Exercise-1

ONLY ONE OPTION CORRECT TYPE

Section (A) : Pressure, Volume and Temperature measurement

1. Which of the following is not a unit of pressure : (1) Atmosphere (2) Pascal (3) Torr (4) Newton 2. The SI unit of area is : (1) Litre (2) hector (3) m² (4) dm² How many of the prefixes are correctly matched with their multiples : 3. (iii) giga (G) - 109 (i) pico (p) $- 10^{-12}$ (ii) tera (T) $- 10^{12}$ (iv) nano (n) - 10⁻⁹ (v) mega (M) - 106 (vi) micro (μ) – 10⁻⁶ (vii) centi (D) - 10⁻¹ (viii) deci (D) - 10 (ix) milli (m) – 10⁻³ (1)5(2) 6(3)7(4) 8 4. In which of the following options, the units of pressure are not correctly related : (1) 1 bar = 10^5 N/m^2 (2) 1 torr = 1mm of Hg (3) 1 atm = 10^5 Pa (4) 1 atm= 760 mm of Hg 5. Which of the following is the correct order of units of pressure : (1) 1 atm > 1 bar > 1 cm of Hg > 1 torr > 1 pascal (2) 1 bar > 1 atm > 1 pascal > 1 torr > 1 cm of Hg (3) 1 pascal > 1 torr > 1 cm of Hg > 1 bar > 1 atm (4) 1 torr < 1 pascal < 1 cm of Hg < 1 bar < 1 atm 6. Four persons P, Q, R and S are given a gas sample each. They reported the pressure of gas samples to be 0.5 atm, 760 torr, 1×10³ Pa & 0.5 bar respectively. Whose gas sample exerts maximum pressure: (1) S (2) R (3) Q (4) P 7. In which of the following options, the units of volume are not correctly related : (1) $1mL = 10^{-6} m^3$ (2) $1m^3 = 1000 L$ (3) $1L = 1000 \text{ cm}^3$ (4) $1 dm^3 = 100 L$ 8. Three persons X, Y and Z are given a gas sample each. They reported the temperature of gas samples to be 17°C, 300 K and 96.4°F. Whose gas sample exerts minimum temperature : (1) X (2) Y (3) Z (4) Both (X) and (Y) 9. Which of the prefixe is not correctly matched with their multiples : (1) nano (n) - 10⁻⁹ (2) mega (M)-106 (3) micro (μ) -10⁻⁶ (4) centi (D)-10-1 10. Unit of SI system are similar to the units in : (1) M.K.S. system (2) C.G.S. system (3) F.P.S. system (4) None of these 11. 0.25 atm is not equal to (1) 190 tors (2) 2.53×10^4 pascal (3) 19 cm of Hg (4) 0.275 bar 12. Which pressure is largest (1) 95 tors (2) 1.013 × 10⁴ pascal (3) 190 mm of Hg (4) 0.202 bar

13.	0.05 dm ³ is equal to (1) 50 ml	(2) 0.05 lt	(3) 5 × 10⁻⁵ m³	(4) All of these							
14.	Which volume value is (1) 0.3 It	smallest (2) 2500 ml	(3) 0.4 dm ³	(4) 500 cm ³							
15.	Which temperature is la (1) 102ºF	argest (2) 45ºC	(3) 310 K	(4) All same							
16.	A general rule that for every 1000 feet of altitude the temperature falls 3.5 F. If the temperature at sea level is 78 F, what would you expect the temperature to be at 1000 feet in °c (1) 43°C (2) 23.6°C (3) 6.1°F (4) None of these										
17.	If two moles of an ideal (1) 2 <i>atm</i>	gas at 546 <i>K</i> occupy a v (2) 3 <i>atm</i>	olume of 44.8 <i>litres</i> , the (3) 4 <i>atm</i>	pressure must be (4) 1 <i>atm</i>							
18.	A sample of gas occup at 740 mm pressure, th (1) 21.6 °C	ies 100 ml at 27°C and 7 e temperature of the gas	740 mm pressure. When	its volume is changed to 80 ml (4) 89.5 °C							
19.	A certain sample of gas pressure but at $273^{\circ}C$	s has a volume of 0.2 <i>lit</i> , its volume will be	<i>re</i> measured at 1 <i>atm</i> . p	ressure and $0^{\circ}C$. At the same							
	(1) 0.4 <i>litres</i>	(2) 0.8 <i>litres</i>	(3) 27.8 <i>litres</i>	(4) 55.6 <i>litres</i>							
20.	How many moles of <i>He</i> (1) 0.90	gas occupy 22.4 <i>litres</i> a (2) 1.11	t $30^{o}C$ and one atmosp (3) 0.11	heric pressure (4) 1.0							
21.	The volume of a gas measured at 27°C and 1 atm pressure is 10 L. To reduce the volume to 2 L at 1 atm pressure, the temperature required is : (1) 60 K (2) 75 K (3) 150 K (4) 225 K										
22.	Torr is unit of : (1) Temperature	(2) Pressure	(3) Volume	(4) Density							
23.	The atmospheric press (1) 0.63	ure on Mars is 0.61 kPa. (2) 4.6	What is the pressure in (3) 6.3	mm Hg ? (4) 3.2							
24.	Centigrade and Fahren (1) $\frac{C}{5} = \frac{F - 32}{9}$	heit scales are related as (2) $\frac{C}{9} = \frac{F - 32}{5}$	s: (3) $\frac{C}{8} = \frac{F - 32}{5}$	(4) None of these							
25.	At what temperature, bo (1) 100°	oth Celsius and Fahrenh (2) 130º	eit scale read the same v (3) 60º	value : (4) –40º							
26.	The value of universal ((1) temperature of gas (3) number of moles of	gas constant R depends gas	on : (2) volume of gas (4) units of volume and	pressure							
27.	The value of gas consta (1) 1 cal	ant in calorie per degree (2) 2 cal	temperature per mol is a (3) 3 cal	pproximately : (4) 4 cal							

