

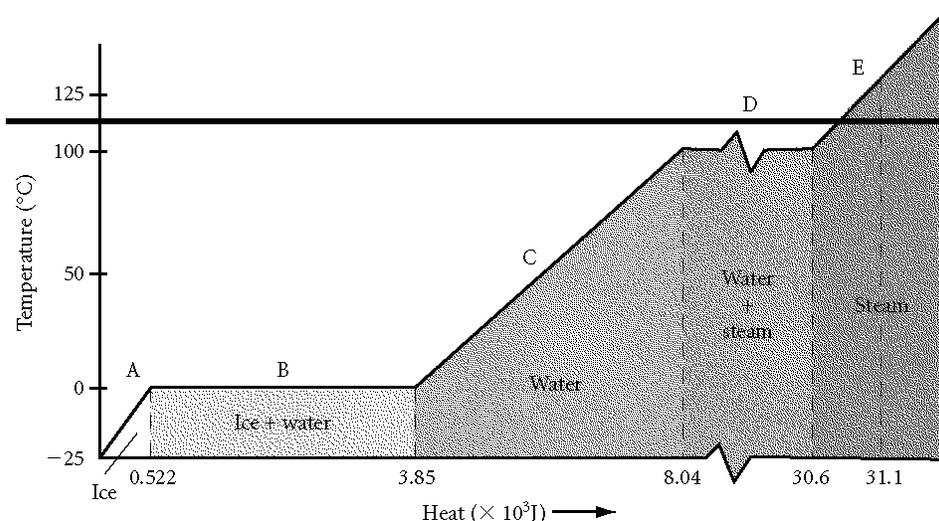
## Phys.12- Q2W3-Test.-Heat

### Multiple Choice

Identify the choice that best completes the statement or answers the question.

- \_\_\_ 1. Which of the following is proportional to the kinetic energy of atoms and molecules?
- temperature
  - potential energy
  - elastic energy
  - thermal equilibrium
- \_\_\_ 2. A calorimeter is used to determine the specific heat capacity of a test metal. If the specific heat capacity of water is known, what quantities must be measured?
- metal mass, water mass, initial and final temperatures of metal and water
  - metal mass, water mass, heat added to or removed from water and metal
  - metal volume, water volume, initial and final temperatures of metal and water
  - metal mass, water mass, final temperature of metal and water
- \_\_\_ 3. A nail is driven into a board with an initial kinetic energy of 150 J. If the potential energy before and after the event is the same, what is the change in the internal energy of the board and nail?
- 150 J
  - 0 J
  - 75 J
  - 150 J
- \_\_\_ 4. A substance registers a temperature change from 20°C to 40°C. To what incremental temperature change does this correspond?
- 313 K
  - 40 K
  - 36 K
  - 20 K
- \_\_\_ 5. As the temperature of a substance increases, its volume tends to increase due to
- thermal expansion.
  - thermal energy.
  - thermal equilibrium.
  - thermal contraction.
- \_\_\_ 6. Which of the following is a form of kinetic energy that occurs within a molecule when the bonds are stretched or bent?
- translational
  - vibrational
  - internal
  - rotational
- \_\_\_ 7. What is the temperature of a system in thermal equilibrium with another system made up of water and steam at 1 atm of pressure?
- 0°F
  - 0 K
  - 273 K
  - 100°C
- \_\_\_ 8. A substance registers a temperature change from 20°C to 40°C. To what incremental temperature change does this correspond?
- 313°F
  - 36°F
  - 20°F
  - 40°F
- \_\_\_ 9. Which of the following best describes the relationship between two systems in thermal equilibrium?
- The masses are equal.
  - No net energy is exchanged.
  - The volumes are equal.
  - The velocity is zero.
- \_\_\_ 10. A slice of bread contains about  $4.19 \times 10^5$  J of energy. If the specific heat capacity of a person is  $4.19 \times 10^3$  J/kg•°C, by how many degrees Celsius would the temperature of a 70.0 kg person increase if all the energy in the bread were converted to heat?
- 1.86°C
  - 1.43°C
  - 2.25°C
  - 1.00°C

