DPP - Daily Practice Problems

Date : ☐ **Start Time :** ☐ **End Time :** ☐

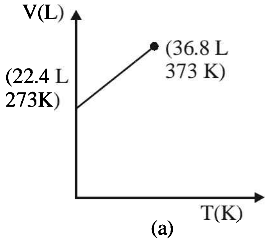
CHEMISTRY CC05

SYLLABUS : States of Matter

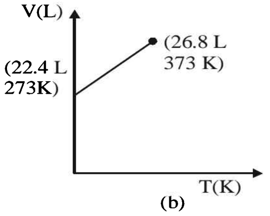
Max. Marks : 120 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 30 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

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



(a)



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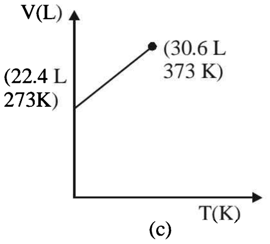

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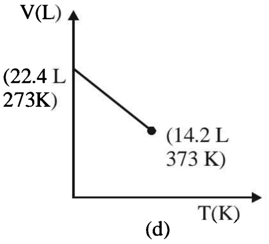
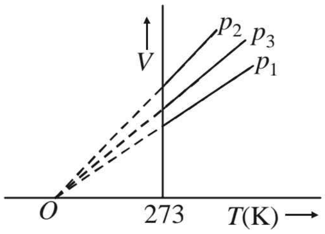


(d)

RESPONSE GRID	**1.** ⓐⓑⓒⓓ

2. The volume-temperature graphs of a given mass of an ideal gas at constant pressure are shown below.



What is the correct order of pressures ?

(a) $p_1 > p_3 > p_2$ (b) $p_1 > p_2 > p_3$

(c) $p_2 > p_3 > p_1$ (d) $p_2 > p_1 > p_3$

3. The inversion temperature T_i (K) of hydrogen is (given van der Waal's constants a and b are 0.244 atm L^2 mol^{-2} and 0.027 L mol^{-1} respectively)

(a) 440 (b) 220 (c) 110 (d) 330

4. The temperature of the gas is raised from 27°C to 927°C, the root mean square velocity is

(a) $\sqrt{927/27}$ time the earlier value

(b) same as before

(c) halved

(d) doubled

5. 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) $\frac{1}{3} \times \frac{273}{298}$ (d) 1/3.

6. The ratio between the root mean square speed of H_2 at 50 K and that of O_2 at 800 K is,

(a) 4 (b) 2

(c) 1 (d) 1/4

7. Calculate the total pressure in a 10.0 L cylinder which contains 0.4g helium, 1.6 g oxygen and 1.4 g nitrogen at 27°C.

(a) 0.492 atm (b) 49.2 atm

(c) 4.52 atm (d) 0.0492 atm

8. A bottle of dry ammonia and a bottle of dry hydrogen chloride connected through a long tube are opened simultaneously at both ends the white ammonium chloride ring first formed will be

(a) at the centre of the tube.

(b) near the hydrogen chloride bottle.

(c) near the ammonia bottle.

(d) throughout the length of the tube.

9. The r.m.s velocity of CO_2 at temperature T (in kelvin) is x cms^{-1}. At what temperature (in kelvin) the r.m.s. velocity of nitrous oxide would be 4x cms^{-1} ?

(a) 16T (b) 2T

(c) 4T (d) 32T

10. A mixture of two gases A and B in the mole ratio 2 : 3 is kept in a 2 litre vessel. A second 3L vessel has the same two gases in the mole ratio 3 : 5. Both gas mixtures have the same temperature and same total pressure. They are allowed to intermix and the final temperature and the total pressure are the same as the initial values, the final volume being 5 litres. Given that the molar masses are M_A and M_B. What is the mean molar mass of the final mixture?

