

Date Planned : / /	Daily Tutorial Sheet-3	Expected Duration : 90 Min			
Actual Date of Attempt : / /	Level-1	Exact Duration :			

31.	A sample of a gas at	100°C	and 0.80	atm pressu	re has	a density	of 1.15	$gL^{-1}$ .	What	is the	molecula
	weight of the gas?										

(A) 88.0

(B) 44.0 (C)

28.0

(D) 46.0

**32**. Which of the following expressions is correct?

(A)

(C)  $M = \left(\frac{1}{p}\right) RT$ 

**(D)** M = (p)RT

**33**. If a gas expands at a constant temperature:  $oldsymbol{f (E)}$ 

(A) The pressure decreases

(B) The kinetic energy of the molecules increases

The kinetic energy of the molecules decreases (C)

**(D)** The number of molecules of the gas increases

34. A helium atom is two times heavier than a hydrogen molecule. At 298 K, the average KE of a helium atom is:

**(B)** 

(A) Two times that of a hydrogen molecule

Same as that of a hydrogen molecule

(C) Four times that of a hydrogen molecule (D) Six times that of a hydrogen molecule

35. Assuming ideal gas behavior, identify the option, which is incorrect as per assumption involved in KTG, speed distribution and biomolecular collision-

Average molar translational KE depends only upon absolute temperature (A)

**(B)** Lighter gases will have more uniform speed distribution pattern as compared to heavier gases at same temperature

(C) All the molecules of heavier gas will move at a slower speed as compared to any molecule of a lighter gas

**(D)** Collision frequency is directly proportional to square root of absolute temperature in a closed rigid vessel.

36. At 27°C, the ratio of rms speed of ozone to that of oxygen is:

> $\sqrt{3/5}$ (A)

(B)

 $\sqrt{2/3}$ (C)

 $\sqrt{1/16}$ (D)

**37**. Which of the following combinations is correct?

> $U_{rms} \propto \sqrt{T}$  and  $U_{rms} \propto \sqrt{M}$ (A)

(B)  $U_{\rm rms} \propto \sqrt{T} \text{ and } U_{\rm rms} \propto \frac{1}{\sqrt{M}}$ (D)  $U_{\rm rms} \propto \frac{1}{\sqrt{T}} \text{ and } U_{\rm rms} \propto \sqrt{M}$ 

 $U_{\rm rms} \propto \frac{1}{\sqrt{T}}$  and  $U_{\rm rms} \propto \frac{1}{\sqrt{M}}$ (C)

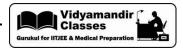
38. Which of the following expressions correctly represents the relationship between the average molar kinetic energies of CO and N2 molecules at the same temperature?

(A)  $KE(CO) = KE(N_2)$ 

**(B)**  $KE(CO) > KE(N_2)$ 

(C)  $KE(CO) < KE(N_2)$ 

(D) Cannot be predicted unless the volumes of the gases are given



	(A)	$(p_A/p_B)(M_A$	$/ M_{\rm B})^{1/2}$		(B)	$(M_A / M_I$	$_{\rm B})({\rm p_A}/{\rm p_B})^{1/2}$			
	(C)	$(p_A / p_B) (M_B)$	$(M_A)^{1/2}$	2	<b>(D)</b>	$(M_A/M_I)$	$_{\rm B}$ ) ( ${ m p_B}$ / ${ m p_A}$ ) $^{1/2}$	}		
0.	The d	ensity of air is 0	.001293	g mL <sup>-1</sup> at S	TP. Its vapo	ur density v	vill be :		$\odot$	
	(A)	10.0	<b>(B)</b>	15.0	(C)	1.44	<b>(D)</b>	14.4		
1.		g of oxygen gas eous oxygen ato 0.821 atm	-				ssure at 1000		dissociated to	
2.	Which	n of the assump	otions of	the kinetic-	molecular th	neory best e	explains the o	observation t	hat a balloon	
	collap	collapses when exposed to liquid nitrogen (which is much colder than a cold winter day)?								
	(A)	Gas molecules move at random with no attractive forces between them								
	(B)	The velocity o	f gas mo	lecules is pro	oportional to	their Kelvi	n temperature	e		
	(C)	The amount gas molecules		occupied by	a gas is mu	ich greater	than the spa	ce occupied	by the actual	
	(D)	Collisions wit	h the wa	lls of the con	ntainer or wi	th other mo	lecules are ela	astic		
3.	Select the correct statement(s).									
	I.	The velocity at which distribution of molecules is maximum is called most probable velocity								
	II.	<b>II.</b> Most probable velocity of a gas is larger than root mean square velocity								
	The correct option is:									
	(A)	I	<b>(B)</b>	II	(C)	I, II	<b>(D)</b>	None of th	ese	
4.		ous benzene rea		hydrogen ga	s in presenc	ee of a nick	el catalyst to	form gaseou	s cyclohexane	
		$C_6H_6(g) + 3H$	<sub>2</sub> (g) ——	$\rightarrow C_6H_{12}(g)$						
	A mix	ture of C <sub>6</sub> H <sub>6</sub> a	nd exces	s H <sub>2</sub> has a	pressure of (	60 mm of H	lg in an unkn	own volume.	After the gas	
	A mixture of $C_6H_6$ and excess $H_2$ has a pressure of 60 mm of Hg in an unknown volume. After the gas has been passed over a nickel catalyst and all the benzene converted to cyclohexane, the pressure of the gas was 30 mm of Hg in the same volume and temperature. The fraction of $C_6H_6$ (by volume) present in									
	the or	riginal mixture is		- /		- /		- /		
	(A)	$\frac{1}{3}$	<b>(B)</b>	$\frac{1}{4}$	(C)	<sup>1</sup> / <sub>5</sub>	<b>(D)</b>	$\frac{1}{6}$		
5.	Root mean square velocity of a gas is $\mathrm{xms}^{-1}\mathrm{at}$ a pressure p atm and temperature T K. If pressure is									
made 2p under isothermal condition, root mean square speed becomes:								$\odot$		
	(A)	2x	<b>(B)</b>	4x	(C)	x/2	<b>(D)</b>	X		

According to Graham's law, at a given temperature the ratio of the rate of diffusion of gases A and B

**39**.

 $(r_A / r_B)$  is given by :