

States of Matter

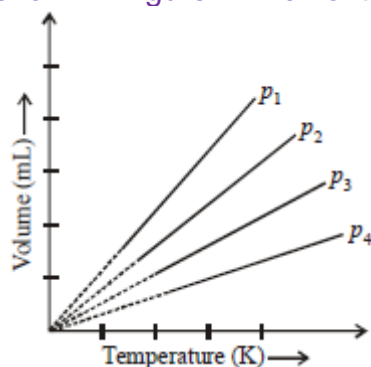
Q.1. The pressure of a 1 : 4 mixture of dihydrogen and dioxygen enclosed in a vessel is one atmosphere. What would be the partial pressure of dioxygen ?

- a) $0.8 \times 10^5 \text{ atm}$
- b) 0.008 Nm^{-2}
- c) $8 \times 10^4 \text{ Nm}^{-2}$
- d) 0.25 atm

Q.2. The ratio of Boyle's temperature and critical temperature for a gas is :

- a) $8/27$
- b) $27/8$
- c) $1/2$
- d) $2/1$

Q.3. A plot of volume (V) versus temperature (T) for a gas at constant pressure is a straight line passing through the origin. The plots at different values of pressure are shown in figure. Which of the following order pressure is correct for this gas ?



- a) $p_1 > p_2 > p_3 > p_4$
- b) $p_1 = p_2 = p_3 = p_4$
- c) $p_1 < p_2 < p_3 < p_4$
- d) $p_1 < p_2 = p_3 < p_4$

Q.4. Densities of two gases are in the ratio 1:2 and their temperatures are in the ratio 2:1 then the ratio of their respective pressures is

- a) 1:1
- b) 1:2
- c) 2:1
- d) 4:1

Q.5. Which of the following mixtures of gases does not obey Dalton's law of partial pressure ?

- a) O_2 and CO_2
- b) N_2 and O_2
- c) Cl_2 and O_2
- d) NH_3 and HCl

Q.6. Increase in kinetic energy can overcome intermolecular forces of attraction.

How will the viscosity of liquid be affected by the increase in temperature ?

- a) Increases
- b) No effect
- c) Decreases
- d) No regular pattern will be followed

Q.7. Which pair of the gaseous species diffuse through a small jet with the same rate of diffusion at same P

and T

- a) NO, CO
- b) NO, CO₂
- c) NO, C₂H₆
- d) NH₃, PH₃

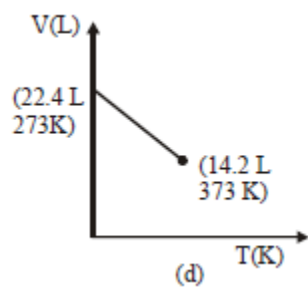
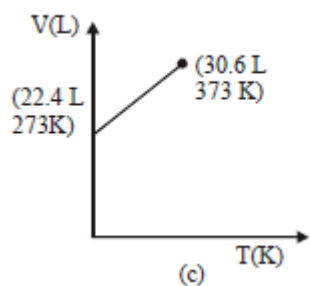
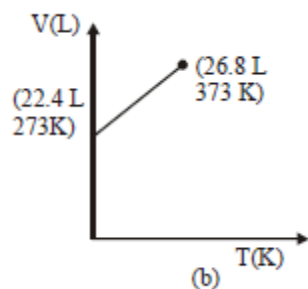
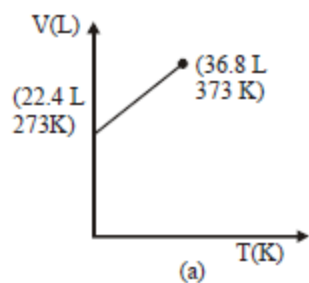
Q.8. At what temperature the RMS velocity of SO₂ be same as that of O₂ at 303 K ?

- a) 273 K
- b) 606 K
- c) 303 K
- d) 403 K

Q.9. The value of van der waals constant 'a' for gases O₂, N₂, NH₃ and CH₄ are 1.360, 1.390, 4.170 and 2.253 liter² atm mol⁻² respectively. The gas which can most easily be liquefied is :

- a) O₂
- b) N₂
- c) NH₃
- d) CH₄

Q.10. Which of the following volume (V) - temperature (T) plots represents the behaviour of one mole of an ideal gas at one atmospheric pressure ?



Q.11. Gases deviate from ideal behaviour because molecules

- a) are colourless
- b) are spherical
- c) attract each other
- d) have high speeds

Q.12. Dominance of strong repulsive forces among the molecule of the gas:

- a) depends on Z and indicates that $Z = 1$
- b) depends on Z and indicates that $Z > 1$
- c) depends on Z and indicates that $Z < 1$
- d) is independent of Z

Q.13. The term which accounts for intermolecular forces in a van der Waal equation is:

- a) $(V - b)$
- b) $(RT)^{-1}$
- c) $(P + a/V^2)$
- d) RT

Q.14. The density of a gas A is twice that of gas B. Molecular mass of A is half of the molecular mass of B. The ratio of the partial pressure of A and B is _____

- a) $1/4$
- b) $1/2$
- c) $4/1$
- d) $2/1$

Q.15. A gas can be liquefied:

- a) above its critical temperature
- b) at its critical temperature
- c) below its critical temperature
- d) at any temperature

Q.16. The density of neon will be highest at

- a) STP
- b) 0°C and 2 atm
- c) 273°C , 1 atm
- d) 273°C , 0.5 atm

Q.17. A gas diffuses $1/5$ times as fast as hydrogen. Its molar mass is

- a) 25
- b) 50
- c) $25\sqrt{2}$
- d) $50\sqrt{2}$

Q.18. 0.5 mole of each of H_2 , SO_2 and CH_4 are kept in a container. A hole was made in the container. After 3 hours, the order of partial pressures in the container will be

- a) $P_{\text{SO}_2} > P_{\text{CH}_4} > P_{\text{H}_2}$
- b) $P_{\text{H}_2} > P_{\text{SO}_2} > P_{\text{CH}_4}$
- c) $P_{\text{CH}_4} > P_{\text{SO}_2} > P_{\text{H}_2}$
- d) $P_{\text{H}_2} > P_{\text{CH}_4} > P_{\text{SO}_2}$

Q.19. If r.m.s. speed of gaseous molecules is

$x \text{ cm sec}^{-1}$ at a pressure of $p \text{ atm}$, then r.m.s. speed at a pressure of $2p \text{ atm}$ and constant temperature will be

- a) x
- b) $2x$
- c) $4x$
- d) $x/4$

Q.20. When temperature is increased, surface tension of water

- a) increases
- b) decreases
- c) remains constant
- d) shows irregular behaviour

Q.21. Density ratio of O_2 and H_2 is 16 : 1. The ratio of their r.m.s velocities will be

- a) 4 : 1
- b) 1 : 16
- c) 1 : 4
- d) 16 : 1

Q.22. Steam distillation is based on

- a) Boyle's Law
- b) Charle's Law
- c) Dalton's Law of partial pressures
- d) Avogadro's Law

Q.23. Equal masses of methane and oxygen are mixed in an empty container at 25°C . The fraction of the total pressure exerted by oxygen is

- a) $1/2$
- b) $2/3$
- c) $(1/2) \times (273/298)$
- d) $1/3$

Q.24. In van der Waal equation of state of gas laws, the constant b is a measure of

- a) Intermolecular collisions per unit volume
- b) Intermolecular attraction
- c) Volume occupied by the molecules
- d) pressure of gas

Q.25. The compressibility factor for H_2 and He is usually

- a) >1
- b) $=1$
- c) <1
- d) either of these