(a) $\frac{5M_A + 8M_B}{13}$ (b) $\frac{77M_A + 123M_B}{200}$

(c) $\frac{123M_A + 77M_B}{250}$ (d) $\frac{123M_A + 77M_B}{150}$

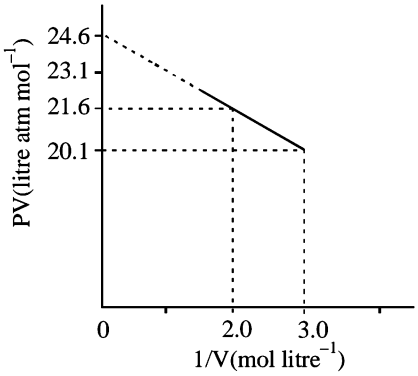
11. At constant volume and temperature conditions, the rate of diffusion D_A and D_B of gases A and B having densities ρ_A and ρ_B are related by the expression.

(a) $D_A = \left[D_B \frac{\rho_A}{\rho_B}\right]^{1/2}$ (b) $D_A = \left[D_B \frac{\rho_B}{\rho_A}\right]^{1/2}$

(c) $D_A = D_B\left(\frac{\rho_A}{\rho_B}\right)^{1/2}$ (d) $D_A = D_B\left(\frac{\rho_B}{\rho_A}\right)^{1/2}$

RESPONSE GRID	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ	6. ⓐⓑⓒⓓ
	7. ⓐⓑⓒⓓ	8. ⓐⓑⓒⓓ	9. ⓐⓑⓒⓓ	10. ⓐⓑⓒⓓ	11. ⓐⓑⓒⓓ

12. For one mole of a van der Waals gas when $b = 0$ and $T = 300$ K, the PV vs, 1/V plot is shown below. The value of the van der Waals constant a (atm. liter^2 mol^{-2}) is :



(a) 1.0 (b) 4.5 (c) 1.5 (d) 3.0

13. As the temperature is raised from 20°C to 40°C, the average kinetic energy of neon atoms changes by a factor of which of the following ?

(a) $313/293$ (b) $\sqrt{(313/293)}$

(c) $1/2$ (d) 2

14. Maximum deviation from ideal gas is expected from :

(a) $N_2(g)$ (b) $CH_4(g)$

(c) $NH_3(g)$ (d) $H_2(g)$

15. Equal masses of H_2,O_2 and methane have been taken in a container of volume V at temperature 27°C in identical conditions. The ratio of the volumes of gases $H_2 : O_2$: methane would be :

(a) $8:16:1$ (b) $16:8:1$

(c) $16:1:2$ (d) $8:1:2$

16. Equal moles of hydrogen and oxygen gases are placed in a container with a pin-hole through which both can escape. What fraction of the oxygen escapes in the time required for one-half of the hydrogen to escape ?

(a) 1/8 (b) 1/4

(c) 3/8 (d) 1/2

17. Which one of the following statements is NOT true about the effect of an increase in temperature on the distribution of molecular speeds in a gas?

(a) The area under the distribution curve remains the same as under the lower temperature

(b) The distribution becomes broader

(c) The fraction of the molecules with the most probable speed increases

(d) The most probable speed increases

18. According to the kinetic theory of gases, in an ideal gas, between two successive collisions a gas molecule travels

(a) in a wavy path

(b) in a straight line path

(c) with an accelerated velocity

(d) in a circular path

19. For 1 mol of an ideal gas at a constant temperature T, the plot of (log P) against (log V) is a (P : Pressure, V : Volume)

(a) Straight line parallel to x-axis.

(b) Straight line with a negative slope.

(c) Curve starting at origin.

(d) Straight line passing through origin.