28.	The value of R in SI un (1) 8.314 × 10 ⁻⁷ erg K ⁻ (3) 0.082 litre atm K ⁻¹ n	it is : 1 mol ^{_1} nol ^{_1}	(2) 8.314 JK ⁻¹ mol ⁻¹ (4) 2 cal K ⁻¹ mol ⁻¹				
Section	on (B) : Relation be	tween Mole, Mass a	and Gaseous volum	ne.			
1.	If the atomic mass of S (1) 1	odium is 23, the number (2) 2	of moles in 46 g of sodium is : (3) 2.3 (4) 4.6				
2.	Which of the following (1) 0.5 mole of H_2	would contain 1 mole of p (2) 2 g of H-atoms	oarticles : (3) 16 g of O-18	(4) 16 g of methane			
3.	How many atoms are the (1) 25	here in 100 amu of He ? (2) 50	(3) 75 (4) 100				
4.	Number of molecules of (1) 3.01×10^{21}	f water in a drop of wate (2) 6.02 × 10 ²¹	r weighing 0.09 g are : (3) 3.01 × 10 ²²	(4) 3.01 × 10 ²⁰			
5.	The largest number of (1) CO_2	molecules is present in 1 (2) H ₂ O	g of (3) C ₂ H ₅ OH (4) N ₂ O ₅ .				
6.	The total number of g-r (1) 0.1	nolecules of SO ₂ Cl ₂ in 13 (2) 0.2	3.5 g of sulphuryl chloride (3) 0.3	e is (4) 0.4			
7.	The number of molecul (1) 6.0×10^{23}	les of CO_2 present in 44 ((2) 3×10^{23}	l g of CO_2 is : (3) 12×10^{23} (4) 3×10^{10}				
8.	The number of mole of (1) 0.425	ammonia in 4.25 g of an (2) 0.25	mmonia is : (3) 0.236 (4) 0.2125				
9.	One mole of P ₄ molecule (1) 1 molecule (3) $\frac{1}{4} \times 6.022 \times 10^{23}$ ato	les contain : oms	 (2) 4 molecules (4) 24.088 × 10²³ atoms 				
10.	1.0 g of hydrogen conta atoms in 1 g of He is :	ains 6×10²³ atoms. The a	ntomic weight of helium is	s 4. It follows that the number of			
	(1) $\frac{1}{4} \times 6 \times 10^{23}$	(2) $4 \times 6 \times 10^{23}$	(3) 6×10^{23}	(4) 12 × 10 ²³			
11.	A sample of aluminium atoms? (At. wt. AI = 27	n has a mass of 54.0 g. , Mg = 24)	. What is the mass of the same number of magnesium				
	(1) 12 g	(2) 24 g	(3) 48 g	(4) 96 g.			
12.	The number of atoms in (1) Twice that in 60 g of (3) Half in 8 g He	n 558.5 g of Fe (at wt.= 5 carbon	55.85) is : (2) 6.022 × 10 ²² (4) 558.5 × 6.023 × 10 ²³				
13.	The weight of 1×10^{22} r (1) 41.59 c	molecules of $CuSO_4$. 5H ₂	O is :	(1) None of these			
	(i) i i.Jo y	(2) +10.8 y	(J) 4.1J9 y				

