

## Extended Response

### 11.1 Temperature and Thermal Energy 45.

What is the meaning of absolute zero?

- a. It is the temperature at which the internal energy of the system is maximum, because the speed of its constituent particles increases to maximum at this point.
- b. It is the temperature at which the internal energy of the system is maximum, because the speed of its constituent particles decreases to zero at this point.
- c. It is the temperature at which the internal energy of the system approaches zero, because the speed of its constituent particles increases to a maximum at this point.
- d. It is that temperature at which the internal energy of the system approaches zero, because the speed of its constituent particles decreases to zero at this point.

46.

Why does it feel hotter on more humid days, even though there is no difference in temperature?

- a. On hot, dry days, the evaporation of the sweat from the skin cools the body, whereas on humid days the concentration of water in the atmosphere is lower, which reduces the evaporation rate from the skin's surface.
- b. On hot, dry days, the evaporation of the sweat from the skin cools the body, whereas on humid days the concentration of water in the atmosphere is higher, which reduces the evaporation rate from the skin's surface.
- c. On hot, dry days, the evaporation of the sweat from the skin cools the body, whereas on humid days the concentration of water in the atmosphere is lower, which increases the evaporation rate from the skin's surface.
- d. On hot, dry days, the evaporation of the sweat from the skin cools the body, whereas on humid days the concentration of water in the atmosphere is higher, which increases the evaporation rate from the skin's surface.

### 11.2 Heat, Specific Heat, and Heat Transfer 47.

A hot piece of metal needs to be cooled. If you were to put the metal in ice or in cold water, such that the ice did not melt and the temperature of either changed by the same amount, which would reduce the metal's temperature more? Why?

- a. Water would reduce the metal's temperature more, because water has a greater specific heat than ice.
- b. Water would reduce the metal's temperature more, because water has a smaller specific heat than ice.
- c. Ice would reduce the metal's temperature more, because ice has a smaller specific heat than water.

- d. Ice would reduce the metal's temperature more, because ice has a greater specific heat than water.

48.

On a summer night, why does a black object seem colder than a white one?

- a. The black object radiates energy faster than the white one, and hence reaches a lower temperature in less time.
- b. The black object radiates energy slower than the white one, and hence reaches a lower temperature in less time.
- c. The black object absorbs energy faster than the white one, and hence reaches a lower temperature in less time.
- d. The black object absorbs energy slower than the white one, and hence reaches a lower temperature in less time.

49.

Calculate the difference in heat required to raise the temperatures of 1.00 kg of gold and 1.00 kg of aluminum by  $1.00^{\circ}\text{C}$ . (The specific heat of aluminum equals  $900\text{ J/kg} \cdot ^{\circ}\text{C}$ ; the specific heat of gold equals  $129\text{ J/kg} \cdot ^{\circ}\text{C}$ .)

- a. 771 J
- b. 129 J
- c. 90 J
- d. 900 J

### 11.3 Phase Change and Latent Heat 50.

True or false—You have an ice cube floating in a glass of water with a thin thread resting across the cube. If you cover the ice cube and thread with a layer of salt, they will stick together, so that you are able to lift the ice-cube when you pick up the thread.

- a. True
- b. False

51.

Suppose the energy required to freeze 0.250 kg of water were added to the same mass of water at an initial temperature of  $1.0^{\circ}\text{C}$ . What would be the final temperature of the water?

- a.  $-69.8^{\circ}\text{C}$
- b.  $79.8^{\circ}\text{C}$
- c.  $-78.8^{\circ}\text{C}$
- d.  $80.8^{\circ}\text{C}$