19-05
0.45-60%

Question 206
A steel gas tank of volume 0.0700 m**3 is filled completely with gasoline. The temperature of the tank increased from 20 to 50 degrees-C. How much gasoline has spilled out of the tank? For steel, the coefficient of linear expansion is 12.0*10**(-6)/degree-C. For gasoline, the coefficient of volume expansion is 9.50*10**(-4)/degree-C.
(a) 2.52*10**(-5) m**3
(b) 2.00*10**(-3) m**3
(c) 7.56*10**(-5) m**3
(d) 1.92*10**(-3) m**3
(e) 1.69*10**(-3) m**3

19-05
0.52-28%

Question 207
An iron ball has a diameter of 6.00 cm and is 0.01 cm larger than the diameter of a brass ring. Both are at a temperature of 20 degrees Celsius. To what temperature should the brass ring be heated so that the ball just passes through the hole? [The coefficient of linear expansion of brass = 1.9*10**(-5) K**-1]
(a) 32 degrees Celsius.
(b) 165 degrees Celsius.
(c) 108 degrees Celsius.
(d) 430 degrees Celsius.
(e) 590 degrees Celsius.

19-6 Temperature and Heat

19-06
0.22-13%

Question 208
Which of the following statements is True:
(a) When the temperature of an object increases by one degree-C it means that it has increased by less than one degree-F.
(b) 272 Kelvin is warmer than zero degree-C.
(c) If two objects are in thermal equilibrium they must have the same temperature
(d) if an object (A) is warmer than a second object (B) in the Fahrenheit scale then object (B) must be warmer than object (A) in the Celsius scale.
(e) The coefficient of linear expansion is the same for all materials.

19-7 The Absorption of Heat by Solids and Liquids

19-07

Question 209
A 20-g ice cube at 0 degree C is heated until 15 g has become water at 100 degree C and 5.0 g has been converted to steam. How much heat is added to do this? (L(melting)=80 cal/g, L(vaporization) = 540 cal/g, c(water) = 1 cal/g/C).
(a) 3.3*10**3 cal.
(b) 6.3*10**3 cal.
(c) 5.2*10**3 cal.
(d) 9.0*10**3 cal.
(e) 2.3*10**3 cal.

19-07
0.57-47%

Question 210
Copper pellets, each of mass 1.0 g, are heated to 100 degrees Celsius. How many pellets must be added to 500 g of water initially at 20 degrees Celsius to make the final equilibrium temperature 30 degrees Celsius? (neglect the heat capacity of the container) Specific heat of copper = 0.0924 cal/g degree Celsius and specific heat of water = 1.0 cal/g degree Celsius.
(a) 773
(b) 120
(c) 250
(d) 680
(e) 924

19-07
0.52-42%

Question 211
How much heat is needed to convert 80 g of ice initially at -10 degrees-C to steam at 100 degrees-C? (C(water) = 1.0 cal/g*degree C, L(f) = 80 cal/g, C(ice) = 0.5 cal/g*degree C, L(v) = 540 cal/g).
(a) 22 kcal
(b) 65 kcal
(c) 58 kcal
(d) 16 kcal
(e) 75 kcal

19-07

Question 212
How much ice at -20 degrees-C must be mixed with 0.25 kg of water, initially at 20 degrees-C, in order for the final temperature to be 0 degrees-C with the ice all melted? (neglect the heat capacity of the container.) C(water) = 4186 J/Kg C-degrees, C(ice) = 2000 J/kg C-degrees Lf(ice) = 33.4*10**4 J/kg.
(a) 75 g
(b) 12 g
(c) 63 g
(d) 85 g
(e) 56 g

19-07
0.09-34%

Question 213
What mass of steam (T = 100 degrees-C) is required to melt 200 g of ice and produce water at 25 degrees-C? (c(water)= 1 cal/g*degrees-C, Lf=79.7 cal/g, Lv=539 cal/g.)
(a) 34.1 g
(b) 22.5 g
(c) 121 g
(d) 254 g
(e) 125 g

19-07

Question 214
A lead bullet,travelling at 200 m/s, strikes a tree and comes to rest. If half the heat produced is retained by the bullet. The temperature of the bullet will be change by: (Specific heat of lead = 0.125*10**3 J/(kg*Celsius degree) (Assume that all the kinetic energy is converted to heat energy.)
(a) 160 Celsius degree.
(b) -80 Celsius degree.
(c) 20 Celsius degree.
(d) 80 Celsius degree.
(e) 40 Celsius degree.

