1.3.5.2: Practice with Heat and Temperature Calculations

Exercise 1.3.5.2.1

Convert each Celsius temperature to Fahrenheit and to Kelvin. Use correct significant digits.

a) 62.7 °C

b) 4.8 °C

c) − 51.7 °C

Answer a

   145 °F, 335.9 K

Answer b

   40.6 °F, 278.0 K

Answer c

   − 61.1 °F, 221.5 K

Convert each Fahrenheit temperature to Celsius and to Kelvin. Use correct significant digits.

d) − 46.7 °F

e) 6.3 °F

f) 65 °F

Answer d

   − 43.7 °C, 229.4 K

Answer e

   − 14.3 °C, 258.9 K

Answer f

   18 °C, 291 K

Exercise 1.3.5.2.1

Convert each energy below. [1 cal = 4.184 J exactly] [1 Cal = 1 kcal = 10^3 cal]

a) 4.83 cal to J and to Cal

b) 657 J to cal and to kcal

c) 54.0 Cal to cal and to J

Answer a

   20.2 J, 0.00483 Cal

Answer b

   157 cal, 0.157 kcal

Answer c

   54000 cal (or 5.40 x 10^4 cal), 226000 J. (3 sig dig in each)

Exercise 1.3.5.2.1

You find that it takes 261 J to raise the temperature of a piece of metal from 18.6 °C to 42.2 °C. The mass of your metal is 28.72 g. What is the specific heat of the metal?

Answer

0.385 J/g °C

Exercise 1.3.5.2.1

How much energy is needed to raise the temperature of 65.8 g of aluminum from 22.0 °C to 47.8 °C? The specific heat of aluminum is 0.214 cal/g°C.

Answer

363 cal (which is 1520 J)

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