Name: _____ **Class:** _____ **Date:** _____ **ID: P**

Ch 13 and 14 practice Test

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

<u>You need to memorize all formulas, how to convert celsius to Kelvin and units of pressure.</u>
1 atm = 101.3 kPa
1 atm = 760 mm Hg or Torr

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$ **PV = nRT R=8.31 J/(mol K)**

____ 1. Most solids ____.
a. are able to flow
b. have a disorderly structure
c. are amorphous
d. are dense and difficult to compress

____ 2. Which of the following examples correctly explains what happens when a bottle of warm water is placed in a refrigerator.
a. The air molecules in the refrigerator will transfer their cold to the water molecules and make the water molecules move faster.
b. The water molecules will transfer their kinetic energy to the air molecules in the refrigerator, which causes the air molecules to move faster and the water molecules to move slower.
c. The water molecules will transfer their kinetic energy to the air molecules in the refrigerator, which causes the air molecules to move slower and the water molecules to move faster.
d. The air molecules in the refrigerator absorb the energy from the water and turn it into potential energy.

____ 3. The random molecular motion of a substance is greatest when the substance is
a. a gas.
b. condensed.
c. frozen.
d. a liquid.

____ 4. The direct change of a substance from a solid to a gas is called...
a. sublimation
b. condensation
c. evaporation
d. boiling

____ 5. In terms of kinetic energy, how does the pressure inside a car tire change as the air temperature outside the tire changes.
a. an increase in temperature will decrease the pressure inside the tire.
b. a decrease in temperature will increase the pressure inside the tire.
c. an increase in temperature will increase the pressure inside the tire

____ 6. Which of the following statements is part of the kinetic theory?
a. The particles of a gas move independently of each other.
b. The particles in a gas move rapidly.
c. The particles in a gas are relatively far apart.
d. all of the above

____ 7. When the external pressure is 505 kPa, what is the vapor pressure of water at its boiling point?
a. 505 kPa
b. 1010 kPa
c. 101.3 kPa
d. 0 kPa

____ 8. Water could be made to boil at 105°C instead of 100°C by ____.
a. taking the sample to a higher altitude
b. decreasing the external pressure
c. increasing the external pressure
d. adding a lot of energy to the water

____ 9. What is the pressure when a liquid is boiling at its normal boiling point?
a. 202 kPa
b. 505 kPa
c. 0 kPa
d. 101.3 kPa

____ 10. Why does the boiling point of a liquid decrease at higher elevations?
a. The boiling point decreases because the pressure increases.
b. The boiling point decreases because there are less air molecules colliding at higher elevations and less KE is needed.
c. The boiling point decreases because there are more air molecules colliding at higher elevations and more KE is needed.
d. None of the above.

____ 11. Which of the following statements is NOT true, according to the kinetic theory?
a. The particles of a gas collide with each other and with other objects.
b. Only particles of matter in the gaseous state are in constant motion.
c. There is no attraction between particles of a gas.
d. All of the statements are true.

____ 12. Consider an iron cube and an aluminum cube. If the two cubes were at the same temperature, how would the average kinetic energy of the particles in iron compare with the average kinetic energy of the particles in aluminum?
a. No determination can be made based on the information given.
b. The average kinetic energy of the aluminum particles would be greater.
c. The average kinetic energy of the iron particles would be greater.
d. There would be no difference in the average kinetic energies.

____ 13. According to the kinetic theory of gases, the particles in a gas:
a. move in rapid, constant motion
b. move independently of each other
c. are far apart
d. All of the above

____ 14. The average kinetic energy of the particles of a substance ____.
a. increases as the temperature of the substance is lowered
b. is not affected by the temperature of the substance
c. is equal to the total energy absorbed by the substance
d. is directly proportional to the temperature of the substance

____ 15. Which states of matter can flow?
a. gases, liquids, and solids
b. gases and liquids only
c. gases only
d. liquids only

____ 16. What happens to the rate of evaporation of a liquid as the liquid is cooled?
a. It decreases.
b. It does not change.
c. The change cannot be determined.
d. It increases.

