States of Matter Gases and Liquids Important Questions With Answers

NEET Chemistry 2023

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1. Joule-Thomson coefficient is zero at:
   a) Inversion temperature **b) Critical temperture** c) Absolute temperature d) Below O^oC

   Solution : -
   Joule-Thomson coefficient is zero at critical temperature.
   Note: In Joule-Thomson effect, a gas gets cooled because it has to do some work against intermolecular forces of attraction. In Joule-Thomson effect, gases get cooled only if they are below inversion temperature.

2. A mixture contains 16g of oxygen. 2Rg or nitrogen and 8g of methane. Total pressure of the mixture is 740mm. What is the partial pressure of nitrogen in mm?
   a) 185 mm **b) 370 mm** c) 555 mm d) 740 mm

   Solution : -

   $$X_{N_2} = \frac{(28//28)}{\left(\frac{16}{32}\right) + \left(\frac{28}{28}\right) + \left(\frac{8}{16}\right)} = \frac{1}{2}$$

   $$\Rightarrow p_{n_2} = X_{N_2} \times 740 = \frac{1}{2} \times 740 = 370mm$$

3. Under what conditions will a pure sample of an ideal gas not only exhibit a pressure of 1 atm but also a concentration of 1 mol L^{-1}? [R = 0.082 L atm mol^{-l} deg^{-1}]
   a) at STP b) When V = 22.4 L **c) When T = 12K** d) Impossible under any conditions.

   Solution : -
   For in ideal gas the ideal gas equation is as follows:
   PV = nRT
   1 atm x lL = lmol x 0.082 L atm mol^{-l} deg^{-1} x T
   $\frac{1}{0.082 deg^{-1}}$ =T
   T=12K

4. Assertion: Windowpanes of old buildings become thicker at the bottom than at the top.
   Reason: Glass is an extremely viscous liquid
   a) If both assertion and reason are true and reason is the correct explanation of assertion.
   b) If both assertion and reason are true but reason is not the correct explanation of assertion
   c) If assertion is true but reason is false. d) If both assertion and reason are false

   Solution : -
   Old windows are sometimes found to be thicker at bottom than at top is often offered as supporting evidence has the view that glass flows over a fire-scale of centuries.
   Reason : Glass is ann amarphous solids/super cooled liquid having high viscocity.

5. In which one of the following cases mean free path increases

a) Helium molecules in a container are replaced by oxygen molecules
b) Oxygen molecules in a container replaced by CO_2 molecules
c) N_2 molecules in a container are replaced by Helium molecules
d) Helium molecules in a container are replaced by nitrogen molecules

Solution : -
$\lambda \downarrow$ is size of molecules $\uparrow$

6. Match the column I with column II and mark the appropriate choice.

Column I		Column II	
(A)	u_{rms}/u_{av}	(i)	1.22
(B)	u_{av}/ump	(ii)	1.13
(C)	u_{rms}/ump	(iii)	1.08

a) $(A) \rightarrow (iii), (B) \rightarrow (ii), (C) \rightarrow (i)$ b) $(A) \rightarrow (i), (B) \rightarrow (ii), (C) \rightarrow (iii)$
c) $(A) \rightarrow (iii), (B) \rightarrow (i), (C) \rightarrow (ii)$ d) $(A) \rightarrow (ii), (B) \rightarrow (iii), (C) \rightarrow (i)$

7. A five litre flask contains 3.5 gm of N_2, 3g of H_2 and 8g of H_2 at 27^oC. The total pressure exerted by the mixture of these gases is:
a) 92.4 atm b) 0.924 atm **c) 9.24 atm** d) 924 atm

Solution : -
Total moles = $\frac{3.5}{28} + \frac{3}{2} + \frac{8}{32} = 1.875$
$\Rightarrow P = \frac{nRT}{V} = \frac{1.875 \times 0.0821 \times 300}{5} = 9.24\ atm$

