## BY PRINCE SINGH

# MOLE CONCEPT REDOX REACTION GASEOUS STATE



ET(	NO. 1 ONLINE COACHING			FTR BY P.S. SIR
1.	One litre of a gas following tempera	weighs 2g at 300 K and 2 a ature will one litre of the sam	tm pressure. Of the pressur me gas, weigh one gram?	e is made 0.5 atm at which of the
	(A) 450 K	(B) 150 K	(C) 600 K	(D) 75 K
Ans.	<b>(B)</b>			
2.	The temperature o it would become-	f an Ideal gas is increased fi	rom 27°C to 927°C . if at 27°C	C the rms velocity of the gas is V , at $927^{\circ}$ C
	(A) 5V	(B)2V	(C) V/2	(D) V/4
3.	z	A —Ideal gas, from the infor	mation given in the graph r	nark the correct statement :

(A) Gas A shows negative deviation and Gas B shows positive deviation at all pressures

- (B) Gas A shows negative deviation at high pressure only
- (C) Gas A shows positive deviation at all pressures

۰B →P

(D) Gas C shows negative deviation at all pressures

4. At what absolute temperature the pressure of He gas in a definite volume become equal to zero?

(A) 
$$\frac{a}{R} \times \frac{(V_m - b)^2}{V_m^2}$$
 (B)  $\frac{a}{R} \times \frac{(V_m - b)}{V_m^2}$  (C)  $\frac{a}{R} \times \frac{(V_m - b)^2}{V_m}$  (D)  $\frac{a}{R} \frac{V_m}{R}$ 

Ans. **(B)** 

Which of the following is/are correct regarding the distribution of speed of N2 and CO2 at the definite temperature? 5.



Ans. (A)

The r.m.s. velocity of oxygen is  $\sqrt{3}$  times the r.m.s. velocity of a gas at temperature T, the gas is : 6. (A) SO,  $(B) SO_{3}$  $(C)N_2O_4$  $(D)NO_{2}$ Ans. **(C)** MnO<sub>4</sub><sup>-</sup> is good oxidising agent in different medium changing to -7.  $MnO_4^- \longrightarrow Mn^{2+}$  $\longrightarrow$  MnO<sub>4</sub><sup>2-</sup>  $\longrightarrow$  MnO<sub>2</sub>  $\longrightarrow$  Mn<sub>2</sub>O<sub>3</sub> Changes in oxidation number respectively are -(A) 1, 3, 4, 5 (B) 5, 4, 3, 2 (C) 5, 1, 3, 4 (D) 2, 6, 4, 3 8. For 10 minute each, at 0 °C, from two identical holes nitrogen and an unknown gas are leaked into a common vessel of 4 litre capacity. The resulting pressure is 2.8 atm and the mixture contains 0.4 mole of nitrogen. What is the molar mass of unknown gas? (B)540 (C)448 (A) 224 (D) 190 9. Volume V1 mL of 0.1M K2Cr2O7 is needed for complete oxidation of 0.678 g N2H4 in acidic medium. The volume of 0.3 M KMnO<sub>4</sub> needed for same oxidation in acidic medium will be: (A)  $\frac{2}{5}$  V<sub>1</sub> (B)  $\frac{5}{2}$  V<sub>1</sub> (C) 113 V<sub>1</sub> (D) can not be determined Ans. **(A)** The root mean square speed of gas molecules at a temperature 27°C and pressure 1.5 bar is 10<sup>4</sup> cm/sec. If both 10. temperature and pressure are raised three times, the new rms speed of gas molecules will be-(B)  $\sqrt{3} \times 10^4$  cm/sec. (C)  $3 \times 10^4$  cm/sec. (A)  $10^4 \text{ cm/sec.}$ (D)  $9 \times 10^4$  cm/sec. Ans. **(B)** Which of the following expressions between the van der Waals constant b and the radius r of spherical molecules 11. is correct -(A)  $b = \left(\frac{4}{3}\pi r^3\right) N_A$ (B) b =  $\left(\frac{4}{3}\pi r^3\right)$ (D) b = 4  $\left(\frac{4}{3}\pi r^3\right)N_A$ (C) b = 2  $\left(\frac{4}{3}\pi r^3\right)N_A$ Ans. **(D)** 