____ 17. Why is boiling a cooling process?

a. The particles with more potential energy leave the liquid first, leaving the remaining particles with less potential energy
b. The particles with less potential energy leave the liquid first, leaving the remaining particles with more potential energy
c. The particles with more kinetic energy leave the liquid first, leaving the remaining particles with less kinetic energy
d. The particles with less kinetic energy leave the liquid first, leaving the remaining particles with more kinetic energy

____ 18. When the vapor pressure of a liquid is equal to the atmospheric pressure, the liquid ____.

a. boils vigorously.
b. evaporates.
c. has no observable changes.
d. begins to boil.

____ 19. What instrument is normally used to measure atmospheric pressure?

a. manometer
b. vacuum
c. barometer
d. thermometer

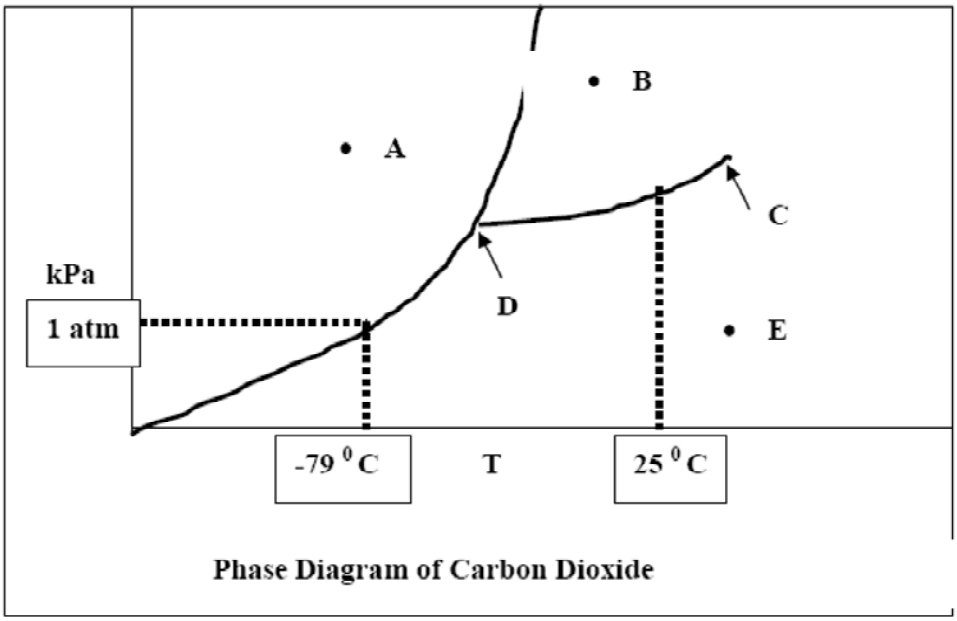
____ 20. Particles of a gas will move

a. Slowly and predictably.
b. In controlled, spiral motions.
c. In random motions, constantly colliding with each other.
d. Parallel to the surface of a liquid.

____ 21. What must happen for liquid water to freeze?

a. The water must absorb kinetic energy from the surroundings.
b. The water molecules must begin to move in random patterns.
c. The water molecules must begin to move faster
d. The water must release energy to the surroundings.

Name: _____ **ID: P**



Phase Diagram of Carbon Dioxide

____ 22. **In the above phase diagram for carbon dioxide, carbon dioxide is a liquid at 25⁰ C and a very high pressure. Carbon dioxide solidifies when the temperature decreases and the pressure remains constant.**
What would happen to a sample of Carbon Dioxide at a constant pressure of 0.9 atm if it were heated from -100°C to 25°C?

a. It would melt
b. It would freeze
c. It would boil
d. It would sublime
e. It would condense

____ 23. Which state/s of matter has no attractive or intermolecular forces between the particles?

a. gases, liquids, and solids
b. liquids only
c. gases only
d. gases and liquids only

____ 24. What happens to the average kinetic energy of the particles in a sample of matter if the temperature of the sample is increased?

a. it does not change
b. it increases
c. it decreases

____ 25. The pressure of a gas in a container is 152 mm Hg. This is equivalent to how many atm?

a. 0.3 atm
b. 0.4 atm
c. 0.2 atm
d. 2 atm

____ 26. The temperature at which the motion of particles theoretically ceases is _____?

a. 0 K
b. 0°C
c. –273 K
d. 273°C

____ 27. Standard conditions when working with gases are defined as ____.

a. 0°C and 101.3 kPa
b. 0 K and 101.3 kPa
c. 0°C and 1 kPa
d. 0 K and 1 kPa

____ 28. Why does the pressure inside a container of gas increase if more gas is added to the container?
a. There is an increase in the number of collisions between particles and the walls of the container.
b. There is an increase in the temperature of the gas.
c. There is a decrease in the volume of the gas.
d. There is an increase in the force of the collisions between the particles and the walls of the container.