8. When 2g of a gas A is introduced into an evacuated flask kept at 25°C. the pressure is found to be 1 atmosphere. If 3g of another gas is then added to the same flask, the total pressure becomes 1.5 atm. Assuming ideal behaviour, the ratio of their molecular weights $M_A : M_B$ is
a) 3 : 1 **b) 1 : 3** c) 2 : 3 d) 3 : 2

Solution : -
When 2 grams of a gas A is introduced in an evacuated flask kept at 25^oC; the pressure was found to be 1 atm .i.e.
Partial Pressure of gas A = 1 atm.
And let moles be n_A = $\frac{2}{M_A}$
if 3 g of another gas B is then added to the same flask;
Partial Pressure of gas B = 1.5 atm – 1 atm. = 0.5 atm
moles of gas B=$\frac{3}{M_b}$
Again the temp and volume are constant therefore,
$\frac{P_1}{n_1} = \frac{P_2}{n_2}$
Hence, $\frac{1}{\frac{2}{M_A}} = \frac{0.5}{\frac{3}{M_B}}$
$M_A = \frac{0.5 M_B}{3} \times 2$
$\frac{M_A}{1} = \frac{M_B}{3}$
$M_A = \frac{M_B}{3}$
or
$\frac{M_A}{M_B} = \frac{1}{3} \Rightarrow 1 : 3$

9. At low pressure Vander Waal's equation for 3 moles of a real gas will have its simplified from

a) $\frac{PV}{RT-(3a/V)}=3$ b) $\frac{PV}{RT+RB}=3$ c) $\frac{PV}{RT-3Pb}=1$ d) $\frac{PV}{RT-(9/V)}=3$

Solution : -

Low P ⇒ negligible b

$$\left(P+\frac{an^2}{V^2}\right)(V)=n^{RT}; for\ 3\ moles$$

$$\left(P+\frac{a\times 9}{v^2}\right)(V)=3RT$$

$$PV+\frac{9a}{V}=3RT, PV=3\left(RT-\frac{3a}{V}\right)$$

10. An ideal gas, obeying kinetic theory of gases cannot be liquefied, because
    a) it solidifies before becoming a liquid **b) forces acting between its molecules are negligible**
    c) its critical temperature is above 0°C d) its molecules are relatively small in size

    Solution : -

    A gas can only be liquefied if some forces of attraction are acting in its molecules. According to kinetic theory, an ideal gas is devoid of the force of attraction in its molecules, therefore it cannot be liquefied.

11. In the fluorite structure, the coordination number of Ca^{2+} ions is
    a) 4 b) 6 **c) 8** d) 3

    Solution : -

    Each Ca^{2+} ion is surrounded by $8F^-$ ions. It has a co-ordination number of 8 whereas each F^- ion is surrounded by 4 Ca^{2+} ions i.e. it has a co-ordination number of 4. Thus, this structure has 8 : 4 co-ordination.
    In Na_2O, each oxide ion is co-ordinated to 8 Na^+ ions and each Na^+ ion to 4 oxide ions. Hence, it has 4 : 8 co-ordination. This is called anti-fluorite structure. Other examples being Cl_2O, K_2O etc.

12. What is the effect on chemical properties and physical properties of water when temperature is changed?
    a)
    Chemical properties of water remain same but the physical state changes with change in temperature.
    b) Chemical properties of water change with change in temperature but physical properties remain same.
    c) There is no effect on chemical or physical properties of water when temperature is changed
    d) Both chemical and physical properties of water change with change in temperature

    Solution : -

    When temperature is changed, water is converted to ice or steam depending upon the temperature. There is no change in the chemical properties of water and only physical state changes

13. At 1 atmospheric pressure and 0°C, certain mass of a gas measures 0.4 L. Keeping the pressure constant, if the temperature is increased to 273°C, what will be its volume?
    a) 0.8 L b) 22.4 L c) 54.6 L d) 0.4 L

    Solution : -

    $\frac{P_1V_1}{T_1}=\frac{P_2V_2}{T_2}\Rightarrow\frac{1\times0.4}{273}=\frac{1\times V_2}{546}$
    $V_2=\frac{1\times0.4\times546}{273\times1}=0.8L$