- 12. If the mean free path of gaseous molecules is 60 cm at a pressure of  $1 \times 10^{-4}$  mm Hg, what will be its mean free-path when the pressure is increased by 100 times ?
  - (A)  $6.0 \times 10^{-1}$  cm (B) 6.0 cm (C)  $6.0 \times 10^{1}$  cm (D)  $6.0 \times 10^{2}$  cm
- Ans. (A)

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13.	The number of mole of KM (A) 2/5	$AnO_4$ that will need to react (B) $3/5$	completely with one mole fe (C)4/5	rrous oxalate in acidic solution is: (D) 1		
14.	Compressibility factor for He behaving as real gas is :					
	(A) 1	$(B)\left(1-\frac{a}{RTV}\right)$	$(C)\left(1+\frac{Pb}{RT}\right)$	(D) <u>RTV</u> (1-a)		
Ans.	(C)					
15.	The correct order of norm 'a' are 1.360, 1.390, 4.170	al boiling points of gases A and 2.253 L <sup>2</sup> . atm. mol <sup>-2</sup> res	,B,C and D, for whom the spectively, is :	values of vander Waal's constant		
Ans.	(A) A< B< C <d (D)</d 	$(B) D \le B \le C \le A$	(C) A< C< C <b< th=""><th>(D)A &lt; B &lt; D &lt; C</th></b<>	(D)A < B < D < C		
16. Ans.	At critical condition- (A) Both the liquid and ga (B) density of liquid is mo (C) Liquid and gas phase (D) Gas cannot be liquified (A)	as have same density ore than the density of gas separate out d				
17.	A 300 mL sample of hydro and vapour pressure of wa	ogen was collected over wat ater was 19 Torr. How man	er at 21°C on a day and the y mili moles of H <sub>2</sub> O were p	pressure over water was 748 Torr resent ?		
Ans.	(A) 0.75 ( <b>B</b> )	(B)0.31	(C) 0.57	(D) 1		
18.	The chloride of a metal co the metal will be (valency	ontains 71% chlorine by we of metal is 2) -	ight and the vapour density	of it is 50. The atomic weight of		
	(A) 29	(B) 58	(C) 35.5	(D) 71		
Ans.	(A)					
19.	A 2L solution (X) contain 0.02 mole of $[Co(NH_3)_5SO_4]Br$ and 0.02 mol $[Co(NH_3)_5Br]SO_4$ . 1 L of this solution taken : -					
	$X + AgNO_3 (excess) \rightarrow Y$	mol AgBr↓				
	$X + BaCl_2 (excess) \rightarrow Z n$	nol BaSO <sub>4</sub> $\downarrow$				
	Values of Y and Z are $-$	$(\mathbf{D}) = 0 = 0 = 0$	(0) 0.02 0.01	$(D) \land 01 \land 01$		
Ang	(A) 0.01, 0.02	(B) 0.02, 0.02	(C) 0.02, 0.01	(D) 0.01, 0.01		
r <b>1115.</b>	(12)					

<b>20.</b> Which of the following relations is incorrect for solutions ?				
	(A) 3 NAl <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> =	$0.5 \mathrm{MAl}_2(\mathrm{SO}_4)_3$	(B) 3 M $H_2SO_4 = 6$	5 N H <sub>2</sub> SO <sub>4</sub>
	(C) 1 M $H_3 PO_4 = 1/2$	3 N H <sub>3</sub> PO <sub>4</sub>	(D) 1 M $Al_2(SO_4)_3$	$= 6 \text{ NAl}_2(\text{SO}_4)_3$
Ans.	(C)			
21.	A purified pepsin (p amino acid analysis	protein containing several s. It was seen 0.43 gm of	amino acids) isolated from lysine (mol wt = 146) was	bovine preparation was introduced in the present in 100 gm of pepsin. Therefore
	minimum molecular	r wt of pepsin approximate	ely 15 -	
	(A) 34000	(B) 39000	(C)40,000	(D) None of these