20. When $CO_2(g)$ is passed over red hot coke it partially gets reduced to $CO(g)$. Upon passing 0.5 L of $CO_2(g)$ over red hot coke, the total volume of the gases increased to 700 mL. The composition of the gaseous mixture at STP is

(a) $CO_2 = 300$ mL; $CO = 400$ mL

(b) $CO_2 = 0.0$ mL; $CO = 700$ mL

(c) $CO_2 = 200$ mL; $CO = 500$ mL

(d) $CO_2 = 350$ mL; $CO = 350$ mL

21. For gaseous state, if most probable speed is denoted by C*, average speed by $\bar{C}$ and mean square speed by C, then for a large number of molecules the ratios of these speeds are :

(a) $C^* : \bar{C} : C = 1.225 : 1.128 : 1$

(b) $C^* : \bar{C} : C = 1.128 : 1.225 : 1$

(c) $C^* : \bar{C} : C = 1 : 1.128 : 1.225$

(d) $C^* : \bar{C} : C = 1 : 1.225 : 1.128$

RESPONSE GRID	**12.** ⓐⓑⓒⓓ	**13.** ⓐⓑⓒⓓ	**14.** ⓐⓑⓒⓓ	**15.** ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ
	17. ⓐⓑⓒⓓ	**18.** ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ	**20.** ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ

22. Sulphur dioxide and oxygen were allowed to diffuse through a porous partition. 20 dm^3 of SO_2 diffuses through the porous partition in 60 seconds. The volume of O_2 in dm^3 which diffuses under the similar condition in 30 seconds will be (atomic mass of sulphur = 32 u):

(a) 7.09 (b) 14.1
(c) 10.0 (d) 28.2

23. By how many folds the temperature of a gas would increase when the root mean square velocity of the gas molecules in a container of fixed volume is increased from 5×10^4 cm/s to 10×10^4 cm/s ?

(a) Two (b) Three
(c) Six (d) Four

24. The temperature at which oxygen molecules have the same root mean square speed as helium atoms have at 300 K is: Atomic masses: He = 4 u, O = 16 u)

(a) 300 K (b) 600 K
(c) 1200 K (d) 2400 K

25. If Z is a compressibility factor, van der Waals equation at low pressure can be written as:

(a) $Z = 1 + \frac{RT}{Pb}$ (b) $Z = 1 - \frac{a}{VRT}$
(c) $Z = 1 - \frac{Pb}{RT}$ (d) $Z = 1 + \frac{Pb}{RT}$

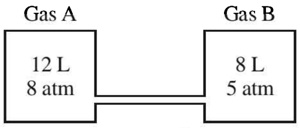
26. The initial volume of a gas cylinder is 750.0 mL. If the pressure of gas inside the cylinder changes from 840.0 mm Hg to 360.0 mm Hg, the final volume the gas will be:

(a) 1.750 L (b) 3.60 L
(c) 4.032 L (d) 7.50 L

27. 56 g of nitrogen and 96 g of oxygen are mixed isothermally and at a total pressure of 10 atm. The partial pressures of oxygen and nitrogen (in atm) are respectively

(a) 4, 6 (b) 5, 5
(c) 2, 8 (d) 6, 4

28. Two vessels containing gases A and B are interconected as shown in the figure. The stopper is opened, the gases are allowed to mix homogeneously. The partial pressures of A and B in the mixture will be, respectively



(a) 8 and 5 atom (b) 9.6 and 4 atm
(c) 4.8 and 2 atm (d) 6.4 and 4 atm

29. A neon-dioxygen mixture contains 70.6 g O_2 and 167.5 g neon. If pressure of the mixture of gases in the cylinder is 25 bar. What is the partial pressure of O_2 and Ne in the mixture respectively ?

(a) 5.25 bar, 10 bar (b) 19.75 bar, 5.25 bar
(c) 19.75 bar, 10 bar (d) 5.75 bar, 19.75 bar

30. Let the most probable velocity of hydrogen molecules at a temperature of t° C be V_0. When the temperature is raised to (2t + 273)°C the new rms velocity is (suppose all the molecules dissociate into atoms at latter temperature)

(a) $2\sqrt{3}V_0$ (b) $\sqrt{6}V_0$
(c) $\sqrt{3\left(2+\frac{273}{t}\right)}V_0$ (d) $\sqrt{\frac{2}{3}}V_0$