14. A closed container contains equal number of moles of two gases X and Y at a total pressure of 710 mm of Hg. If gas X is removed from the mixture, the pressure will :
    a) become double **b) become half** c) remain same d) become one-fourth

    Solution : -

Here in the closed container, the equal number of moles of two gases are taken.
Thus, when gas X is removed, the number of moles of the gases in the container becomes half.
According to an Ideal gas equation,
PV=nRT.
$\therefore$ P $\propto$ n
Thus, if all the other conditions are kept constant, the pressure is directly proportional to the number of moles.
Thus, if the number of moles of the gas is halved, the pressure will also become half of the original pressure.

15. What is SI unit of viscosity coefficient (η)?

    a) pascal **b) N s m^{-2}** c) km^{-2} s d) N m^{-2}

    Solution : -

    Viscosity is defined as the ratio of the force required to shear a liquid to the velocity of shear (shear means when adjacent layers of liquid are made to slide over each other).
    Coefficient of viscosity is defined as the tangential force required to maintain a unit velocity gradient between two parallel layers of liquid of unit area.
    Coefficient of viscosity = Fr/v
    F = tangential force, Area,
    r = distance between the layers,
    v = velocity.
    so SI unit of the coefficient of viscosity is Nsm^{-2}

16. The relations between various variables of gaseous substances are given along with their formulae. Mark the incorrect relationship.

    a) Density and molar mass$M = \frac{dRT}{P}$ b) Universal gas constant,P,V,T:R=$\frac{PV}{nT}$
    c) Volume and pressure:V_2= $\frac{P_2V_1}{P_1}$ d) Volume and temperature:V2=$\frac{V_1T_2}{T_1}$

    Solution : -

    According to Boyle's law, at constant temperature,
    Pressure $\propto \frac{1}{Volume}$
    $\Rightarrow P_1V_1 = P_2V_2$
    $\Rightarrow V_2 = \frac{P_1V_1}{P_2}$
    But not, $V_2 = \frac{P_2V_1}{P_1}$

17. The vapour density of a gas is 11.2. The volume occupied by 10g of the gas at STP is

    a) 10 L b) 1 L c) 11.2 L d) 5.6 L

    Solution : -

    VD =11.2 $\Rightarrow$M.wt = 22.4

    $$10gm \Rightarrow \frac{10}{22.4} moles = 10L \; at \; STP$$

18. A 2 L vessel is filled with air at 50°C and a pressure of 3 atm. The temperature is now raised to 200°C. A valve is now opened so that the pressure inside drops to one atm. What will be the fraction of the total number of moles, inside escaped on opening the valve? (Assume no change in the volume of the container) .

    a) 7.7 b) 9.9 c) 8.9 **d) 0.77**

    Solution : -

Given that, V=2L, T_1=50+273=473,P_2=?

Using P-T law, $\frac{P_1}{T_1} = \frac{P_2}{T_2}$

$P_2 = \frac{3\times473}{323} = 4.39atm$

$and \quad n = \frac{PV}{RT} = \frac{3\times2}{0.0821\times323} = 0.226$

Now value is opened till the pressure is maintained at 1 atm. thus, at constant V and T, P∝ n