Ans. (A)

## BY PRINCE SINGH

# **MOCK TEST - 1**



to: I offente ookoninto					
When an electron in a Hydrogen atom in ground state absorb a photon of energy 12.75 eV, its angular momentum					
will become-					
(A) 2 times of its initial	value	(B) 3 times of its initial value			
(C) 16 times of its initial	value	(D) 4 times of its initial value			
<b>(D)</b>					
Choose incorrect stabil	ity order				
(A) $[Cu(NH_3)_4]^{2+} < [Cu(NH_3)_4]^{2+}$	$[en)_2]^{2+} < [Cu(trien)]^{2+}$				
(B) $[Fe(H_2O)_6]^{3+} < [Fe(N_2O)_6]^{3+}$	$NO_2)_6]^{3-} < [Fe(NH_3)_6]^{3+}$				
(C) $[Co(H_2O)_6]^{3+} < [Rh(A_2O)_6]^{3+}$	$H_2O_6]^{3+} < [Ir(H_2O_6)]^{3+}$				
(D) $[Cr(NH_3)_6]^{1+} < [Cr(NH_3)_6]^{1+}$	$(NH_3)_6]^{2+} < [Cr(NH_3)_6]^{3+}$				
<b>(B)</b>					
An emulsifier is a subs	tance				
(A) which stabilises an	emulsion				
(B) which breaks the emulsion into its constituent liquids					
(C) which can convert liquid into an emulsion					
(D) which brings about	t coagulation of an er	nulsion			
(A)					
• Equal volumes of 0.015MCH <sub>3</sub> COOH & 0.015M NaOH are mixed together. What would be molar conductivity of mixture if conductivity of CH <sub>3</sub> COONa is $6.3 \times 10^{-4}$ S cm <sup>-1</sup>					
(A) 8.4 S cm <sup>2</sup> mol <sup>-1</sup>	(B) 84 S cm <sup>2</sup> mol <sup>-1</sup>	$(C) 4.2 \text{ S cm}^2 \text{mol}^{-1}$	(D) 42 S cm <sup>2</sup> mol <sup>-1</sup>		
<b>(B)</b>					
Which occurswhen a su	ubstance is converted	fromliquid to gas at the norma	l boiling point?		
I. Potential energy of the system increases					
II. The distance betweenmolecules increases					
III. The average kinetic energy of themolecules increases					
(A) II only	(B) I and II only	(C) II and III only	(D) I, II and III		
<b>(B)</b>					
What is the pKb of awe	eak basewhose 0.1Ms	olution has $pH = 9.5$ ?			
(A) 7.5	(B)8	(C)9	(D) 10		
<b>(B)</b>					
Which of the following	ideal aqueous solutio	ns will show maximum boiling	point.		
(A) 0.5M NaCl showing	g 50% dissociations				
(B) 0.3 M K, Fe[Fe(CN)]	.]				
(C) 1M Glucse solution	<del>,</del>				
(D) 1 mole of AgCl is m	ixed with 0.5 l of H <sub>2</sub> O				
(B)	2				
	When an electron in a F will become- (A) 2 times of its initial (C) 16 times of its initial (D) Choose incorrect stabil (A) $[Cu(NH_3)_4]^{2+} < [Cu(B) [Fe(H_2O)_6]^{3+} < [Fe(P_2O)_6]^{3+} < [Fe(P_2O)_6]^{3+} < [Cr(P_2O)_6]^{3+} < [Cr(P_2O)_6]^$	When an electron in a Hydrogen atom in grow will become- (A) 2 times of its initial value (C) 16 times of its initial value (D) Choose incorrect stability order (A) $[Cu(NH_3)_4]^{2+} < [Cu(en)_2]^{2+} < [Cu(trien)]^{2+}$ (B) $[Fe(H_2O)_6]^{3+} < [Fe(NO_2)_6]^{3+} < [Fe(NH_3)_6]^{3+}$ (C) $[Co(H_2O)_6]^{3+} < [Rh(H_2O)_6]^{3+} < [Ir(H_2O)_6]^{3+}$ (D) $[Cr(NH_3)_6]^{1+} < [Cr(NH_3)_6]^{2+} < [Cr(NH_3)_6]^{3+}$ (B) An