____ 29. If the volume of a container of gas is reduced, what will happen to the pressure inside the container?
a. The pressure will increase.
b. The pressure will not change.
c. The pressure will decrease.
d. The pressure depends on the type of gas.

____ 30. When the temperature and number of particles of a gas are constant, which of the following is also constant?
a. the sum of the pressure and volume
b. the difference of the pressure and volume
c. the product of the pressure and volume
d. the ratio of the pressure and volume

____ 31. If a balloon is heated, what happens to the volume of the air in the balloon if the pressure is constant?
a. It increases.
b. It stays the same.
c. It decreases.
d. The change cannot be predicted.

____ 32. When the volume and number of particles of a gas are constant, which of the following is also constant?
a. the sum of the pressure and temperature in kelvins
b. the difference of the pressure and temperature in kelvins
c. the product of the pressure and temperature in kelvins
d. the ratio of the pressure and temperature in kelvins

____ 33. A 50.0 L container holds 88.0 g of Carbon Dioxide at 298 K. What is the pressure inside the container?
a. 48.7 kPa
b. 101.3 kPa
c. 87.8 kPa
d. 99.1 kPa

____ 34. What is the new volume when 10.0 L of Neon gas at 10^{o}C is heated to 100^{o}C without changing the pressure.
a. 22.0 L
b. 7.6 L
c. 13.2 L
d. 100. L

____ 35. What is the volume of 63.8 g of Carbon Dioxide at a pressure of 75.0 kPa and a temperature of 345 K?
a. 78.4 L
b. 8.23 L
c. 55.4 L
d. 22.4 L

____ 36. A 200. mL sample of gas is collected at 50.0 kPa and a temperature of 271^{o}C. What volume would this gas occupy at 100. kPa and a temperautre of -14.0^{o}C?
a. 125 mL
b. 47.6 mL
c. -5.17 mL
d. 87.8 L

____ 37. A sample of a gas with a volume of 3.9 L at 27°C and 1.00 atm is cooled at a constant pressure until the temperature is 11°C. Calculate the new volume.
a. 1.4 L
b. 5.1 L
c. 3.7 L
d. 4.0 L

____ 38. At what temperature will 0.654 moles of neon gas occupy 12.30 liters at 1.95 atmospheres?
a. 447 K
b. 298 K
c. 328 K
d. 4.4 K

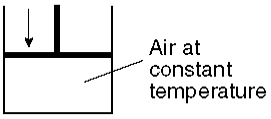
____ 39. The volume of 400 mL of chlorine gas at 400 mm Hg is decreased to 200 mL at constant temperature. What is the new gas pressure?

a. 800 mm Hg
c. 650 mm Hg
b. 300 mm Hg
d. 400 mm Hg

____ 40. The average kinetic energy of gas particles will be directly proportional to

a. The Pressure of the gas.
c. The Celsius temperature of the gas.
b. The number of moles of a gas.
d. The ideal gas constant.

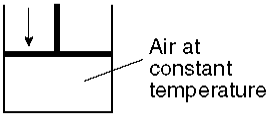
____ 41. A cylinder with a tightly fitted piston is shown in the diagram below.