∴ P2 ∝ n

1∝ n_{left}

∴ $\frac{P_2}{1} = \frac{n}{n_{left}}$

$n_{left} = \frac{0.226}{4.39} = 0.052$

∴ Moles escaped out =0.226-0.052=0.174

∴ Fraction of moles escaped out = $\frac{0.174}{0.226} = 0.77$

19. Which of the following indicates RMS velocity of a gas?

(a) $\sqrt{\frac{2RT}{M}}$

(b) $\sqrt{\frac{3P}{d}}$

(c) $\sqrt{\frac{8RT}{\pi M}}$

(d) $\sqrt{\frac{3RT}{M}}$

a) c, d **b) b, d** c) a, c d) a, b

Solution : -

$$U_{rms} = \sqrt{\frac{3RT}{M}} = \sqrt{\frac{3P}{d}}$$

20. What is r.m.s speed of O_2 molecule if its kinetic energy is 2 k cal mol^{-1}?

a) 7.24 x 10^2 m/sec b) 3.5 x 10^2 m/sec c) 1.8 x 10^1 m1sec d) 3.5 x 10^4 m/sec

Solution : -

$$KE = \frac{3}{2}PV \Rightarrow \underset{RMS}{C} = \sqrt{\frac{3PV}{M}} = \sqrt{\frac{2KE}{M}}$$

= $\sqrt{\frac{2\times2\times10^3\times4.18}{32\times10^{-3}}} = 7.24\times10^2 sec$

21. If the ratio of molar masses of two gases A and B is 1 : 4. What is the ratio or the average speeds?

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

Solution : -

$\frac{r_1}{r_2} = \frac{p_1}{p_2}\sqrt{\frac{M_2}{M_1}}$ and $\frac{C_1}{C_2} = \sqrt{\frac{M_2}{M_1}}$

22. For an ideal solution, the correct option is:

a) $\Delta_{\text{mix}} V \neq 0$ *at constant T and P* **b)** $\Delta_{\text{mix}} \text{H} = 0$ *at constant* T *and* P

c) $\Delta_{\text{mix}} \text{G} = 0$ *at constant* T*and* P d) $\Delta_{\text{mix}} \text{S} = 0$ *at constant* T *and* P

Solution : -

The solutions which obey Raoult’s law over the entire range of concentration are known as ideal solutions.
The ideal solutions have two other important properties. The enthalpy of mixing of the pure components to form the solution is zero and the volume of mixing is also zero, i.e.,
For ideal solution,
$\triangle_{mix}H = 0 \quad \triangle_{mix}V = 0$

23. Assertion: Dipole-dipole forces acting between the molecules possessing permanent dipole, are weaker than ion-ion interactions
Reason : The attractive forces decrease with the increase of distance between the dipoles
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false. d) If both assertion and reason are false

Solution : -

Ends of the dipoles possess 'partial charges' which are always less than the unit electronic charge (1.6 x 10^{-19} C) present in ions. Thus, dipole-dipole forces are weaker than ion-ion interactions.

24. At Boyle temperature:
a) the effects of the repulsive and atractive intermolecular forces just cancelled each other
b) the repulsive intermolecular forces are greater than the attractive intermolecular forces
c) the repulsive intermolecular forces are less than the attractive intermolecular forces d) $b - \dfrac{a}{RT} > 0$

Solution : -

The Boyle temperature is the temperature at which a non ideal gas behaves most like an ideal gas.
At this temperature that the attractive forces and the repulsive forces acting on the gas particles balance out.
Therefore vapor pressure = atmospheric pressure

25. A closed flask contains water in all its three states, solid, liquid and vapour at 0^oC. In this situation, the average kinetic energy of water molecules will be
a) the greatest in all the three states b) the greatest in vapour state c) the greatest in the liquid state
d) same in all the three states

Solution : -

In the three states of matter, the maximum kinetic energy is possessed by the gaseous molecules, so water vapour state has maximum kinetic energy in this situation.

26. A bubble of air is underwater at temperature 15°C and pressure 1.5 bar. If the bubble rises to the surface where the temperature is 25°C and the pressure is 1.0 bar, what will happen to the volume of the bubble?
a) Volume will become greater by a factor of 1.6. b) Volume will become greater by a factor of 1.1
c) Volume will become smaller by a factor of 0.70 d) Volume will become greater by a factor of 2.5.