emulsifier is a substance (A) which stabilises an emulsion (B) which breaks the emulsion into its const (C) which can convert liquid into an emulsic (D) which brings about coagulation of an err (A) Equal volumes of 0.015MCH_3COOH & 0.015 mixture if conductivity of CH_3COONa is 6.3 > (A) 8.4 S cm <sup>2</sup> mol <sup>-1</sup> (B) 84 S cm <sup>2</sup> mol <sup>-1</sup> (B) Which occurswhen a substance is converted I. Potential energyof the systemincreases II. The distance betweenmolecules increas III. The average kinetic energyof themolecu (A) II only (B) I and II only (B) What is the pKb of aweak basewhose 0.1Ms (A) 7.5 (B) 8 (B) Which of the following ideal aqueous solutio (A) 0.5M NaCl showing 50% dissociations (B) 0.3 M K <sub>2</sub> Fe[Fe(CN) <sub>6</sub> ] (C) 1M Glucse solution (D) 1 mole of AgCl is mixed with 0.5 <i>l</i> of H <sub>2</sub> O (B)	When an electron in a Hydrogen atom in ground state absorb a photon of ene will become- (A) 2 times of its initial value (B) 3 times of its initial value (C) 16 times of its initial value (D) 4 times of its initial value (D) 4 times of its initial value (D) (D) 4 times of its initial value (D) (D) (Cn(H <sub>3</sub> ) <sub>4</sub> ) <sup>2</sup> < [Cu((Hr <sub>1</sub> ) <sub>2</sub> ) <sup>2</sup> < [Cu((Trien)] <sup>2+</sup> (B) [Fe(H <sub>2</sub> O) <sub>4</sub> ) <sup>2+</sup> < [Fe(NO <sub>3</sub> ) <sub>4</sub> ] <sup>3-</sup> < [Fe(NH <sub>3</sub> ) <sub>4</sub> ] <sup>2+</sup> (C) [Co(H <sub>2</sub> O) <sub>4</sub> ) <sup>2+</sup> < [Rh(H <sub>2</sub> O) <sub>4</sub> ) <sup>2+</sup> < [Fr(NH <sub>3</sub> ) <sub>4</sub> ] <sup>2+</sup> (D) [Cr(NH <sub>3</sub> ) <sub>4</sub> ] <sup>2+</sup> < [Cr(NH <sub>3</sub> ) <sub>4</sub> ] <sup>2-</sup> < [Cr(NH <sub>3</sub> ) <sub>6</sub> ] <sup>2+</sup> (B) (B) (An emulsifier is a substance (A) which stabilises an emulsion (B) which breaks the emulsion into its constituent liquids (C) which can convert liquid into an emulsion (D) which brings about coagulation of an emulsion (D) which brings about coagulation of an emulsion (A) Equal volumes of 0.015MCH <sub>3</sub> COOH & 0.015M NaOH are mixed together. V mixture if conductivity of CH <sub>1</sub> COON a is $6.3 \times 10^{-4}$ S cm <sup>-1</sup> (A) 8.4 S cm <sup>3</sup> mol <sup>-1</sup> (B) 84 S cm <sup>3</sup> mol <sup>-1</sup> (C) 4.2 S cm <sup>3</sup> mol <sup>-1</sup> (B) Which occurswhen a substance is converted fromliquid to gas at the norma 1. Potential energyof the systemincreases II. The distance betweenmolecules increases II. The average kinetic energy of themolecules increases II. The distance between the point of the point of the following 50% dissociations (B) 0.3 M K <sub>2</sub> Fe[Fe(CN) <sub>6</sub> ] (C) 1M Gluces solution (D) 1 mole of AgCl is mixed with 0.57 of H <sub>2</sub> O (B)		

