Name: _____ **Class:** _____ **Date:** _____ **ID: A**

Webreview - AP B practice test ch 11 thermal processes

Please do not write on my tests

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. Sea breezes that occur near the shore are attributed to a difference between land and water with respect to what property?
a. mass density
b. coefficient of volume expansion
c. specific heat
d. emissivity
e. none of the above

____ 2. An inventor develops a stationary cycling device by which an individual, while pedaling, can convert all of the energy expended into heat for warming water. How much mechanical energy is required to increase the temperature of 300 g of water (enough for 1 cup of coffee) from 20°C to 95°C? (1 cal = 4.186 J, the specific heat of water is 4 186 J/kg·°C)
a. 94 000 J
b. 22 000 J
c. 5 400 J
d. 14 J
e. 2 300 J

____ 3. A 3.00-g lead bullet is traveling at a speed of 240 m/s when it embeds in a wood post. If we assume that half of the resultant heat energy generated remains with the bullet, what is the increase in temperature of the embedded bullet? (specific heat of lead = 0.030 5 kcal/kg·°C, 1 kcal = 4 186 J)
a. 113°C
b. 137°C
c. 226°C
d. 259°C
e. 284°C

____ 4. A 0.2-kg aluminum plate, initially at 20°C, slides down a 15-m-long surface, inclined at a 30° angle to the horizontal. The force of kinetic friction exactly balances the component of gravity down the plane so that the plate, once started, glides down at constant velocity. If 90% of the mechanical energy of the system is absorbed by the aluminum, what is its temperature increase at the bottom of the incline? (Specific heat for aluminum is 900 J/kg·°C.)
a. 0.16 C°
b. 0.07 C°
c. 0.04 C°
d. 0.03 C°
e. 0.01 C°

____ 5. A solar heating system has a 25.0% conversion efficiency; the solar radiation incident on the panels is 1 000 W/m^2. What is the increase in temperature of 30.0 kg of water in a 1.00-h period by a 4.00-m^2-area collector? (c_w = 4 186 J/kg·°C)
   a. 14.3°C
   b. 22.4°C
   c. 28.7°C
   d. 44.3°C
   e. 53.6 C°

____ 6. A 2.00-kg copper rod is 50.00 cm long at 23°C. If 40 000 J are transferred to the rod by heat, what is its change in length? c_{copper} = 387 J/kg·°C and α_{copper} = 17 x 10^{-6}/°C.
   a. 0.022 cm
   b. 0.044 cm
   c. 0.059 cm
   d. 0.086 cm
   e. More information is needed.

____ 7. An 80.0-g piece of copper, initially at 295°C, is dropped into 250 g of water contained in a 300-g aluminum calorimeter; the water and calorimeter are initially at 10.0°C. What is the final temperature of the system? (Specific heats of copper and aluminum are 0.092 0 and 0.215 cal/g·°C, respectively. c_w = 1.00 cal/g·°C)
   a. 12.8°C
   b. 16.5°C
   c. 28.4°C
   d. 32.1°C
   e. 34.3°C

____ 8. Twenty grams of a solid at 70°C is placed in 100 grams of a fluid at 20°C. Thermal equilibrium is reached at 30°C. The specific heat of the solid:
   a. is equal to that of the fluid.
   b. is less than that of the fluid.
   c. is more than that of the fluid.
   d. cannot be compared to that of a material in a different phase.

____ 9. A 0.003 0-kg lead bullet is traveling at a speed of 240 m/s when it embeds in a block of ice at 0°C. If all the heat generated goes into melting ice, what quantity of ice is melted? (L_f = 80 kcal/kg, the specific heat of lead = 0.03 kcal/kg·°C, and 1 kcal = 4 186 J)
   a. 1.47×10^{-2} kg
   b. 5.8×10^{-4} kg
   c. 3.2×10^{-3} kg
   d. 2.6×10^{-4} kg
   e. 8.72×10^{-2} kg

____ 10. I take 1.0 kg of ice and dump it into 1.0 kg of water and, when equilibrium is reached, I have 2.0 kg of ice at 0°C. The water was originally at 0°C. The specific heat of water = 1.00 kcal/kg·°C, the specific heat of ice = 0.50 kcal/kg·°C, and the latent heat of fusion of water is 80 kcal/kg. The original temperature of the ice was:
   a. one or two degrees below 0°C.
   b. −80°C.
   c. −160°C.
   d. The whole experiment is impossible.
   e. None of the above.

____ 11. The surfaces of a Dewar flask are silvered for the purpose of minimizing heat transfer by what process?
   a. conduction
   b. radiation
   c. convection
   d. vaporization
   e. none of the above

____ 12. A 2.0-m^2 Thermopane window is constructed, using two layers of glass 4.0 mm thick, separated by an air space of 5.0 mm. If the temperature difference is 20 C° from the inside of the house to the outside air, what is the rate of heat flow through this window? (Thermal conductivity for glass is 0.84 J/s·m·°C and for air 0.023 4 J/s·m·°C.)
   a. 7 700 W
   b. 1 900 W
   c. 547 W
   d. 180 W
   e. 120 W

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Answer Section

MULTIPLE CHOICE

1. C
2. A
3. A
4. B
5. C
6. B
7. B
8. C
9. D
10. C
11. B
12. D