Solution : -

We know that from ideal equation
$V \propto \frac{T}{P}$
Given T_1+15+273=288K,P_1=1.5bar
T_2=25+273=298K,P_2=1bar
$V_1 \propto \frac{288}{1.5} i.e. V_1 \propto 192; V_2 \propto \frac{298}{1}$
$\frac{V_2}{V_1} = \frac{298}{192} = 1.55 \approx 1.6$

27. Equal volumes of two jars contain HCl,NH_3, gases respectively at constant temperature and pressure P. When one of the jars is inverted over another jar so that they mix up, the pressure in either of the jars is
a) 1 atm b) Equal to P **c) Becomes Zero** d) P+P=2P

Solution : -

$NH_3(g) + HCl(g) \rightarrow NH_4Cl(s)$

Since they combine to form solid NH_3Cl, the pressure becomes zero.

28. If the molecules of SO_2 effuse a distance of 150 cm in a certain period 0 f time, the distance travelled by the molecules of CH_4 effusing in the same time is:

a) 300 cm b) 600 cm c) 37.5 cm d) 75 cm

Solution : -

$$\frac{150}{l_{CH_4}} = \sqrt{\frac{16}{64}} \Rightarrow l_{CH_4} = 300\ cm$$

29. A gaseous mixture was prepared by taking equal mole of CO and N_2. If the total pressure of the mixture was found 1 atmosphere, the partial pressure of the nitrogen (N_2) in the mixture is:

a) 0.5 atm b) 0.8 atm c) 0.9 atm d) 1 atm

Solution : -

According to question $\mathrm{n_{CO}} = {}^{\mathrm{n}}\mathrm{N_2}$

$\mathrm{P_{CO}} + {}^{\mathrm{P}}\mathrm{N_2} = 1\ \mathrm{atm}$

Then, partial pressure of a gas = mole fraction of gas x total press

Partial pressure of N_2

${}^{\mathrm{P}}\mathrm{N_2} = \frac{{}^{n}\,\mathrm{N_2}}{{}^{n}\mathrm{CO} + {}^{n}\,\mathrm{N_2}} \times 1$

$= \frac{{}^{n}\,\mathrm{N_2}}{2n} \times 1$

$= \frac{1}{2} = 0.5\ \mathrm{atm.}$

30. At 127°C, for helium, if time of flight is 0.1 nanosec, the mean free path of helium (in A) is

a) 15.8 b) 158 **c) 1580** d) 158000

Solution : -

$$\lambda = C \times t = \sqrt{\frac{3RT}{M}} \times t = 1580 \times 10^{-10} m$$

31. Molecular mass of a gas is 78. Its density at 98°C and 1 atm will be

a) $200gL^{-1}$ **b) $2.56gL^{-1}$** c) $256gL^{-1}$ d) $78gL^{-1}$

Solution : -

P = 1atm, T= 98°C+ 273 = 371 K,M = 78 g mol^{-1}R = 0.0821 L atm K^{-1} mol^{-1}

PM=dRT or d=$\frac{PM}{RT} = \frac{1\times78}{0.0821\times371} 2.56gL^{-1}$

32. In a flask of volume V litres, 0.2 mol of oxygen, 0.4 mol of nitrogen, 0.1 mol of ammonia and 0.3 mol of helium are enclosed at 27°C. If the total pressure exerted by these non-reacting gases is one atmosphere, the partial pressure exerted by nitrogen is

a) 0.1 atmosphere b) 0.2 atmosphere c) 0.3 atmosphere **d) 0.4 atmosphere**

Solution : -

$P_{N_2} = \frac{0.4}{0.2+0.4+0.1+0.3} \times 1 = 0.4atm$

($\because$partial pressure =mole fraction x total pressure)

33. A 10 L flask contains a gaseous mixture of CO and CO_2 at a total pressure of 2 atm and 298 K. If 0.20 mole of CO is present, find its partial pressure.

a) 0.49 atm b) 1.51 atm c) 1 atm d) 2 atm

Solution : -

Here, V=10L, n=0.20mole, and T=298K
By Ideal gas equation
PV = nRT
$\therefore P=\frac{nRT}{V}=\frac{0.20\times0.0821\times298}{10}=0.49atm$