RESPONSE GRID	22. ⓐⓑⓒⓓ 23. ⓐⓑⓒⓓ 24. ⓐⓑⓒⓓ 25. ⓐⓑⓒⓓ 26. ⓐⓑⓒⓓ 27. ⓐⓑⓒⓓ 28. ⓐⓑⓒⓓ 29. ⓐⓑⓒⓓ 30. ⓐⓑⓒⓓ

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 5 - CHEMISTRY			
Total Questions	30	Total Marks	120
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	38	Qualifying Score	53
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

1. **(c)** $\frac{V_1}{T_1} = \frac{V_2}{T_2}$ at const. pressure

$\Rightarrow \frac{22.4}{273} = \frac{V_2}{373}$, $V_2 = 30.6$ litre

2. **(a)** From the graph we can see the correct order of pressures $p_1 > p_3 > p_2$

3. **(b)** Gases become cooler during Joule Thomson's expansion only if they are below a certain temperature known as inversion temperature (T_i). The inversion temperature is characteristic of each gas and is given by

$T_i = \frac{2a}{bR}$, where R is gas constant

Given $a = 0.244$ atm L^2 mol^{-2}

$b = 0.027$ L mol^{-1}

$R = 0.0821$ L atm deg^{-1} mol^{-1}

$\therefore T_i = \frac{2 \times 0.244}{0.027 \times 0.0821} = 220$ K

4. **(d)** $u \propto \sqrt{T}$ or $u_1 / u_2 = \sqrt{T_1 / T_2}$

$= \sqrt{\frac{27+273}{927+273}} = \sqrt{\frac{300}{1200}} = \frac{1}{2}$

$u_2 = 2u_1$

5. **(d)** Let the mass of methane and oxygen = m gm.

Mole fraction of O_2

$= \frac{\text{Moles of } O_2}{\text{Moles of } O_2 + \text{Moles of } CH_4}$

$= \frac{m/32}{m/32 + m/16} = \frac{m/32}{3m/32} = \frac{1}{3}$

Partial pressure of O_2 = Total pressure × mole fraction of O_2, $P_{O_2} = P \times \frac{1}{3} = \frac{1}{3}P$

6. **(c)** The expression of root mean square speed is

$u_{rms} = \sqrt{\frac{3RT}{M}}$

Hence,

$\frac{u_{rms}(H_2)}{u_{rms}(O_2)} = \left[\frac{3R(50K)/(2\,g\,mol^{-1})}{3R(800K)/(32\,g\,mol^{-1})}\right]^{1/2} = 1$

7. **(a)** Given $T = 27°C = 27 + 273 = 300$ K

$V = 10.0$ L

Mass of He = 0.4 g

Mass of oxygen = 1.6 g

Mass of nitrogen = 1.4 g

n He $= 0.4/4 = 0.1$

$n\,O_2 = 1.6/32 = 0.05$

$n\,N_2 = 1.4/28 = 0.05$

n total $= n$ He $+ n\,O_2 + n\,N_2 = 0.1 + 0.05 + 0.05 = 0.2$

$P = \frac{nRT}{V} = \frac{0.2 \times 0.082 \times 300}{10} = 0.492$ atm

8. **(b)** Rate of diffusion $\propto \sqrt{\frac{1}{\text{Molecular mass}}}$

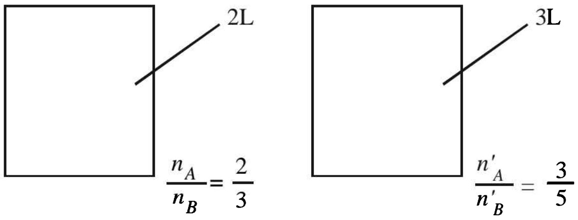
$\because$ Molecular mass of HCl > Molecular mass of NH_3

$\therefore$ HCl diffuses at slower rate and white ammonium chloride is first formed near HCl bottle.

