

## Chapter 16 Review...Please study for the test.

Test Date: \_\_\_\_\_

**Modified True/False:** *Indicate whether the sentence or statement is true or false. If false, change the identified word or phrase to make the sentence or statement true.*

1. \_\_\_\_ Temperature is the measure of the average kinetic energy of a substance.
2. \_\_\_\_ When a gas condenses to a liquid it absorbs heat from its surroundings.
3. \_\_\_\_ To calculate the density of a fluid, you must divide its volume by its mass.
4. \_\_\_\_ A(n) liquid does not have a definite shape, but it does have a definite volume.
5. \_\_\_\_ Particles in a liquid move around just as freely as particles in a solid.
6. \_\_\_\_ The change in state from a gas to a liquid is called evaporation.
7. \_\_\_\_ Vaporization is when a solid changes into a gas without becoming a liquid first.
8. \_\_\_\_ When a substance cools it loses energy to its surroundings.
9. \_\_\_\_ Heating a fluid increases the viscosity of that fluid.
10. \_\_\_\_ The temperature of a substance increases when the kinetic energy of the substance increases.

### Multiple Choice :

11. \_\_\_\_ Which of the following best describes particles in a solid?  
A) particles tightly packed together  
B) no attractive forces between particles  
C) molecules slide past each other; sample takes shape of container  
D) fills whatever container it is in
12. \_\_\_\_ What does the constant bombardment of gas molecules against the inside walls of a container produce?  
A) temperature                      B) pressure  
C) density                              D) diffusion
13. \_\_\_\_ Why does a can collapse when a vacuum pump removes air from the can?  
A) The inside and outside forces balance out and crush the can  
B) The unbalanced outside force from atmospheric pressure crushes the can.  
C) The atmosphere exerts pressure on the inside of the can and crushes it.  
D) The vacuum pump creates a force that crushes the can.
14. \_\_\_\_ Why does the air pressure inside the tires of a car increase when the car is driven?  
A) Some of the air has leaked out.  
B) The air particles collide with the tire after the car is in motion.  
C) The air particles inside the tire increase their speed because their temperature rises.  
D) The atmosphere compresses the tire.

15. \_\_\_\_ When the temperature of a substance is lowered, its particles \_\_\_\_\_.  
 A) vibrate more slowly                      B) escape quickly the attractive forces of the other particles  
 C) vibrate more                                D) stop vibrating completely
16. \_\_\_\_ What happens to the volume of a gas during compression?  
 A) The volume increases.                      B) The volume decreases.  
 C) The volume remains constant.            D) It is impossible to tell because all gases are different.
17. \_\_\_\_ Compared with the particles in a gas, the particles in a liquid  
 A) have more energy.                      B) move around less.            C) are larger.                      D) are farther apart.
18. \_\_\_\_ Particles within a solid  
 A) do not move.                                B) vibrate energetically.  
 C) vibrate weakly about fixed positions.    D) exchange positions easily.
19. \_\_\_\_ Compared with the particles in a liquid, the particles in a solid usually are  
 A) higher in energy.                      B) more massive.                      C) closer together.                      D) more fluid.
20. \_\_\_\_ Solids have a definite volume because  
 A) the particles do not have a tendency to change positions.  
 B) the particles are far apart.  
 C) they can be easily compressed.  
 D) the energy of the particles is high.
21. \_\_\_\_ Which of the following properties do solids share with liquids?  
 A) fluidity                      B) definite volume                      C) definite shape                      D) slow rate of diffusion.
22. \_\_\_\_ Charles' Law relates what two variables?  
 A) Volume and pressure                      B) Volume and temperature  
 C) Temperature and pressure                D) Pressure and moles of gas
23. \_\_\_\_ Boyle's Law relates what two variables?  
 A) Volume and pressure                      B) Volume and temperature  
 C) Temperature and pressure                D) Pressure and moles of gas
24. \_\_\_\_ Increasing temperature  
 A) increases viscosity.                      B) decreases viscosity.  
 C) does not affect viscosity.                D) eliminates viscosity.
25. \_\_\_\_ Which of the following equations correctly relates the two variables?  
 A)  $P_1/V_1 = P_2/V_2$                       B)  $V_1/T_1 = V_2/T_2$                       C)  $(P_1)(T_1) = (P_2)(T_2)$                       D)  $(P_1)(n_1) = (P_2)(n_2)$
26. \_\_\_\_ According to the kinetic-molecular theory, particles of matter  
 A) are in constant motion.                      B) have different colors.                      C) have different shapes.                      D) are always fluid.