- \_\_\_ 11. If two small beakers of water, one at 70°C and one at 80°C, are emptied into a large beaker, what is the final temperature of the water?
- The water temperature will fluctuate.
  - The final temperature is between 70°C and 80°C.
  - The final temperature is less than 70°C.
  - The final temperature is greater than 80°C.
- \_\_\_ 12. Which of the following describes a substance in which the temperature and pressure remain constant while the substance experiences an inward transfer of energy?
- gas
  - substance undergoing a change of state
  - liquid
  - solid
- \_\_\_ 13. Energy transfer as heat between two objects depends on which of the following?
- The difference in volume of the two objects.
  - The difference in composition of the two objects.
  - The difference in temperature of the two objects.
  - The difference in mass of the two objects.
- \_\_\_ 14. In an elastic collision between two ball bearings, kinetic energy is conserved. If there is no change in potential energy, which of the following is true?
- $\Delta U$  cannot be determined for this event.
  - $\Delta U < 0$
  - $\Delta U = 0$
  - $\Delta U > 0$
- \_\_\_ 15. What happens to the internal energy of an ideal gas when it is heated from 0°C to 4°C?
- It increases.
  - It decreases.
  - It is impossible to determine.
  - It remains constant.
- \_\_\_ 16. What three properties of a substance affect the amount of energy transferred as heat to or from the substance?
- volume, temperature change, specific heat capacity
  - mass, temperature change, specific heat capacity
  - mass, temperature change, latent heat
  - density, temperature change, specific heat capacity
- \_\_\_ 17. Which of the following is true during a phase change?
- Temperature increases.
  - There is no transfer of energy as heat.
  - Temperature decreases.
  - Temperature remains constant.



- \_\_\_ 18. At what point on the figure above does the substance undergo a phase change?
- B
  - A
  - C
  - E
- \_\_\_ 19. The figure above shows how the temperature of 10.0 g of ice changes as energy is added. Which of the following statements is correct?
- The water absorbed energy continuously, but the temperature increased only when all of the water was in one phase.
  - The water did not absorb energy.
  - The water absorbed energy sporadically, and the temperature increased only when all of the water was in one phase.
  - The water absorbed energy continuously, and the temperature increased continuously.
- \_\_\_ 20. At what point on the figure above is the amount of energy transferred as heat approximately  $4.19 \times 10^3$  J?
- C
  - A
  - D
  - B
- \_\_\_ 21. Using the figure above, determine which value equals the latent heat required to change the liquid water into steam.
- $30.6 \times 10^3$  J
  - $22.6 \times 10^3$  J
  - $8.04 \times 10^3$  J
  - $31.1 \times 10^3$  J
- \_\_\_ 22. Energy is transferred as heat between two objects, one with a temperature of  $5^\circ\text{C}$  and the other with a temperature of  $20^\circ\text{C}$ . If two other objects are to have the same amount of energy transferred between them, what might their temperatures be?
- $10^\circ\text{C}$  and  $15^\circ\text{C}$
  - $17^\circ\text{C}$  and  $32^\circ\text{C}$
  - $80^\circ\text{C}$  and  $90^\circ\text{C}$
  - $15^\circ\text{C}$  and  $25^\circ\text{C}$
- \_\_\_ 23. In the presence of friction, not all of the work done on a system appears as mechanical energy. What happens to the rest of the energy provided by work?
- The remaining energy is stored as mechanical energy within the system.
  - The remaining energy causes an increase in the internal energy of the system.
  - The remaining energy is dissipated as sound.
  - The remaining energy causes a decrease in the internal energy of the system.
- \_\_\_ 24. Which of the following terms describes a transfer of energy?
- internal energy
  - temperature
  - heat
  - kinetic energy

