$c_{H_2O} = 4190 \frac{J}{kgK}$

Heat Group Review

1. The lowest possible temperature in nature is

   A. 0 degrees Celsius
   B. 270 degrees Celsius
   C. 0 ~~degrees~~ Kelvin
   D. – 270 degrees Kelvin

2. The second law of thermodynamics states that heat will always flow from

   A. warm to cold
   B. cold to warm
   C. cold to cold
   D. warm to warm

3. Entropy is a measure of

   A. temperature and constant pressure
   B. temperature an pressure increases
   C. disorganized energy
   D. organized energy

4. How much heat is needed to raise the temperature of 1.2kg g of tin(c=230) from 24°C to 32°C?

   $m = 1.2kg \quad \Delta T = 32 - 24 = 8$
   $c = 230$
   $Q = mc\Delta T = 2208J$

5. What amount of water that is heated with 12,550J of energy will heat up from 10.0°C to 70.0°C?

   $Q = 12550J$
   $c = 4190 \frac{J}{kg \cdot K}$
   $\Delta T = 70 - 10 = 60K$
   $m = \frac{Q}{c\Delta T} = 0.05kg = 50g$

6. Heat transfer by conduction occurs when

   A. Electromagnetic waves travel through the air from one object to another
   B. Heat energy is transferred from one object to another through direct contact
   C. Heat energy moves in currents through a liquid or gas
   D. Heat energy in the form of radiation travels through space from one object to another

7. Styrofoam is a good heat

   A. Absorber
   B. Conductor
   C. Radiator
   D. Insulator

8. Heat transfer through convection occurs when

   A. Heat energy moves in currents through a liquid or gas
   B. Electromagnetic waves travel through the air from one object to another
   C. Heat energy is transferred from one object to another through direct contact
   D. Heat energy in the form of radiation travels through space from one object to another

9. If 13,000 joules were used to raise the temperature of a 5kg piece of lead(specific heat=129) to a temperature of 32 degrees Celsius. What was the initial temperature of the lead?

   $Q = 13000J \quad c = 129$
   $m = 5kg \quad T_f = 32°C$
   $\Delta T = \frac{Q}{mc} = 20.16°C \quad T_i = T_f - \Delta T = 11.84°C$

10. Heat travels from the Sun to the Earth by

A. Conduction
B. Convection
C. Radiation
D. Insulation

11. A good conductor of heat energy is usually a poor

A. Absorber
B. Conductor
C. Radiator
D. Insulator

12. Why does a piece of metal feel colder than a piece of wood at the same temperature?

A. Metal has a higher specific heat capacity
B. Metal is colder than wood
C. Metals are usually good heat conductors
D. Wood usually is a poor insulator

13. You found a shiny 0.825 kg rock in your back yard. If 5,000 J of heat caused the temperature to go from 25° C to 72° C, what is this rock made of?

$m = 0.825\ kg$

$Q = 5000\ J$

$\Delta T = 72 - 25 = 47\ K$

$c = \frac{Q}{m\Delta T} = 129\ \frac{J}{kgK}$

14. Melting snow

A. Neither warms nor cools the surrounding air
B. Cools the surrounding air
C. Warms the surrounding air

15. Evaporation takes place when matter changes from a

A. Solid to a liquid
B. Liquid to a gas
C. Gas to a liquid
D. Gas to a solid

16. Temperature is related closely to the_____.

A. total energy in something
B. average energy in a substance
C. average molecular kinetic energy in a substance
D. average heat in a substance

DON'T DO

17. 12,000 J of energy is added to a 1.5kg snowball as you hold it in your hands. What is the temperature of the water in your hands?

change in T

$Q = 12000\ J$

$m = 1.5\ kg$

$c = 4190$

$\Delta T = \frac{Q}{mc} = 1.91\ K$

18. Which temperature scale labels the freezing point of water at 0 degrees?

A. Celsius
B. Fahrenheit
C. Kelvin
D. Caloric

19. Heat is the _____.

A. total amount of energy contained in a substance.
B. average amount of energy contained in a substance.
C. energy that transfers from one substance to another due to a difference in temperature
D. amount of temperature in an object

20. The reason the temperature near the beach doesn't change as much as the temperature in the desesrt from day to night is that _____.

A. oceans are located in mild regions of the earth
B. oceans are located next to large land masses
C. water has a high specific heat capacity
D. water has a low specific heat capacity

21. You have 2.50 kg of some substance at 22.0°C. You find that it requires 3,200 J of energy to raise its temperature to 32.0°C. What is this substance you have? → $C = ?$

$m = 2.5\,kg$ $\Delta T = 32 - 22 = 10\,K$

$T_i = 22\,^\circ C$

$Q = 3200\,J$

$C = \frac{Q}{m\Delta T} = 128\,\frac{J}{kgK}$ Lead

22. When an iron ball is heated over a flame, the circumference of the ball becomes _____.

A. larger
B. smaller
C. stays the same
D. burnt

23. During a cold winters night, water pipes will sometimes burst because_____.

A. the ground contracts when colder, crushing the pipes.
B. water expands when frozen
C. water contracts when frozen
D. the thawing process releases pressure on the pipes

24. 30,000 J of heat energy is added to a 1.00 kg block of aluminum that has an initial temperature of 10.0°C. Calculate the final temperature.

$Q = 30{,}000$

$m = 1\,kg$

$T_i = 10\,^\circ C$

$C = 897\,\frac{J}{kgK}$

$\Delta T = \frac{Q}{mC} = 33.44\,^\circ K$

$T_f = T_i + \Delta T = 43.44\,^\circ C$