9. **(a)** $\frac{U_{CO_2}}{U_{N_2O}} = \sqrt{\frac{T_{CO_2} \times M_{N_2O}}{M_{CO_2} \times T_{N_2O}}}$

$\Rightarrow \frac{x}{4x} = \sqrt{\frac{T_{CO_2}}{44} \times \frac{44}{T_{N_2O}}} \Rightarrow T_{N_2O} = 16T_{CO_2}$

10. **(b)**



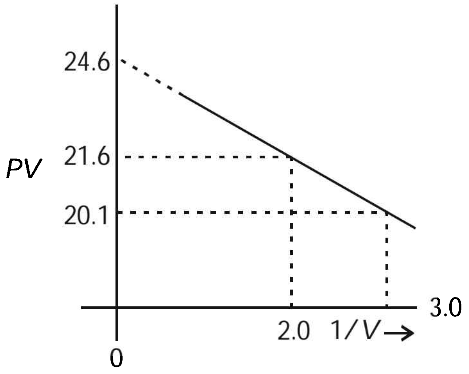
$\frac{n_A}{n_B} = \frac{2}{3}$ $\frac{n'_A}{n'_B} = \frac{3}{5}$

Mean molar mass $= \frac{(n_A + n'_A)M_A + (n_B + n'_B)M_B}{n_A + n'_A + n_B + n'_B}$

$= \frac{77M_A + 123M_B}{200}$

11. **(d)** $\frac{D_A}{D_B} = \sqrt{\frac{\rho_B}{\rho_A}} = \left[\frac{\rho_B}{\rho_A}\right]^{1/2}$; $\therefore D_A = D_B \left(\frac{\rho_B}{\rho_A}\right)^{1/2}$

12. **(c)**



$\left(P + \frac{a}{V^2}\right)(V) = RT$

$PV + a/V = RT$

$PV = RT - \frac{a}{V}$

$y = RT - a(x)$

So, slope $= -a = \frac{21.6 - 20.1}{2 - 3} = -a = -1.5$

$a = 1.5$

13. **(a)** $\frac{\text{K.E of neon at } 40°C}{\text{K.E of neon at } 20°C} = \frac{\frac{3}{2}K \times 313}{\frac{3}{2}K \times 293} = \frac{313}{293}$

14. (c) Higher the critical temperature more easily will be the gas liquify. Now since most easily liquifiable gas show larger deviation, NH_3 will show maximum deviation from ideal behaviour.

15. (c) According to Avogadro's law "At same temperature and pressure

Volume ∝ no. of moles"

$$n_{H_2} = \frac{w}{2};\quad n_{O_2} = \frac{w}{32};\quad n_{CH_4} = \frac{w}{16}$$

$$\because V_{H_2} : V_{O_2} : V_{CH_4} = n_{H_2} : n_{O_2} : n_{CH_4}$$

$$= \frac{w}{2} : \frac{w}{32} : \frac{w}{16} = 16 : 1 : 2$$

16. (a) Given, $n_{H_2} = n_{O_2}$ and $t_{H_2} = t_{O_2}$

According to Graham's law of diffusion for two different gases.

$$\frac{r_{H_2}}{r_{O_2}} = \frac{v_1/t_1}{v_2/t_2} \Rightarrow \sqrt{\frac{M_{O_2}}{M_{H_2}}} = \sqrt{\frac{32}{2}}$$

$$\frac{1/2}{1/x} = \sqrt{16} = 4$$

$$\frac{x}{2} = 4$$

$\therefore x = 8$

$\therefore$ Fraction of $O_2 = 1/8$

17. (c) As temperature rises the most probable speed increases and the fraction of molecules possessing most probable speed decreases.

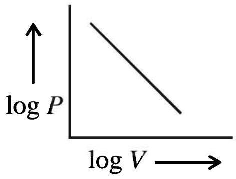
18. (b) According to kinetic theory the gas molecules are in a state of constant rapid motion in all possible directions colloiding in a random manner with one another and with the walls of the container and between two successive collisions molecules travel in a straight line path but show haphazard motion due to collisions.

