

Kinetic Molecular Theory: Review

- In what ways do real gases differ from ideal gas behaviour.
 - At what conditions would real gases behave like ideal gases.
- In a closed system, what happens to the pressure of a gas when the absolute temperature is tripled, the volume is tripled and the number of molecules is tripled.
- A flask contains a mixture of three gases which are at the same temperature. The three gases are helium, methane and sulphur dioxide. At this temperature, the average molecular velocity of the methane molecule is 600 m/s. Calculate the average molecular velocities for the helium and sulphur dioxide molecules.
- Two identical containers are at the same temperature. One contains oxygen gas and the other helium gas. The kinetic energy of the molecules of helium is (a) eight times greater than, (b) eight times smaller than, (c) four times greater than, (d) equal to that of the molecules of oxygen.
- The KMT states that gases are made up of particles called molecules which:
 - are in continuous and random straight line motion
 - collide with each other and the container wall
 - have very large spaces between them
 - have an average K.E. directly proportional to the Kelvin temperatureWhich of the above points BEST explains why gases are easily compressed?
- The "molar volume of a gas" is (a) the volume occupied by the Avogadro number of molecules of the gas, (b) the volume occupied by one molecule of the gas, (c) the volume occupied by 22.4g of the gas, (d) 22.5 L of the gas at STP.
- At a constant pressure, what will be the effect on a volume of gas of raising temperature?
- A gas is heated in a closed vessel. What will happen to the molecules?
- If a sample of gas is compressed at constant temperature, what will be the effect of such change?
- If a great quantity of gas is removed from a container made of thick steel; What can be concluded?
- As a result of cooling, we lower the pressure inside a glass bulb containing a gas. Why is the pressure lowered?
- Through inflation with the aid of an air pump we increased the pressure inside a car tire from 200 to 400 kPa. According to the KMT how can we explain the fact that the pressure is doubled?

Pick the false statement:

- Consider two equal sized containers. One contains helium and the other, hydrogen gas.
 - If the container is made larger, the pressure will drop.
 - Each container holds the same number of molecules of gas.
 - Each container holds the same number of grams of gas.
- Temperature is a measure of:
 - The average potential energy of the molecules
 - The average kinetic energy of the molecules
 - The total kinetic energy of the molecules

15. Explain why condensation is a heat evolving process.
16. Under what conditions will a gas condense into a liquid?
17. Do the molecules of two different gases at the same temperature have the same average velocity? Explain.
18. What would happen to a gas if the collisions between its molecules and the container wall were not elastic?
19. A liquid takes the shape of its container but has a definite volume. This may be explained by the fact the molecules of a liquid .
- A) Attract each other.
 - B) Do not attract each other.
 - C) Have small spaces between them.
 - D) Have large spaces between them.
20. If the temperature of a gas could be lowered to -273°C its kinetic energy would .
- A) Remain constant
 - B) Decrease by half
 - C) Increase
 - D) Become zero
21. Consider the velocities of molecules in a gas. Identify the False statement.
- A) At the same temperature, lighter molecules have higher average velocity than heavier ones.
 - B) There are more high speed molecules at 500°C than at 300°C .
 - C) All molecules are moving faster at 500°C than at 300°C .
 - D) At 500°C the average kinetic energy of oxygen molecules will be greater than the average kinetic energy of hydrogen molecules at 300°C .
22. With respect to the kinetic energy of SO_2 and CH_4 gas at the same temperature:
- A) Both have the same kinetic energy.
 - B) Kinetic energy of the SO_2 is four times that of CH_4 .
 - C) Kinetic energy of SO_2 is twice that of CH_4 .
 - D) Kinetic energy of SO_2 is half that of CH_4 .
23. Gases can be distinguished from solids and liquids because they are compressible. The KMT explains this by proposing that in gases:
- A) The molecules are continually in motion.
 - B) The molecules have large spaces between them.
 - C) The molecules collide with each other and their container.
 - D) The collisions are elastic.
24. Two identical containers are filled with two different gases at the same temperature and the same pressure. What conclusion can be made about their kinetic energy?
25. A liquid takes the shape of its container but has a definite volume. Explain.

26. In terms of KMT, explain why:
- A) Gases fill their containers.
 - B) Gases are compressible.
 - C) Gases exert pressure.
 - D) Gases are invisible (will mix each other)
27. By means of the KMT explain why?
- A) Heating air out of a tire reduces the pressure.
 - B) The pressure exerted by a gas increases as it is heated.
 - C) 2 g of oxygen gas in a given container exerts twice the pressure compared to 1 g of oxygen in the same container, at the same temperature.
 - D) Hydrogen diffuses faster than oxygen when the two gases are at the same temperature.
28. Which of the following statements is NOT a correct explanation of the three states of matter.
- A) In a solid, the attractive forces between the particles are too strong to allow them complete freedom of motion.
 - B) The attractive forces between the particles of a liquid are strong enough so that a liquid has a definite volume, but weak enough so that the particles can move with respect to one another.
 - C) In a gas, the attractive forces are so weak that the particles have almost complete freedom of motion.
 - D) The attractive forces in all three states are the same but the particles themselves are different.
29. Which of the following may cause an increase in the number of collisions between the molecules of a gas in a cylinder with a piston as illustrated?
- A) An increase in the volume of the gas.
 - B) A decrease in the volume of the gas.
 - C) An increase in the number of molecules of the gas.
 - D) A decrease in the number of molecules of the gas.