As the piston moves downward, the volume of air in the cylinder…

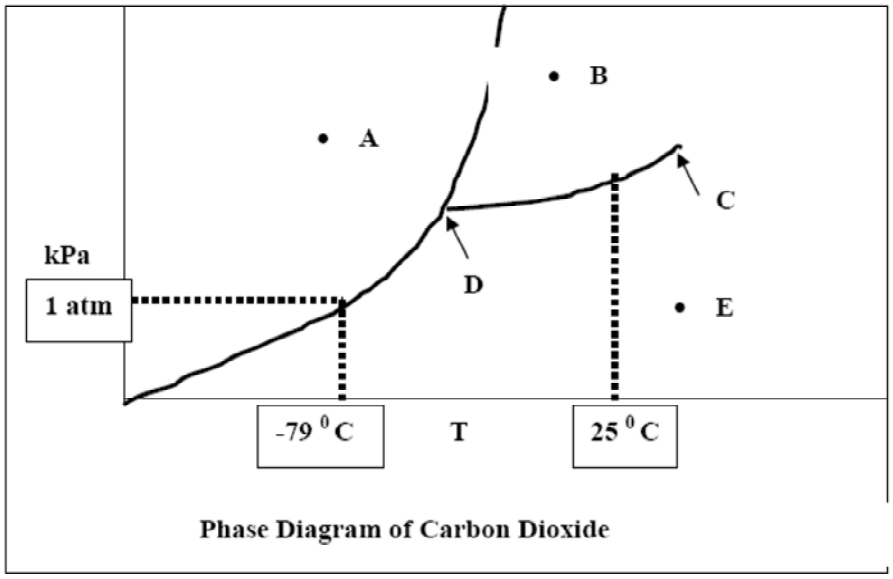
a. Decreases
c. Fluctuates
b. Stays the same
d. Increases

____ 42. A cylinder with a tightly fitted piston is shown in the diagram below.



As the piston moves downward, the pressure inside the cylinder…

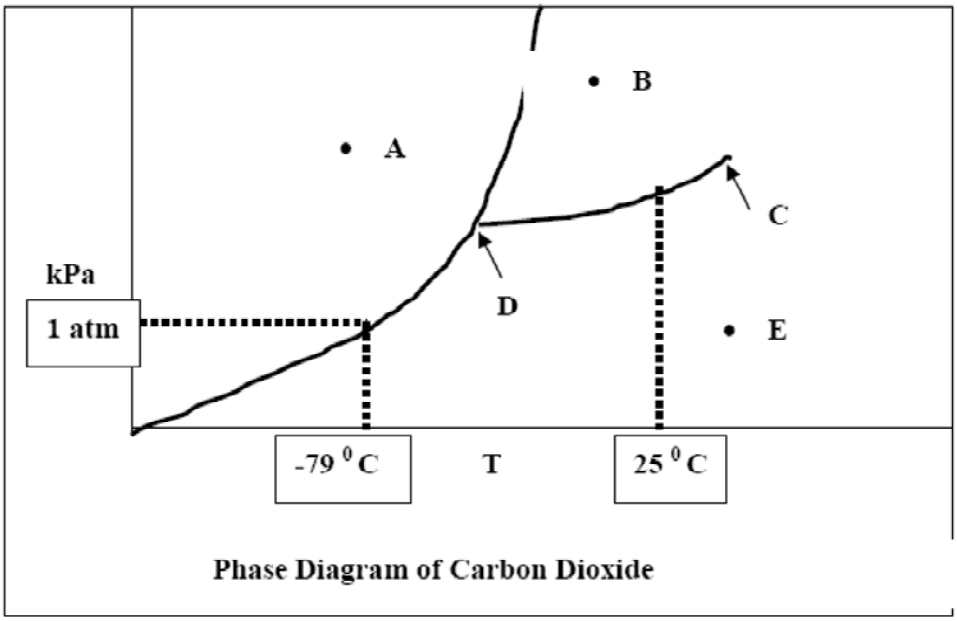
a. Decreases
c. Stays the same
b. Fluctuates
d. Increases



___ 43. **In the above phase diagram for carbon dioxide, carbon dioxide is a liquid at 25^0 C and a very high pressure. Carbon dioxide solidifies when the temperature decreases and the pressure remains constant.**

What does the line separating the solid phase from the liquid phase represent?

a. the values at which the solid and liquid phases vaporize
b. the values at which the solid and liquid phases are in dynamic equilibrium.
c. the values at which the solid and liquid phases condense



Phase Diagram of Carbon Dioxide

____ 44. **In the above phase diagram for carbon dioxide, carbon dioxide is a liquid at 25^0 C and a very high pressure. Carbon dioxide solidifies when the temperature decreases and the pressure remains constant.**
Which letter represents the point at which all three states coexist?

a. A
b. B
c. C
d. D

____ 45. A car has an internal volume of 2500 L. The temperature inside the car is 27.2°C. The pressure is 742 mm Hg. How many moles of gas are inside the car?
a. 99.1 mol
b. 42.8 mol
c. 16.7 mol
d. 22.4 mol

True/False
Indicate whether the statement is true or false.