14.	5.6 litre (1) 6.02	e of oxygen at ST 2 × 10 ²³ atoms	[•] P contains : (2) 3.01 × 10 ²³ atoms	(3) 1.505 × 10 ²³ atoms	(4) 0.7525 × 10 ²³ atoms		
15.	lf 1 dm (1) 56 g	³ of a gas weight g	s 2.5 g at STP, its gram- (2) 11.2 g	molecular weight is : (3) 22.4 g	(4) 224 g		
16.	Which (1) 16 ((3) 28 (one of the follow g of O ₂ and 14 g g of N ₂ and 22 g	ing pairs of gases contai of N_2 of CO_2	is the same number of molecules : (2) 8 g of O_2 and 22 g of CO_2 (4) 32 g of O_2 and 32 g of N_2			
17.	1.5 × 1 (1) 36	0 ²² atoms of an	element weigh about 0.9 (2) 18	g. The atomic mass of the element (in amu) i(3) 54 (4) 72			
18.	The lea (1) 2 g	ast number of mo Hydogen	blecules are contained in (2) 8 g oxygen	(3) 4 g Nitrogen	(4) 16 g CO ₂		
Section	on (C)	: Log calcula	tion				
1.	What is (1) 4.3	s pH of 2× 10 ^{−4} N	/i H₃O⁺ : (2) 3.7	(3) 4.7	(4) None		
2.	Which (1) pH	have highest cor = 4.3	nc. of H_3O^+ in solution (2) pH = 5.7	(3) pH = 2.4	(4) pH = 8		
3.	What is	s conc. of OH⁻ w	ith pOH = 4.4 :	F	,		
	(1) 4×10^{-4} (2) 4×10^{-5}		(2) 4 × 10 ⁻⁵	(3) $\frac{10^{-5}}{4}$	(4) $\frac{10^{4}}{4}$		
4.	Comple (1) (2) (3)	ete the table of p H ₃ O ⁺ 3 × 10 ⁻² -	H (pH + pOH = 14) [H+] pH - 6.3 -	[OH ⁻] = 10 ⁻¹⁴ OH ⁻ - - 2 × 10 ⁻⁴	рОН - -		
5.	What is (1) 10 ^{_(}	s addition value o	of 10 ⁻² , 10 ⁻³ , 10 ⁻⁴ (2) 11 × 10 ⁻²	(3) 1.1 × 10 ⁻⁴	(4) 1.11 × 10 ^{−2}		
6.	What is (1) 1.3	s new pH when ().1 mole H⁺ added into 1 (2) 0.7	Itr solution of $pH = 1$ (3) 1.7 (4) none			
7.	What is	s sum of 0.2, 0.3	and 0.4 in term of log				
	(1) log	9	(2) $\log \frac{9}{10}$	(3) log 8	(4) log 4		
8.	What is (1) log	s sum of 0.3, 0.4 9	8 and 0.6 in term of log (2) log 6	(3) log 12	(4) log 24		
9.	What is (1) 0.3	s x value if x = lo	g 18 – 2 log3 (2) 0.6	(3) 0.48	(4) 1.3		