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Q.8	Copper metal crystalliz into the voids of coppe	Copper metal crystallizes in FCClattice. Edge length of unit cell is 362 pm. The radius of largest atom that can fit into the voids of copper latticewithout disturbing it.						
	(A) 53 pm	(B) 45 pm	(C) 93 pm	(D) 60 pm				
Ans.	(A)							
Q.9	Choose incorrect option	n regarding atomic size.						
	$(A) Zr \simeq Hf$	(B) Fe $\simeq$ Co $\simeq$ Ni	$(C) Y \simeq La$	$(D) Al \simeq Ga$				
Ans.	(C)							
Q.10.	In which of the following	ng O–N–O bond angle is hi	ghest?					
	$(A) \operatorname{NO}_2^+$	$(B) NO_3^-$	$(C) NO_2^-$	(D) None				
Ans.	(A)							
Q.11	Which of the following	g is resistant to hydrolysis a	t room temperature?					
	(A) $SF_6$	(B) $\operatorname{SiCl}_4$	$(C) PCl_5$	(D) $\mathrm{BCl}_{3}$				
Ans.	(A)							
Q.12.	The complex ion which	exhibits geometrical isome	erism as well as optical isomer	ism is:				
	$(A) [Cr(NH_3)4Cl_2]^+$	$(B) [Pt(NH_3)2Cl_2]$	$(C) [Pt(NH_3)_2(Br_2)2Cl_2]$	$(D) [Ca(EDTA)]^{2-}$				
Ans.	(C)							
Q.13.	Select the reaction (s)	which would liberate hydro	ogen gas?					
	(I) $SiH_4 + H_2O \rightarrow ?$	(II) Al + NaOH $\rightarrow$ ?	(III) $Zn + H_2SO_4(dil) \rightarrow 3$	$? (IV) XeF_6 + H_2O \rightarrow ?$				
	(A) II, III	(B) I, II, III	(C) I, IV	(D) I, II, III, IV				
Ans.	(B)							
Q.14.	The metal which is extr	racted by hydrometallurgy	as well as pyrometallurgy is:					
	(A) Mg	(B) Fe	(C) Pb	(D)Cu				
Ans.	(D)							
Q.15.	Which of the given set	of compounds does not ex	kist?					
	(A) $H_2S$ , PbCl <sub>4</sub> , Fel <sub>3</sub>	(B) $HgI_2$ , $FeI_3$ , PbI4	$(C) PH_{5}, SCl_{6}, BiCl_{5}$	(D) $\operatorname{BiI}_{3}$ , $\operatorname{Al}_{2}\operatorname{Br}_{6}$ , $\operatorname{Fe}_{2}\operatorname{Cl}_{6}$				
Ans	(C)							
Q.16.	100 ml solution (I) of b	ouffer containing 0.1(M) H	A and 0.2 (M) A <sup>-</sup> , is mixed w	ith another solution (II) of 100 ml				
	containing 0.2(M) HA a	and $0.3(M) A^{-}$ .						
	After mixing what is th	epH of resulting solution	?					
	Given $pK_a$ of HA = 5							
	(A) $5 - \log 5/3$	(B) $5 + \log 5/3$	(C) $5 + \log 2/5$	(D) $5 - \log 5/2$				
Ans.	<b>(B)</b>							