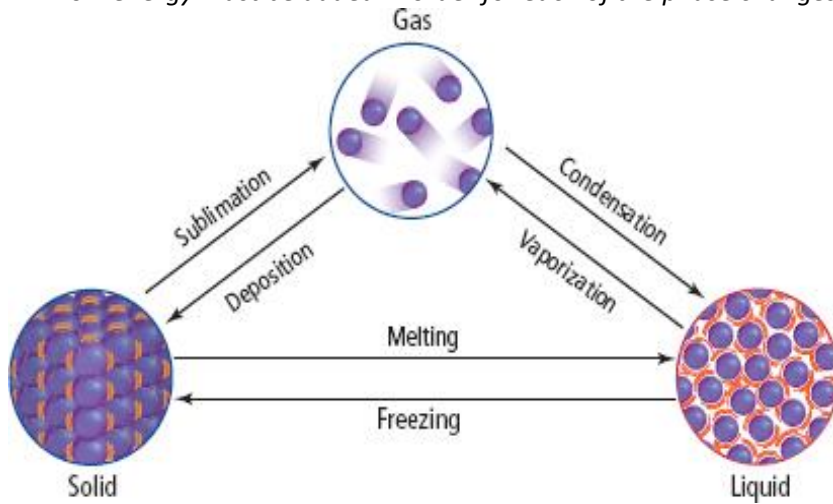
**Fill in the blank/Short Answer:**

27. According to Boyle's law, at a constant temperature, if the volume of a container of gas is

\_\_\_\_\_, then pressure of the gas will \_\_\_\_\_

28. Bernoulli's principle states that as the velocity of a fluid \_\_\_\_\_, the pressure exerted by the fluid \_\_\_\_\_.

29. In what **directions** must energy be added to cause the indicated phase changes? (*Hint: Add arrows to show how energy must be added in order for each of the phase changes to take place.*)



**Short Answer Essay:**

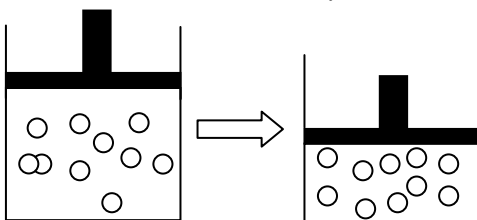
30. Describe the Kinetic Theory.

31. Describe thermal expansion. Which gas law is related to the concept of thermal expansion?

32. What does Archimedes' principle state?

33. Why does the air pressure inside the tire of a car increase when the car is driven?

34. The dots in the containers represent particles of air. Use what you know about pressure, temperature, volume, and the kinetic theory of matter to write a hypothesis to explain what is happening in the containers.



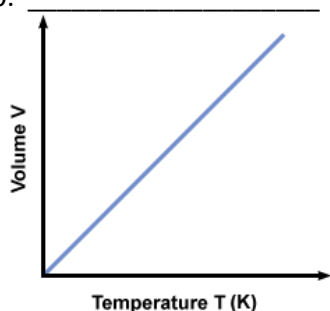
**Completion:** Each of the following examples gives a change in volume, temperature, amount, or pressure of a gas sample. Indicate whether the other variable mentioned would increase or decrease. ↑ = increases ↓ = decreases

35. An inflated balloon is placed in a refrigerator. The volume \_\_\_.
36. A piston in an engine compresses the gas into a smaller volume. The pressure \_\_\_.
37. Compressed air in scuba tanks cools off as a diver swims at deeper levels. The pressure in the tanks\_\_\_.
38. An unopened bag of potato chips is left in a hot car. The volume\_\_\_.
39. Dry ice (solid  $\text{CO}_2$ ) is sealed in a plastic bag. As the temperature increases, the amount of gas present in the bag

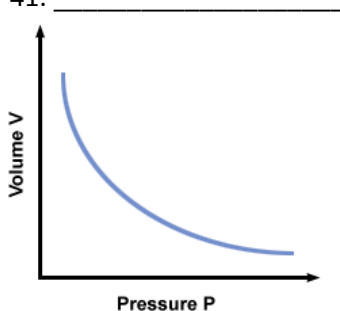
**Graph Analysis:**

The two graphs below represent one of the gas laws. Label each graph accordingly.

40.



41.



**Practice Problems:**

42. 25. A  $100 \text{ cm}^3$  object weighing  $0.49 \text{ N}$  ( $50 \text{ g}$ ) is placed in water. What is the buoyant force of the water ( $1 \text{ cm}^3$  of water weighs  $0.0098 \text{ N}$ ) on the object? Will the object sink or float?
43. A hydraulic lift is used to lift a heavy machine that is pushing down on a  $3.2 \text{ m}^2$  piston A1 with a force  $F_1$  of  $1200 \text{ N}$ . What force  $F_2$  needs to be exerted on a  $0.0068 \text{ m}^2$  piston A2 to lift the machine?
44. A hydraulic lift is used to lift a heavy machine that is pushing down on a  $6.8 \text{ m}^2$  piston A1 with a force  $F_1$  of  $900 \text{ N}$ . What force  $F_2$  needs to be exerted on a  $0.0075 \text{ m}^2$  piston A2 to lift the machine?
45. A balloon has a volume of  $8.0 \text{ L}$  at a pressure of  $101 \text{ kPa}$ . What will be the new volume when the pressure drops to  $43.0 \text{ kPa}$ ?
46. A sample of gas occupies a volume of  $2.00$  liters at a temperature of  $100 \text{ K}$ . What volume will the gas occupy at  $300 \text{ K}$  assuming the pressure remains constant?
47. An object weighs  $25 \text{ Newtons}$ . When submerged in a fluid it displaces  $20 \text{ N}$  of water. What is the buoyant force pushing up on this object? Will the object sink or float? Explain.