34. A and B are ideal gases. The molecular weights of A and B are in the ratio of 1 : 4. The pressure 0 a gas mixture containing equal weights of A and B is P atm. What is the partial pressure (in atm) 0 B in the mixture?
a) P/5 b) P/2 c) P/2.5 d) 3P/4

Solution : -

$$p_B=X_B.p=\frac{\frac{W}{M_B}}{\frac{W}{M_A}}.\rho=\frac{\frac{W}{4}}{\frac{W}{1}+\frac{w}{4}}.p$$

= $\frac{w}{4}\times\frac{4}{5w}.p=p/5$

35. Which of the following indicates Kinetic gas equation?
a) $PV=\frac{3M}{C^2}$
b) $PV=\frac{1}{3}mnC^2$
c) $P=\frac{1}{2}dc^2$
d) $KE=\frac{3}{2}RT$
a) a, c b) b, d c) a, b **d) b, c**

Solution : -

$$PV=\frac{1}{3}mnc^2\Rightarrow PV=\frac{1}{3}dc^2$$

36. Assertion: In Maxwell-Boltzmann distribution of speeds, the curve broadens at higher temperature
Reason: At a particular temperature, the individual speed of molecules as well as the distribution of speeds remains the same.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false. d) If both assertion and reason are false

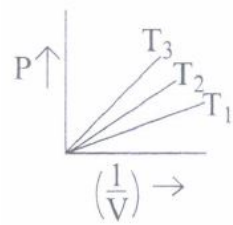
Solution : -
Speed distribution curve broadens at higher temperature because number of molecules moving atchigher speed increases. At a particular temperature, the individual speed of molecules keeps changing but the distribution of speeds remains same

37. A mixture of dihydrogen and dioxygen at one bar pressure contains 20% by weight of dihydrogen. Calculate the partial pressure of dihydrogen.
a) 0.8 b) 1.8 c) 2.8 d) 3.0

Solution : -
In 100 g of mixture, the mass of hydrogen and oxygen will be 20 and 80 g respectively.
The number of moles of hydrogen are $n=\frac{20}{2}=10$
The number of moles of oxygen are n $=\frac{80}{32}=2.5$

The mole fraction of hydrogen is $\frac{10}{10+2.5} = 0.8$
Partial pressure of hydrogen is 0.8×P=0.8×1=0.8 bar.

38. From th e graph the correct order of temperatures is



a) T_3>T_2>T_1 b) $T_3$21 c) T_3=T_2=T_1 d) T_3 > T_2 < T_l

Solution : -

At same volume,P_3>P_2>P_1(from graph)
using Gay-Lussac's law:T_3> T_2 > T_1

39. In a mixture of N_2 and CO_2 gases, the partial pressure of CO_2 is 1.25 atm.The total pressure of the mixture is 5 atm. The mole fraction of N_2 in the mixture is.

a) 0.82 **b) 0.75** c) 0.80 d) 0.65

40. The root mean square speed of N_2 molecules in a gas is u. If the temperature is doubled and the nitrogen molecules dissociate into nitrogen atoms, the root mean square speed becomes

a) u/2 **b) 2u** c) 4u d) 14u

Solution : -

$u_{N_2} = \sqrt{\frac{3RT}{M}}$

Mass of nitrogen atom=$\frac{Mass\ of\ nitrogen\ molecule}{2} = \frac{M}{2}$

$u_{N_2} = \sqrt{\frac{3R(2T)}{M/2}} = 2\sqrt{\frac{3RT}{M}} = 2u_{N_2}$

41. 2 moles of Xenon is present in a one litre vessel. For Xenon gas a = 4.19lt^2. atm. mol^{-2}, b = 0.05 lt/mol. The volume of free space available for random motion of molecules is

a) 900 c.c b) 100 c.c c) 950 c.c d) 50 c.c

Solution : -

$V_{molecule}$= s nb = 2 x 0.05 = 0.1 lit = 100 ml
Free space = 1000 ml - 100 ml = 900 ml

42. 2 grams of Helium diffuses from a porous plate in 4min. How many grams of CH_4 would diffuse through the same plate in same time under similar conditions?