10.	What is y value if logy = $\log 5 + \frac{1}{2} \log 4$											
	(1) 20		(2) 1010)	(3) 10		(4) √20					
11.	What is	s x value if x = -lo	og10 ^{_2} –	log10 ⁻³ – log10 ⁻	-4							
	(1) 10-	9	(2) 9		(3) 10 ⁹		(4) $\frac{1}{9}$					
Sectio	on (D)	: Energy, way	veleng	th calculatio	n							
1.	Which work value is equal with $W = 20$ atm×lt											
	(1) 202	6 J	(2) 482	.38 cal	(3) both 1 & 2		(4) None of these					
2.	Which (1) ∆G ^c	is correct R (gas $p^{0} = -2.3 \text{ RT log I}$	constan ≺,	t) value accordir R = 0.082	ng to given relation	on.						
	(2) log	$\frac{\mathrm{K}_{2}}{\mathrm{K}_{1}} = \frac{\Delta \mathrm{H}}{2.3\mathrm{R}} \left(\frac{1}{\mathrm{T}_{1}} - \frac{2}{\mathrm{T}_{1}}\right)$	$\left(\frac{1}{2}\right)$,	$R = 2$ for $\Delta H = 2$	κKJ							
	(3) K =	$Ae^{-K_a/RT}$,		$R = 8.31, E_a = 1$	xKJ							
	(4) d(g	$J/lt) = \frac{MP}{RT},$		R = 2								
3.	How m (1) 2.5	any no of waves × 10 ³ m ⁻¹	present (2) 2.5	having waveleng × 10¹m⁻¹	gth 400 μm. (3) 2.5 × 10⁵cm	_I –1	(4) Both (1) and (3)					
4.	What is (1) 2.5	s wavelength if 4 × 10 ⁻⁴ m	× 10 ³ wa (2) 4 ×	aves are present in 10 m 10 ^{−3} m (3) 2.5 × 10 ^{−3} m			(4) none					
5.	What is (1) 3 ×	s approximate en 10 ⁻²⁴ J	ergy of ((2) 3 ×	one photon havir 10 ^{–16} J	ng wavelength 6. (3) 10 ^{–16} J	.62 Å	(4) none					
6.	What is (1) 4 ev	s approxe energy ⁄	0 nm	(4) 0.4 ev								
7.	Fill in th	ne blanks in give	n questio	on.								
		λ	v (wave	e no.)	E	no. of photon						
	(1)	-	-		6.62 × 10 ^{−16} J		1					
	(2)	3000 Pm	-		-		10					
	(3)	-	2 × 10 ⁹		-		NA					
8.	What is	s wavelength obt	ained wh	nen 2000Å and 4	000Å wave are	merged	:					
	(1) 600	Å	(2) $\frac{400}{3}$	$\frac{10}{10}$ Å (3) $\frac{2000}{3}$ Å		(4) none						
9.	What is (1) 6ev	gle photon ? (4) 2ev										
10.	Wavelength of a photon having a (1) 6.2×10^{-7} m (2) 6.2×10^{-7} m			an energy of 2 e × 10 ^{−6} m	V. will be : (3) 6.2 × 10 ^{−9} m	ı	(4) 6.2×10^{-8} m					
11.	The fre (1) 5.0	equency of yellow × 10¹⁴ Hz	/ light ha (2) 2.5	ving wavelength × 10 ⁷ Hz	600 nm is : (3) 5.0 × 10 ⁷ Hz	2	(4) 2.5 × 10 ¹⁴ Hz					
12.	Wave r (1) 1.33	number of radiation 3 × 10 ⁻⁶ cm ⁻¹	ons havi (2) 1.33	ng frequency of $3 \times 10^{-7} \text{ cm}^{-1}$	4 × 10 ⁴ Hz will b (3) 9 × 10 ^{–11} cn	e: n ^{−1}	(4) 4 × 10 ^{−5} cm ^{−1}					

(4) i < ii < iii < iv

Section (E) : Concentration, Solvent, solute calculation

1.	What is amount of solu	ite present in 4% w/w sol	lution of 500 gm weight ?							
	(1) 4gm	(2) 20 gm	(3) 40 gm	(4) 2000 gm						
2.	What is amount of solv	vent present in 10% w/w	solution having 50 gm so	lute						
	(1) 10 gm	(2) 500 gm	(3) 450 gm	(4) None						
3.	What is mass of solute	present in 2ltr solution o	f molarity 2M (Molar mas	ss solute = 50 g						
	(1) 200 g	(2) 4 gm	(3) 400 gm	(4) none						
4.	2.5 mole/ltr solution is not equal to (Molar mass solute = 40)									
	(1) 100 g/lt	(2) 0.1 g/ml	(3) 2.5 × $10^{-3} \frac{\text{mole}}{\text{m}^3}$	(4) 10 ⁵ g/m ³						
5.	Which solution contain	highest solute when solu	ution have equal amount	will same solute ? (d=1.5 g/ml)						
	(1) 10 % w/v	(2) 10 % w/w	(3) equal in both	(4) none						
6.	Calculate volume of fo	Calculate volume of following gases at STP and arrange in increasing order of volume								
	(i) 1.20 mol O ₂	(ii) 8.40 × 10 ²³ atoms o	of Ne							
	(iii) 50 g Ar	(iv) 2.60 mol C ₂ H ₆								

(3) iv < ii < i < iii

- An alcoholic solution is prepared by adding 50 mL ethanol in 150 mL water of calculate
 (1) Volume percent of the solution ?
 - (2) What is the volue of ethanol present 100 mL of the solution ?