19. (b) According to Boyle's law, PV = constant

$\therefore$ log P + log V = constant

log P = – log V + constant

Hence, the plot of log P vs log V is straight line with negative slope.



20. (a) $CO_2 + C \longrightarrow 2CO$

Stoichoimetry ratio is 1 : 2

AT STP, P = 1 atm, T = 273 K, R = 0.0821

Initial moles of CO_2, $n(CO_2\text{initial}) = \frac{PV}{RT}$

$$= \frac{1 \times 0.5}{0.0821 \times 273} = 0.022 \text{ mole}$$

In final mixture no. of moles; $n(CO_2/CO$ mixture)

$$= \frac{1 \times 0.7}{0.0821 \times 273} = 0.031$$

Increase in volume is by = 0.031 – 0.022

= 0.009 mole of gas

Final no. of moles of CO i.e. $n_{(CO\ final)}$

$n_{(CO\ final)} = 2n_{(CO_2\ initial)} - n_{(CO_2\ final)}$

$= 2(0.022 - n_{(CO_2\ final)}$ ...(i)

$n_{(CO\ final)} = 0.044 - 2n_{(CO_2\ final)}$ ...(ii)

$\therefore$ Now, $n_{(CO\ final)} + n_{(CO\ final)} = 0.031$

$n_{(CO_2\ final)} = 0.031 - n_{(CO\ final)}$...(ii)

Substituting (ii) in eq. (i)

$n_{(CO\ final)} = 0.044 - 2[0.031 - n_{(CO\ final)}]$

$n_{(CO\ final)} = 0.044 - 0.062 + 2n_{(CO\ final)}$

$n_{(CO\ final)} = 0.018$ mol.

$$\text{Volume of CO} = V = \frac{nRT}{P} = \frac{0.018 \times 0.0821 \times 273}{1}$$

= 0.40 Litre

and volume of CO_2 = 0.7 litre – 0.4 litre

= 0.3 litre

$\therefore$ CO_2 = 300 mL, CO = 400 mL

21. (c) Most probable speed $(C^*) = \sqrt{\frac{2RT}{M}}$

Average Speed $(\bar{C}) = \sqrt{\frac{8RT}{\pi M}}$

Root mean square velocity $(C) = \sqrt{\frac{3RT}{M}}$

$$C^* : \bar{C} : C = \sqrt{\frac{2RT}{M}} : \sqrt{\frac{8RT}{\pi M}} : \sqrt{\frac{3RT}{M}}$$

$$= 1 : \sqrt{\frac{4}{\pi}} : \sqrt{\frac{3}{2}} = 1 : 1.128 : 1.225$$

22. (b) According to Graham's Law Diffusion:

$$\frac{r_1}{r_2} = \sqrt{\frac{d_2}{d_1}}$$

Since rate of diffusion $= \frac{\text{Vol. of gas diffused } (V)}{\text{Time taken for diffusion} (t)}$

$$\therefore \quad \frac{r_1}{r_2} = \frac{V_1/t_1}{V_2/t_2}$$

$$\text{or} \quad \frac{r_1}{r_2} = \frac{V_1/t_1}{V_2/t_2} = \sqrt{\frac{d_2}{d_1}}$$

$$= \frac{20/60}{V_2/30} = \sqrt{\frac{16/2}{32/2}} = \sqrt{\frac{1}{2}}$$

$\because$ Mol. wt = 2 × V.D

$\therefore$ V.D $= \frac{\text{Mol.wt}}{2}$

On calculating,

$V_2 = 14.1$

23. **(d)** r.m.s. velocity $V_{rms} = \sqrt{\frac{3RT}{M}}$

i.e., $\frac{V_1}{V_2} = \sqrt{\frac{T_1}{T_2}}$

$$\frac{5\times10^4}{10\times10^4} = \frac{1}{2} = \sqrt{\frac{T_1}{T_2}}$$

$\therefore$ $T_2 = 4T_1$

24. **(d)** $V_{\text{rms}} = \sqrt{\frac{3RT}{M}}$

$$V_{\text{rms}(O_2)} = V_{\text{rms(He)}}$$

$$\sqrt{\frac{3RT_{O_2}}{M_{O_2}}} = \sqrt{\frac{3RT_{\text{He}}}{M_{\text{He}}}}$$