____ 46. The melting point and the freezing point of a substance occur at the same temperature.

____ 47. Deposition occurs when a solid turns to a gas.

Ch 13 and 14 practice Test
Answer Section

MULTIPLE CHOICE

1. ANS: D PTS: 1 DIF: L2 REF: p. 396
   OBJ: 13.3.1
2. ANS: B
   St. 7a

   PTS: 1 STA: 7a
3. ANS: A
   St. 4b, 7a

   PTS: 1 STA: 4b, 7a
4. ANS: A PTS: 1
5. ANS: C PTS: 1
6. ANS: D PTS: 1 DIF: L1 REF: p. 385
   OBJ: 13.1.1 STA: Ch.4.b
7. ANS: A PTS: 1 DIF: L2 REF: p. 394
   OBJ: 13.2.4 STA: Ch.4.d
8. ANS: C PTS: 1 DIF: L2 REF: p. 394
   OBJ: 13.2.4 STA: Ch.4.a
9. ANS: D PTS: 1 DIF: L2 REF: p. 395
   OBJ: 13.2.4 STA: Ch.4.d
10. ANS: B PTS: 1
11. ANS: B PTS: 1 DIF: L2 REF: p. 385
    OBJ: 13.1.1 STA: Ch.4.b
12. ANS: D PTS: 1 DIF: L3 REF: p. 388
    OBJ: 13.1.3 STA: Ch.7.a
13. ANS: D PTS: 1
14. ANS: D PTS: 1 DIF: L2 REF: p. 389
    OBJ: 13.1.3 STA: Ch.7.a
15. ANS: B PTS: 1 DIF: L2 REF: p. 390
    OBJ: 13.2.1
16. ANS: A PTS: 1 DIF: L2 REF: p. 391
    OBJ: 13.2.2 STA: Ch.7.a
17. ANS: C PTS: 1
18. ANS: D PTS: 1 DIF: L1 REF: p. 393
    OBJ: 13.2.4 STA: Ch.4.a
19. ANS: C PTS: 1 DIF: L1 REF: p. 386
    OBJ: 13.1.2
20. ANS: C
    Standard 4b

    PTS: 1 STA: 4b

21. ANS: D
St. 7c

PTS: 1

22. ANS: D PTS: 1
23. ANS: C PTS: 1
24. ANS: B PTS: 1
25. ANS: C PTS: 1
26. ANS: A PTS: 1
27. ANS: A PTS: 1 DIF: L1 REF: p. 387
OBJ: 13.1.2 STA: Ch.4.d
28. ANS: A PTS: 1 DIF: L1 REF: p. 415
OBJ: 14.1.2 STA: Ch.4.a
29. ANS: A PTS: 1 DIF: L1 REF: p. 416
OBJ: 14.1.2 STA: Ch.4.c
30. ANS: C PTS: 1 DIF: L1 REF: p. 418
OBJ: 14.2.1 STA: Ch.4.c
31. ANS: A PTS: 1 DIF: L1 REF: p. 420
OBJ: 14.2.1 STA: Ch.4.c
32. ANS: D PTS: 1 DIF: L1 REF: p. 422
OBJ: 14.2.1 STA: Ch.4.c
33. ANS: D PTS: 1
34. ANS: C PTS: 1
35. ANS: C
Stt. 4h

PTS: 1 STA: 4h
36. ANS: B PTS: 1
37. ANS: C
St. 4c

PTS: 1 STA: 4c
38. ANS: A PTS: 1
39. ANS: A
St. 4c

PTS: 1 STA: 4c
40. ANS: A
St. 4c,g

PTS: 1 STA: 4c,g
41. ANS: A
Standard 4c

PTS: 1 STA: 4c

42. ANS: D
St. 4c

PTS: 1

43. ANS: B PTS: 1
44. ANS: D PTS: 1
45. ANS: A PTS: 1

TRUE/FALSE

46. ANS: T PTS: 1
47. ANS: F PTS: 1