Sci111 Exam 3

*Name*_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) The fact that a thermometer "takes its own temperature" illustrates *1)* _____

A) the difference between heat and thermal energy.
B) the fact that molecules are constantly moving.
C) thermal equilibrium.
D) energy conservation.

2) When you touch a cold piece of ice with your finger, energy flows *2)* _____

A) from the ice to your finger. *B) from your finger to the ice.* *C) actually both ways*

3) A substance that heats up relatively quickly has a *3)* _____

A) low specific heat capacity. *B) high specific heat capacity.*

4) The moderate temperatures of islands throughout the world has much to do with water's *4)* _____

A) poor conductivity.
B) high specific heat capacity.
C) vast supply of thermal energy.
D) absorption of solar energy.
E) high evaporation rate.

5) Ice has a lower density than water because ice *5)* _____

A) sinks.
B) molecules are more compact in the solid state.
C) molecules vibrate at lower rates than water molecules.
D) density decreases with decreasing temperature.
E) is made of open–structured, hexagonal crystals.

6) Before ice can form on a lake, all the water in the lake must be cooled to *6)* _____

A) 4°C. *B) 0°C.*
C) a value slightly below 0°C. *D) Neither of these*

7) Some molecules are able to absorb large amounts of energy in the form of internal vibrations and rotations. Materials composed of such molecules have *7)* _____

A) low specific heat capacities. *B) high specific heat capacities.*

8) The fact that desert sand is very hot in the day and very cold at night is evidence that sand has a *8)* _____

A) high specific heat capacity. *B) low specific heat capacity.*

9) Pour a liter of water at 40°C into a liter of water at 20°C and the final temperature of the two becomes *9)* _____

A) more than 30°C. *B) less than 30°C.* *C) at or about 30°C.*

10) *The lowest temperature possible in nature is* 10) _____

A) –273°C. *B) 0°C.* *C) 4 K.*

11) *It is possible to wholly convert a given amount of heat energy into mechanical energy.* 11) _____

A) True *B) False* *C) Sometimes possible*

12) *It is possible to totally convert a given amount of mechanical energy into heat.* 12) _____

A) True *B) False*

13) *When 100 J of heat is added to a system that performs 60 J of work, the thermal energy change of the system is* 13) _____

A) 40 J.

B) 0 J.

C) 100 J.

D) 60 J.

E) none of these

14) *When a volume of air expands against the environment and no heat enters or leaves, the air temperature will* 14) _____

A) increase. *B) decrease.* *C) remain unchanged.*

15) *Suppose you put a closed, sealed can of air on a hot stove burner. The contained air will undergo an increase in* 15) _____

A) pressure.

B) temperature.

C) thermal energy.

D) all of these

E) none of these

16) *If you run a refrigerator in a closed room with the refrigerator door open, the room temperature will* 16) _____

A) increase. *B) decrease.* *C) remain unchanged.*

17) *As a system becomes more disordered, entropy* 17) _____

A) increases. *B) decreases.* *C) remains the same.*

18) *As a piece of metal with a hole in it cools, the diameter of the hole* 18) _____

A) remains the same. *B) increases.* *C) decreases.*

19) *If glass expanded more than mercury, then the column of mercury in a mercury thermometer would rise when the temperature* 19) _____

A) increases. *B) decreases.* *C) neither of these*

20) *Consider a sample of water at 0°C. If the temperature is slightly increased, the volume of water* 20) _____

A) remains the same. *B) expands.* *C) contracts.*

21) During a very cold winter, water pipes sometimes burst. The reason for this is 21) _____

A) the ground contracts when colder, pulling pipes apart.

B) the thawing process releases pressure on the pipes.

C) water expands when freezing.

D) water contracts when freezing.

E) none of these

22) Consider a metal ring with a gap cut in it. When the ring is heated, the gap 22) _____

A) becomes narrower. B) retains its size. C) becomes wider.

23) The higher the temperature of an object, the 23) _____

A) shorter the wavelengths it radiates. B) longer the wavelengths it radiates.

24) Objects that radiate relatively well, 24) _____

A) absorb radiation relatively well. B) reflect radiation relatively well.

C) both of these D) neither of these

25) A substance can absorb heat energy by the process of 25) _____

A) conduction. B) radiation. C) convection. D) all of these

26) Hot water will cool to room temperature faster in a 26) _____

A) black pot.

B) silver pot.

C) depends more on the size of the pots than their color

27) It is commonly thought that a can of beverage will cool faster in the coldest part of a refrigerator. Knowledge of Newton's law of cooling 27) _____

A) shows this common knowledge is false. B) supports this common knowledge.

28) A water–filled paper cup held in a flame will not catch fire. This is because 28) _____

A) the inside of the paper is wet.

B) water is an excellent conductor of heat.

C) the paper cup cannot become appreciably hotter than the water it contains.

D) paper is a poor conductor of heat.

29) The silver coating on the glass surfaces of a Thermos bottle reduces energy that is transferred by 29) _____

A) conduction.

B) radiation.

C) friction.

D) convection.

E) none of these

30) When a volume of air is compressed, its temperature 30) _____

A) increases.

B) decreases.

C) neither increases nor decreases.

31) The reason the Sun's radiant energy is of shorter wavelengths than the earth's is because the Sun 31) _____

A) has a higher temperature than the earth.

B) is an energy source while the earth is primarily an energy receiver.

C) has much more thermal energy.

D) all of these

E) none of these

32) Suppose you are served coffee at a restaurant before you are ready to drink it. In order for it to be the hottest when you are ready for it, you should add cream 32) _____

A) right away.

B) at any time.

C) when you are ready to drink the coffee.

33) The planet Earth loses heat mainly by 33) _____

A) radiation. B) convection. C) conduction. D) all of these

34) When heat is added to boiling water, the water temperature 34) _____

A) increases. B) decreases. C) stays the same.

35) In the mountains, water boils at 35) _____

A) a lower temperature than at sea level.

B) a higher temperature than at sea level.

C) the same temperature as at sea level.

36) Food in a pressure cooker is cooked faster because of the 36) _____

A) increased thermal energy in the water.

B) greater rate of bubble formation in the water.

C) higher temperature.

D) all of these

E) none of these

37) When a gas is changed to a liquid phase, the gas 37) _____

A) releases energy.

B) absorbs energy.

C) neither releases nor absorbs energy.

38) Increasing the temperature of 50 grams of water by 1°C requires 38) _____

A) 1 calorie. B) 50 calories. C) none of these

39) Ice is put in a cooler in order to cool the contents. To speed up the cooling process, the ice can be *39)* _____

A) wrapped in newspaper.

B) crushed.

C) drained of ice water periodically.

D) kept out of contact with the food.

E) kept in circulating air currents provided by a small fire under one end of the cooler.

40) A hot dog pants *40)* _____

A) to bring more oxygen into its lungs.

B) for no particular reason—some things just happen.

C) to impress dogs of the opposite sex.

D) to help evaporation occur in its mouth and bronchial tract.

1) C
2) B
3) A
4) B
5) E
6) A
7) B
8) B
9) C
10) A
11) B
12) A
13) A
14) B
15) D
16) A
17) A
18) C
19) B
20) C
21) C
22) C
23) A
24) A
25) D
26) A
27) B
28) C
29) B
30) A
31) A
32) A
33) A
34) C
35) A
36) C
37) A
38) B
39) B
40) D