

## Critical Thinking Items

### 11.1 Temperature and Thermal Energy 8.

The temperature of two equal quantities of water needs to be raised - the first container by 5 degrees Celsius and the second by 5 degrees Fahrenheit. Which one would require more heat?

- a. The heat required by the first container is more than the second because each degree Celsius is equal to 1.8 degrees Fahrenheit.
- b. The heat required by the first container is less than the second because each degree Fahrenheit is equal to 1.8 degrees Celsius.
- c. The heat required by the first container is more than the second because each degree Celsius is equal to 3.6 degrees Fahrenheit.
- d. The heat required by the first container is less than the second because each degree Fahrenheit is equal to 3.6 degrees Celsius.

9.

What is 100.00 °C in kelvins?

- a. 212.00 K
- b. 100.00 K
- c. 473.15 K
- d. 373.15 K

### 11.2 Heat, Specific Heat, and Heat Transfer 10.

The value of specific heat is the same whether the units are J/kg K or J/kg °C. How?

- a. Temperature difference is dependent on the chosen temperature scale.
- b. Temperature change is different in units of kelvins and degrees Celsius.
- c. Reading of temperatures in kelvins and degree Celsius are the same.
- d. The temperature change is the same in units of kelvins and degrees Celsius.

11.

If the thermal energy of a perfectly black object is increased by conduction, will the object remain black in appearance? Why or why not?

- a. No, the energy of the radiation increases as the temperature increases, and the radiation becomes visible at certain temperatures.
- b. Yes, the energy of the radiation decreases as the temperature increases, and the radiation remains invisible at those energies.
- c. No, the energy of the radiation decreases as the temperature increases, until the frequencies of the radiation are the same as those of visible light.
- d. Yes, as the temperature increases, and the energy is transferred from the object by other mechanisms besides radiation, so that the energy of the radiation does not increase.

12.

What is the specific heat of a substance that requires 5.00 kJ of heat to raise the temperature of 3.00 kg by 5.00 °F?

- a.  $3.33 \times 10^3 \text{ J/kg } ^\circ \text{C}$
- b.  $6.00 \times 10^3 \text{ J/kg } ^\circ \text{C}$
- c.  $3.33 \times 10^2 \text{ J/kg } ^\circ \text{C}$
- d.  $6.00 \times 10^2 \text{ J/kg } ^\circ \text{C}$

**11.3 Phase Change and Latent Heat 13.**

Assume 1.0 kg of ice at 0 °C starts to melt. It absorbs 300 kJ of energy by heat. What is the temperature of the water afterwards?

- a. 10 °C
- b. 20 °C
- c. 5 °C
- d. 0 °C