Q.17.	An unknown compound A dissociates at 500°C to give products as follows -					
	$A(g) \Longrightarrow B(g) + C(g) + D(g)$					
	Vapour density of the equilibrium mixture is 50 when it dissociates to the extent to 10%. What will be the molecular weight of Compound $A-$					
	(A) 120	(B) 130	(C) 134	(D) 140		
Ans.	(A)					
Q.18.	Ratio of O–H <sub>2</sub> and p–H	I <sub>2</sub> at room temperature is -				
	(A) 1 : 1	(B) 3 : 1	(C) 1 : 3	(D) 2 : 5		
Ans.	<b>(B)</b>					
Q.19.	AlCl, can be dimerised whereas BCl, cannot be dimerised because -					
	(A) backbonding is stronger in the case of boron halides					
	(B) size of boron is quite smaller					
	(C) size of Al is larger					
	(D) $AlCl_3$ has incompl	lete octet				
Ans.	(A)					
Q.20	LiNO3 on heating giv	es -				
	(A) $Li_2O + NO_2$	(B) do not decompose	(C)LiNO <sub>2</sub>	(D) None of these		
Ans.	(A)					

**Q.21.** Consider the reaction A  $\longrightarrow$  B, graph between half life ( $t_{1/2}$ ) and initial concentration (a) of the reactant



Hence graph between  $\frac{-d[A]}{dt}$  and time will be



- Ans. (C)
- **Q.22.** The equivalent conductivity of an infinitely dilute solution of  $NH_4Cl$  is 150 and the ionic conductance of OH<sup>-</sup> and Cl<sup>-</sup> ions are 198 and 76 respectively. If the equivalent conductance of a 0.01 N solution of  $NH_4OH$  is 9.6, What will be its degree of dissociation ?

(A) 0.0353 (B) 0.0103 (C) 0.96 (D) 0.414

Ans. (A)

Q.23	Given at 350 K $p_A^o = 300$	torr and $p_B^o = 800$ torr, the	composition of the mixture	having a boiling point of 350 K is -
	(A) $X_A = 0.08$	(B) $X_{A} = 0.06$	$(C) X_{A} = 0.04$	(D) $X_A = 0.02$
Ans.	(A)			

Q.24 The stability of lyophilic colloid is due to which of the following

(A) Charge on their particles

- (B) Large size of their particles
- (C) Small size of their particles
- (D) Solvation by dispersion medium

Ans. (D)

Q.25 Compounds (A) and (B) are –  $Cl_{2} - \underbrace{Cold and dilute NaOH}_{Hot a nd c onc. Na OH} (A) + NaCl + H_{2}O$ (A) NaClO<sub>3</sub>, NaClO (B) NaOCl<sub>2</sub>, NaOCl (C) NaClO<sub>4</sub>, NaClO<sub>3</sub> (D) NaOCl, NaClO<sub>3</sub> Ans. (D)

Q.26	Which complex has square planar structure –					
	(A) Ni(CO) <sub>4</sub>	(B) $[NiCl_4]^{2-}$	$(C)[Ni(H_2O)_6]^{2+}$	$(D) [Cu(NH_3)_4]^{2+}$		
Ans.	(D)					

Q.27	catalysts used in contact process of manufacture of sulphuric acid is –					
	(A) NO	(B) V <sub>2</sub> O <sub>5</sub>	(C) Mo	(D) Platinised asbestos		
Ans.	<b>(B)</b>					

**Q.28** A P-V curve at constant temperature is shown below.  $T_1$  and  $T_2$  in kelvin are-



(A) 500, 250 (B) 250, 500 (C) 300, 150 (D) 300, 300 Ans. (B) Q.29 X g of ethanal (CH<sub>3</sub>CHO) was subjected to combusion in a bomb calorimeter and the heat produced is Y joules. Then which of following is correct -

(A) 
$$\Delta E_{(comb.)} = -Y kJ$$
  
(B)  $\Delta E_{(comb.)} = -\frac{44Y}{X} J mol^{-1}$   
(C)  $\Delta H_{(comb.)} = -\frac{44Y}{X} J mol^{-1}$   
(D)  $\Delta H_{(comb.)} = -Y J mol^{-1}$   
(B)

## BY PRINCE SINGH

# PERIODIC TABLE S-BLOCK



1. Which of the following relation is correct with respect to first (I) and second (II) ionization enthalpies of potassium and calcium?