(2) I < iii < ii , iv

- (3) What is the new volume percent when 50 mL of ethanol is further added ?
- **8.** By Application of PV = nRT. Fill the table

(1) iii < l < ii < iv

	Р	V	Ν	Т
(i)	atom	2.5 L	3 mol	400 K
(ii)	Ра	4.0 m ³	2 mol	57⁰C
(iii)	380 mm	L	1.5 mol	87⁰C
(iv)	2 bar	60 L	4.8 mol	
(v)	1.5 atm	3.0 L		–23°C

9. Fill the table

Substance	Moles	Mass	No. of particles
CO ₂	0.25		
NaOH		10g	
He			7.8 × 10 ²² atoms
CaCO ₃	1.50 mol		
C ₈ H ₁₈		22.8g	
Ca ₃ (PO ₄) ₂	2.50 mol		

Answers

E

	EXERCISE - 1												
SECTI	ON (A)												
1.	(4)	2.	(3)	3.	(3)	4.	(3)	5.	(1)	6.	(3)	7.	(4)
8.	(1)	9.	(4)	10.	(1)	11.	(4)	12.	(3)	13.	(4)	14.	(1)
15.	(2)	16.	(2)	17.	(1)	18.	(3)	19.	(1)	20.	(1)	21.	(1)
22.	(2)	23.	(2)	24.	(1)	25.	(4)	26.	(4)	27.	(2)	28.	(2)
SECTIO	ON (B)												
1.	(2)	2.	(4)	3.	(1)	4.	(1)	5.	(2)	6.	(1)	7.	(1)
8.	(2)	9.	(4)	10.	(1)	11.	(3)	12.	(1)	13.	(3)	14.	(2)
15.	(1)	16.	(1)	17.	(1)	18.	(3)						
SECTIO	ON (C)												
1.	(2)	2.	(3)	3.	(2)								
4.	(1)	3 x 1	0-2		1.52			$\frac{10^{-12}}{3} = 3.3 \times 10^{-13}$			12.48		
	(2) 5×10^{-7} (3) $\frac{10^{-10}}{2} = 5 \times 10^{-11}$			6.3			$\frac{10^{-7}}{5} = 2 \times 10^{-8}$ 2×10^{-4}			7.7 3.7			
			0 ⁻¹¹	10.3									
	(4)	5 × 1	0 ⁻¹⁰		9.3			2 × 10	0-5		4.7		
5.	(4)	6.	(2)	7.	(3)	8.	(4)	9.	(1)	10.	(3)	11.	(2)
SECTIO	ON (D)												
1.	(3)	2.	(3)	3.	(4)	4.	(3)	5.	(2)	6.	(1)		
7.	(1)	ЗÅ		$\frac{10^{10}}{3}$	=3.3×10	3.3×10 ⁹ 6.6		.62 × 10 ⁻¹⁶ J 1		1			
	(2) 30Å	=3000) Pm	3.3 ×	.3 × 10 ⁸ 6.		6.62	$.62 \times 10^{-16} J \left(n \frac{hc}{\lambda} \right)$		10			
	(3) 5 ×	10 ⁻¹⁰ F	° m	2 × 10	2 × 10 ⁹ 2.		2.38	.38 ×10 ⁸ J		NA			
8.	(2)	9.	(1)	10.	(1)	11.	(1)	12.	(1)				
SECTI	ON (E)												
1.	(2)	2.	(3)	3.	(1)	4.	(3)	5.	(2)	6.	(2)		
7.	(1) 25%	, 0	(2) 25	ml	(3) 50)%	. ,						
8. 9.	(i)	40 at	m	(ii)	1.375	ΚPa	(iii)	90 L	(iv)	300 K	(v)	0.216	mol
	Subst	ance	Moles		Mass	5	Ν	lo. of par	ticles				
	CO ₂		0.25		11 g		1	1.5 × 10 ²³					
	NaOH	I	0.25		10g	10g		1.5 × 10 ²³					
	He		0.13		0.52		7	7.8 × 10 ²² atoms					
	CaCC) ₃	1.50 mc	bl	150 g	gm	9	× 10 ²³					
	C ₈ H ₁₈		0.2		22.8	g	1	.2 × 10 ²³					
	Ca ₃ (P	O ₄) ₂	2.50 m	bl	775 (gm	1	5 × 10 ²³					