona is an extended atmosphere of hot gas (2 Million Kelvin) at a pressure of about 0.03 Pa. What is the density of particles in this gas? (k = 1.38 10^-23 J/K)

A) 10^11 particles per cubic meter
B) 10^13 particles per cubic meter
C) 10^15 particles per cubic meter
D) 10^17 particles per cubic meter
E) 10^20 particles per cubic meter