(A)  $I_{Ca} > II_{K}$  (B)  $I_{K} > I_{Ca}$  (C)  $II_{Ca} > II_{K}$  (D)  $II_{K} > II_{Ca}$ (D)

Ans. (D

- 2. Which of the following statement is incorrect?
  - (A) The tendency to attract bonded pair of electron in case of hybrid orbitals follow the order :  $sp > sp^2 > sp^3$
  - (B) Alkali metals generally have negative value of electron gain enthalpy.
  - (C)  $Cs^+(g)$  releases more energy upon gain of an electron than Cl(g).
  - (D) The electronegativity values for 2p-series elements is less than that for 3p-series elements on account of small size and high inter electronic repulsions.

Ans. (D)

- Values of IE<sub>1</sub>, IE<sub>2</sub> and IE<sub>3</sub> of an element are 9.3, 18.2 and 553.8 eV. What information(s) do these data convey?
   (A) The element has two electrons in the valence shell.
  - (B) The element belongs to  $14^{\mbox{\tiny th}}$  group of Modern periodic table.
  - (C) Both (A) and (B)
  - (D) None of these

4. The set representing the correct order of ionic radius is : (A)  $Na^+ > Li^+ > Mg^{2+} > Be^{2+}$ (B)  $Li^+ > Na^+ > Mg^{2+} > Be^{2+}$ (C)  $Mg^{2+} > Be^{2+} > Li^+ > Na^+$ (D)  $Li^+ > Be^{2+} > Na^+ > Mg^{2+}$ 

5. In which of the following arrangements, the sequence is not strictly according to the property written against it ? (1) HF < HCl < HBr < HI : increasing acid strength (2)  $NH_3 < PH_3 < AsH_3 < SbH_3$  : increasing basic strength (3) B < C < O < N : increasing first ionization enthalpy (4)  $CO_2 < SiO_2 < SnO_2 < PbO_2$  : increasing oxidising power

- A compound X on heating gives a colourless gas. The residue is dissolved in water to obtained Y. Excess CO<sub>2</sub> is bubbled through aqueous solution of Y, Z is formed. Z on gently heating gives back X. The compound X is:
   (A) CaCO<sub>3</sub>
   (B) Na<sub>2</sub>CO<sub>3</sub>
   (C) Ca(HCO<sub>3</sub>)<sub>2</sub>
   (D) K<sub>2</sub>CO<sub>3</sub>
- 7.The first ionisation potential of Na is 5.1 eV. The value of electron gain enthalpy of Na<sup>+</sup> will be :<br/>(A) -2.55 eV(B) -5.1 eV(C) -10.2 eV(D) +2.55 eV

Ans. (B)

- 8. The factor responsible for the same atomic radius of Zr and Hf is-
  - (A) They are members of same group
  - (B) Lanthanide Contraction
  - (C) Zeff. of Zr is greater than Hf
  - (D) Both are D-block elements

Ans. (B)