a) 4g b) 16g c) 8g d) 2g

Solution : -

$$\frac{w_1}{t_1} \times \frac{t_2}{w_2} = \sqrt{\frac{M_1}{M_2}} \Rightarrow \frac{2}{w_2} = \sqrt{\frac{4}{16}}$$
$$W_{CH_4} = 4gm$$

43. The correct statements regarding kinetic molecular theory are

a) The distance between the molecules is high compared to size of the gaseous molecules
b) The motion of the gaseous molecules are affected by gravitational force
c) The attractive forces between the gaseous molecules are very high.
d) The total K.E of a sample of gaseous molecules remains constant at a given temperature

a) b, d b) b, c **c) a, d** d) c, d

Solution : -

$V_{molecules}$ gas' ; KEαT

44. For an ideal gas, a number of moles per litre in terms of its pressure, P, gas constant R temperature T is:
a) PT/R **b) P/RT** c) PRT d) RT/P

Solution : -

According to Ideal Gas Equation, PV=nRT

P is the pressure, V is the volume, n is the number of moles, R is gas constant and T is the temperature.

Therefore number of moles per litre,

$\frac{n}{V} = \frac{P}{RT}$

45. Which of the following is NOT a postulate of the kinetic molecular theory of gases?
a) The molecules possess a volume that is negligibly samll compared 0 the container
b) The pressue and volume of a gas are inversely related
c) Gases consist of discrete particles that are in constant chaotic motion
d) The average kinetic energy of the molecules is directly proportional to the temperature

Solution : -

Kintetic theory does not relate P, V.

46. The thickness of window panes of old buildings is more at the bottom than at the top, which is due to
a) Surface tension of glass **b) Viscosity of glass** c) Expansion of solid at a given temperature
d) Expansion of liquid at a given temperature

Solution : -

Glass is supercooled liquid and flows

47. Carbondioxide present at F can be liquified
a) At critical volume by compression b) At critical pressure by compression
c) By compression at any temperature **d) By compression and lowering the temperature**

Solution : -

F is $T>T_C$

To liquify, T should be dec and then should be inc

48. Cyclopropane and oxygen at partial pressure 170 torr and 570 torr are mixed in a gas cylinder. What is the ratio of the number of moles of cyclopropane to the number of moles of oxygen?
a) $\frac{170\times42}{570\times32} = 0.39$ b) $\frac{170}{42} / \left(\frac{170}{42} + \frac{570}{32}\right) \approx 0.19$ c) $\frac{170}{140}$=0.23 **d) $\frac{170}{570}$=0.30**

Solution : -

Partial pressure of cyclopropane = 170 torr

Partial pressure of oxygen = 570 torr

According to ideal gas equation

PV = nRT

For cyclopropane, 170 torr x V = n_c x R x T

$\frac{170}{n_c} = \frac{RT}{V}$ ...(1)

For oxygen,

570 torr x V = n_o x R x T

$\frac{570}{n_O} = \frac{RT}{V}$ ...(2)

As volume of container, temperature and gas constant are same for both cases. Thus, from eqn (1) and eqn (2)

$\frac{170}{n_C} = \frac{570}{n_O} \Rightarrow \frac{170}{570} = \frac{n_C}{n_O} \Rightarrow \frac{n_C}{n_O}$=0.30

49. A gas deviates from ideal behaviour at a high pressure because its molecules
a) have kinetic energy b) are bound by covalent bonds **c) attract one another** d) show the Tyndall effect

Solution : -

The basic concept of the kinetic-molecular theory give us the information why real gases deviate from ideal behavior. The molecules of an ideal gas are assumed to occupy no space and have no attractions for one another. Real molecules, however, do have finite volumes, and they do attract one another. So, a gas deviates from ideal behavior at a high pressure because its molecules attract one another.

50. The inter molecular forces present in inert gases are

a) Ion - ion b) Ion - dipole c) Dipole - dipole **d) Dispersion**

Solution : -

Inert gases have only london dispersion forces.