Exercise 4.12 – Specific heat capacity

Q412-01 200 J of energy were given to a 10 g sample of copper. If the temperature of the copper increased by 50°C, what is the specific heat capacity of the copper?

A. 0.25 J g^{-1} °C^{-1}
B. 0.40 J g^{-1} °C^{-1}
C. 2.5 J g^{-1} °C^{-1}
D. 4.0 J g^{-1} °C^{-1}

Q412-02 When 40 joules of heat are added to a sample of solid H_2O at -16.0 ºC the temperature increases to -8.0 ºC. What is the mass of the solid H_2O sample? [specific heat capacity of $H_2O(s)$ = 2.0 J g^{-1} K^{-1}]

A. 2.5 g
B. 5.0 g
C. 10 g
D. 160 g

Q412-03 Consider the specific heat capacity of the following metals:

metal	Specific heat capacity / J kg^{-1} K^{-1}
Cu	385
Ag	234
Au	130
Pt	134

Which metal will show the greatest increase in temperature if 50 J of heat is supplied to a 0.001 kg sample of each metal at the same initial temperature?

Q412-04 The mass, m (in g) of a substance with specific heat capacity c (in J g^{-1} K^{-1}) increases by t ºC. What is the heat change in J?

A. mct
B. mc(t + 273)
C. mct/1000
D. mc(t + 273)/1000

Q412-05 The temperature of a 2.0 g sample of aluminium increases from 25ºC to 30ºC. How many joules of heat energy were added (specific heat capacity of Al = 0.90 J g^{-1} K^{-1})

A. 0.36
B. 2.3
C. 9.0
D. 11

Q412-06 What is the energy change in kJ when the temperature of 20g of water increases by 10ºC (shc of water = 4.18 kJ kg-1 K-1)?

A. 20 x 10 x 4.18
B. 20 x 283 x 4.18
C. (20 x 10 x 4.18)/1000
D. (20 x 283 x 4.18)/1000

Exercise 4.12 – Specific heat capacity

Q412-07 A sample of metal is heated. Which of the following are needed to calculate the heat absorbed by the sample?

I	the mass of the metal
II	the density of the sample
III	the specific heat capacity of the sample

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

Q412-08 If 3600J of heat is added to 180 g of $C_2H_5OH(l)$, its temperature increases from 18.5ºC to 28.5ºC. What is the specific heat capacity of C2H5OH(l)?

A. 0.500 J g^{-1} $ºC^{-1}$
B. 2.00 J g^{-1} $ºC^{-1}$
C. 20.0 J g^{-1} $ºC^{-1}$
D. 200 J g^{-1} $ºC^{-1}$

Q412-09 A 0.1375 g sample of solid magnesium is burned in a constant-volume bomb calorimeter that has a heat capacity of 1769 J / °C. The calorimeter contains exactly 1000 g of water and the temperature increases by 0.590 °C. The heat of combustion of Mg is (Note: the specific heat capacity of water is 4.184 J / g °C.)

A. 3.512 kJ.mol.
B. 25.5 kJ/mol
C. 289 kJ/mol
D. 613 kJ/mol

Q412-10 Given the following specific heat capacities of metals:

Metal	Specific Heat (J g^{-1} $\blacksquare C^{-1}$)
Copper	0.385
Magnesium	1.02
Mercury	0.138
Lead	0.129

If 100 kJ of heat is added to 10.0 g samples of each of the metals above, which are all at 25ºC, which metal will have the lowest temperature?

A. Copper
B. Magnesium
C. Mercury
D. Lead
