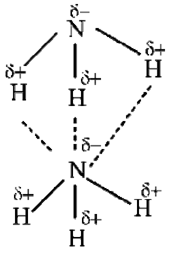
Daily Tutorial Sheet-4 | Level – 1

46.(B) Nitrogen is third most electronegative and hydrogen is highly electropositive and thus strong dipoles develop in NH_3 molecule causing strong dipole-dipole interactions. Note that carbon is less electronegative as compared to nitrogen and hence the dipoles (positive – negative charge centers developed in CH_4 molecule are not as strong as they are in NH_3 and in CO_2 the dipoles developed will be even weaker as both oxygen and carbon are electronegative atoms and hence the electronegativity differences will be less compared to NH_3 and CH_4.



47.(B) units of a = L^2 atm mol^{-2}

units of b = L mol^{-1} $\quad\therefore\quad$ units of $\frac{a}{b}$ = L atm mol^{-1}

48.(C) Real gases behave ideally at low pressure and high temperature

49.(D) Low pressure region $Z = \left(1 - \frac{a}{RTV}\right)$

50.(C) $Z = 1 + \frac{Pb}{RT} \quad \Rightarrow \quad Z = 1 + \frac{b}{(RT/P)} = \left(1 + \frac{b}{V}\right)$

51.(A) van der Waal's equation $\left(P + \frac{an^2}{V^2}\right)(V - nb) = nRT$

For one mole $\left(P + \frac{a}{V^2}\right)(V - b) = RT$

At low P, V is very high $\Rightarrow \quad V - b \approx V$

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

52.(D) $U_{avg} = \sqrt{\frac{8RT}{\pi m}} \Rightarrow U_{avg}^2 \times \frac{\pi M}{8} = RT;$

$KE = \frac{3}{2}RT = \left(\frac{3\pi M}{16}\right)U_{avg}^2$

53.(D) All the three states co-exist at triple point.

54.(C) $P_{Real} = P_i - \frac{n^2a}{V^2}$

$a \uparrow P_r \downarrow$

$P_2 < P_3 < P_1$

55.(B) At high P. $P >> \frac{n^2a}{v^2}$. So 'a' can be neglected.

56.(A) At constant P & n, $V \propto T$

$\therefore$ For a 10% volume increase, there is 10% increase in temperature.

57.(CD)

at constant volume	at constant P
$P \propto T$	$V \propto T$
P = KT	V = KT
P = K(t°C + 273.15)	V = K(t°C + 273.15)

58.(C) Van der Waal equation : $\left(P + \frac{n^2a}{V^2}\right)(v - nb) = nRT$

59.(D) $Z = \frac{PV}{RT}$

60.(C) At high pressure, $P >> \frac{an^2}{V^2}$

$\therefore$ Van der Waal equation becomes

$P(v - nb) = nRT$