19-07

Question 215

A 5-kg block of lead having a temperature of 80 degrees Celsius is added to 0.5 kg of water having a temperature of 20 degrees Celsius. What is the final equilibrium temperature of the system? (Specific heat of lead = 0.03 cal/g*C and for water = 1 cal/g*C.)

(a) 26 degrees Celsius.
(b) 20 degrees Celsius.
(c) 54 degrees Celsius.
(d) 79 degrees Celsius.
(e) 34 degrees Celsius.

19-07

Question 216

A 100 g of water at 100 degrees Celsius is added to a 20-g aluminum cup containing 50 g of water at 20 degrees Celsius. What is the equilibrium temperature of the system? The specific heat of aluminum is 900 J/(kg*K) and the specific heat of water is 4186 J/(kg*K).

(a) 63 degrees Celsius.
(b) 14 degrees Celsius.
(c) 72 degrees Celsius.
(d) 55 degrees Celsius.
(e) 95 degrees Celsius.

19-07

Question 217 0.30-50%

A thermometer, of mass 0.06 kg and specific heat 836 J/(kg K), reads 15 degrees Celsius. It is then completely immersed in 0.15 kg of water of specific heat 4180 J/(kg K). The final temperature reading of the thermometer in the water is 45 degrees Celsius. Assuming no heat losses from the system to the surrounding, the initial temperature of the water was:

(a) 35.1 degrees Celsius.
(b) 47.4 degrees Celsius.
(c) 42.6 degrees Celsius.
(d) 15.4 degrees Celsius.
(e) 50.4 degrees Celsius.

19-07

Question 218

How much heat is required to melt ice of mass 500 g at -10 deg C to water at 0 deg C? (specific heat of ice, c, = 2220 J/(kg.K); heat of fusion of ice, Lf, = 333*10*3 J/kg)

(a) 8.45*10**5 J
(b) 9.05*10**5 J
(c) 1.78*10**5 J
(d) 2.05*10**5 J
(e) 3.01*10**5 J

19-07

Question 219

The temperature of a 0.5 kg sample in a glass cup increases by 20 C-degrees when 2.8*10**4 J of heat are added. The cup absorbs 9.0*10**3 J of the heat added. What is the specific heat of the sample?

(a) 275 J/(kg*K).
(b) 1475 J/(kg*K).
(c) 226 J/(kg*K).
(d) 1900 J/(kg*K).
(e) 475 J/(kg*K).

19-07
Question 220 0.52-50%
A 200-g copper piece was initially at a temperature of 325 degrees-C. It is then dropped nto 2000 g of water at a temperature of 5 degrees-C. Assuming that the copper-water system is an isolated system, and the water does not vaporize, find the heat gained by water. The specific heat of copper is 0.0923 cal/g.K The specific heat of water is 1.00 cal/g.K.
(a) 16000 calories
(b) 4600 calories
(c) 5850 calories
(d) 9500 calories
(e) 12200 calories

19-07
Question 221 (.66-59%
What is the minimum amount of heat required to completely melt 120 g of aluminum in tially at 20 degrees-C. For aluminum, c = 900 J/kg.K, Lf = 3.97*10**5 J/kg, and its melting point is 660 degrees-C.
(a) 3.75*10**5 J
(b) 4.76*10**5 J
(c) 2.15*10**5 J
(d) 6.91*10**5 J
(e) 1.17*10**5 J

19-07
Question 222).36-66%
In an insulated container, 250 grams of ice at 0 degrees-C are added to 500 grams of water at 18 degrees-C. How much ice remains when the system reaches equilibrium ? [The latert heat of fusion of water = 333 kJ/kg and the specific heat of water = 4190 J/kg.K].
(a) 250 g
(b) 113 g
(c) 137 g
(d) 300 g
(e) 79.0 g

19-07
Question 223 0.54-71%
One kilogram of water is initially at a temperature of 30.0 degrees-C. How much ice, ir itially at a temperature of zero degrees-C, must be added to the water to make a mixture whose equilibrium temperature is 10.0 degrees-C ? [The specific heat of water is 4190 J/kg.K and the heat of fusion is 333 kJ/kg.]
(a) 252 g
(b) 224 g
(c) 452 g
(d) 200 g
(e) 476 g

19-07
Question 224
Calculate the amount of energy, in Joules, required to completely melt 130 g of lead initially at temperature of 15.0 degrees Celsius. Melting point of lead = 328 degrees Celsius, latent heat of fusion of lead = 2.32*10**4 J/kg and the specific heat of lead = 128 J/kg/K.
(a) 1.31*10**4.
(b) 5.21*10**3.
(c) 8.22*10**3.
(d) 8.25*10**7.
(e) 3.02*10**3.