or $\frac{T_{O_2}}{M_{O_2}} = \frac{T_{\text{He}}}{M_{\text{He}}}$

$\therefore$ $T_{O_2} = \frac{300\times32}{4} = 2400\text{K}$

25. **(b)** Compressibility factor $(Z) = \frac{PV}{RT}$

(For one mole of real gas)

van der Waals equation

$$(P + \frac{a}{V^2})(V - b) = RT$$

At low pressure, volume is very large and hence correction term *b* can be neglected in comparison to very large volume of *V*.

i.e. $V - b \approx V$

$$\left(P + \frac{a}{V^2}\right)V = RT$$

$$PV + \frac{a}{V} = RT$$

$$PV = RT - \frac{a}{V}$$

$$\frac{PV}{RT} = 1 - \frac{a}{VRT}$$

Hence, $\boxed{Z = 1 - \frac{a}{VRT}}$

26. **(a)** According to Boyle's law

$$\frac{V_1}{V_2} = \frac{P_2}{P_1};\ \frac{750}{V_2} = \frac{360}{840}$$

$V_2 = 1750\text{ ml} = 1.750\text{L}$

27. **(d)** On applying Dalton's law,

Partial pressure of a component

= Mole fraction × Total pressure

Given, mass of $N_2 = 56$ g, mass of $O_2 = 96$ g

Total pressure = 10 atm

$$^{n}N_2 = \frac{56}{28} = 2,\ ^{n}O_2 = \frac{96}{32} = 3$$

$$^{x}N_2 = \frac{^{n}N_2}{^{n}N_2 + {}^{n}O_2} = \frac{2}{2+3} = 0.4,$$

$$^{x}O_2 = \frac{^{n}O_2}{^{n}N_2 + {}^{n}O_2} = \frac{3}{2+3} = 0.6$$

$\therefore {}^{P}N_2 = 0.4\times10 = 4\text{ atm}, {}^{P}O_2 = 0.6\times10 = 6\text{ atm}$

28. **(c)** Moles of A, $(n_A) = \frac{p_A v_A}{RT} = \frac{8\times12}{RT} = \frac{96}{RT}$

Moles of B, $(n_B) = \frac{p_B v_B}{RT} = \frac{8\times5}{RT} = \frac{40}{RT}$

Total pressure × total volume $= (n_A + n_B)\times RT$

$$p\times(12+8) = \frac{1}{RT}(96+40)RT$$

$$p = 6.8$$

Partial pressure of A = p × mole fraction of A

$$= 6.8\left(\frac{96}{RT}\Big/\frac{96+40}{RT}\right)$$

$= 4.8$ atm

Partial pressure of B = 6.8 – 4.8 = 2 atm.

29. **(d)** Number of moles of $O_2 = \frac{70.6\text{g}}{32\text{g mol}^{-1}} = 2.21$ mol

Number of moles of Ne $= \frac{167.5\text{g}}{20\text{g mol}^{-1}} = 8.375$ mol

Mole fraction of $O_2 = \frac{2.21}{2.21 + 8.375} = 0.21$

Mole fraction of Ne = 1 – 0.21 = 0.79

Partial pressure of a gas = Mole fraction × total pressure

Partial pressure of $O_2 = 0.21 \times 25 = 5.25$ bar

Partial pressure of Ne = 0.79 × 25 = 19.75 bar

30. **(b)** $V_0 = \sqrt{\frac{2RT}{M}} = \sqrt{R(273+t)}$

$$U_{\text{rms}} = \sqrt{\frac{3(2t+273+273)R}{1}}$$

$$= \sqrt{6(t+273)R} = \sqrt{6}\,V_0$$