Chapter 1 Heating processes

Chapter test answers Total marks 28

Question 1

D

*Q* = *mc*∆*T* or J kg–1 K–1



Since specific heat is a linear relationship, you may also use the following working:

 (1 mark)

Question 2

To produce a calibrated scale, you would need to fix two points (for example, the triple point and boiling point of water). Your scale would be arbitrary. (1 mark)

For the scale to be absolute, at least one of these fixed points would need to be absolute zero, e.g. 0 K. (1 mark)

Question 3

 (2 marks)

Question 4

*Q* = *mc*∆*T* = 100 × 4200 × (35.0 – 20.0) = 100 × 4200 × 15.0 = 6.3 × 106 J or 6.3 MJ (2 marks)

Question 5

Temperature is a measure of the average kinetic energy of particles within a system. (1 mark)

If the average kinetic energy of the particles within two objects is the same, then their temperature will be the same. (2 marks)

Question 6

Energy transferred to water:  (1 mark)

Energy transferred from metal:  (1 mark)

So the specific heat capacity of the unknown metal:  (1 mark)

From table of specific heat capacities this would most closely match aluminium.   
(Note that the question specifies that the substance is a metal.) (1 mark)

Question 7

There is no change in temperature as all of the energy supplied is used in  
overcoming the inter-particle or intermolecular forces between particles. (2 marks)

Question 8

Heating of ice to 0°C:  (1 mark)

Melting of ice to water at 0°C:  (1 mark)

Total energy required: *Q*Total = 840 + 3.34 × 104 = 3.42 × 104 J (1 mark)

Question 9

At the midpoint in the mixture of steam and ice, *Q* gained by ice = *Q* lost by steam. (1 mark)

Melting ice to water at 0°C:  (1 mark)

Turning steam to water at 100°C:  (1 mark)

Midpoint:

 (1 mark)

 (1 mark)

Question 10

Cooling of water originally at 1000 C:

 (1 mark)

Cooling of steam originally at 1000 C:   
*Q* = latent heat of vaporisation of steam + cooling of water at 100°C (1 mark)

 (1 mark)

(i.e. turning steam to water transfers almost as much heat as then cooling the water to 37°C)

(1 mark)