9.	The correct order of Electron Gain Enthalpy of the given atomic species is -				
	$(A) S <\!\! O <\!\! C l <\!\! F$	(B) Cl <f<s<o< th=""><th>(C) O<s<f<cl< th=""><th>(D) F &lt; C1 &lt; O &lt; S</th></s<f<cl<></th></f<s<o<>	(C) O <s<f<cl< th=""><th>(D) F &lt; C1 &lt; O &lt; S</th></s<f<cl<>	(D) F < C1 < O < S	
Ans.	<b>(B)</b>				
10	Na and Li are placed in	drugir Weget:			
10.	(A) NaOH Na O $\downarrow$ i O	ary an. we get .	$(\mathbf{B})$ Na O Li O		
	(C)  Na O Li O Li N NF	I	$(D) \operatorname{Na}_{2}O, \operatorname{Li}_{2}O$ $(D) \operatorname{Na}_{2}O \operatorname{Li}_{2}O \operatorname{Na}_{2}O$		
Ans.	( <b>D</b> ) ( <b>D</b> )	-3	$(D)^{1}$ $(m_{2}^{2})^{2}$ $(D_{3}^{2})^{3}$ $(D_{2}^{2})^{3}$		
11.	Sodium Nitrate decomp	ooses above 800°C and do	es not give -	$(\mathbf{D})$ No $\mathbf{O}$	
Ang	$(\mathbf{A})\mathbf{N}_2$	$(\mathbf{B})\mathbf{O}_2$	$(C) NO_2$	(D) Na <sub>2</sub> O	
Alls.	(A)				
12.	Which of the following	is incorrect about highly	pure solution of sodium	in liquid ammonia?	
	(A) It shows blue colou	r			
	(B) Conducts electricity	,			
	(C) Produces Sodium an	nide			
	(D) Contains solvated e	electrons			
Ans.	(C)				
13.	A, B, C are the aqueous	chloride of the elements P,	Q, and R respectively, P,	Q and R have same maximum principal	
	quantum number. C for	ms white precipitate with	NaOH, which dissolve	es in excess of NaOH. B forms a white	
	insoluble precipitate wi	ith excess of NaOH. No	precipitate is formed wi	hen NaOH is added to A. Identify the	
	(A) P, Q and R are meta	ls			
	(B) P,Q and R belong to	o the same period			
	(C) P,Q and R could be	Na, Mg and Al respective	ely		
	(D) The correct order of	f second ionisation energ	y is $P > Q > R$		
Ans.	(D)				
14.	$Na_2CO_3 + SiO_2> A + C$	$O_2(g)$ , compound A is-	$(\mathbf{O}) \mathbf{O} \mathbf{I} \mathbf{I} \mathbf{I}$		
	(A) microcosmic salt	(B) Water Glass	(C) Soda ash	(D) Glauber's salt	
Ans.	(B)				
15.	In our Body -				
	(A) $Na^+$ ion is found ou	tside the cell and $K^+$ is for	Ind inside the unit cell		
	(B) Na <sup>+</sup> ions participate	e in the transmission of ne	rve signals		
	(C) Both the ions have	almost similar concentrat	on inside and out side th	e blood plasma	
	(D) $Na^+$ and $K^+$ ions ca	audes dehydration			
Ans.	<b>(B)</b>				
16.	One mole of magnesium	n nitride on the reaction wi	th an excess of water giv	es :	
	(A) one mole of ammoni	a (B) one mole of nitric a	cid (C) two moles of am	monia (D) two moles of nitric acid.	

17. Beryllium and aluminium exhibit many properties which are similar. But, the two elements differ in					
	(A) exhibiting maximum	covalency in compounds	(B) forming polymeric hydrides		
	(C) forming covalent hal	ides	(D) exhibiting amphote	ric nature in their oxides.	
18.	Identify the correct state	ment.			
	(A) Gypsum contains a	lower percentage of calciun	n than Plaster of Paris		
	(B) Gypsum is obtained	by heating Plaster of Paris			
	(C) Plaster of Paris is of	btained by hydration of gyp	osum		
	(D) Plaster of Paris is ob	otained by partial oxidation	of gypsum		
19.	Which salt on heating d	oes not give brown coloure	ed gas ?		
	(A) LiNO <sub>3</sub>	(B) KNO <sub>3</sub>	(C) $Pb(NO_3)_2$	(D)AgNO <sub>3</sub>	
20.	Which one of the follow	ing electrolyte is used in Do	own's process of extracting	g sodium metal ?	
	(A) NaCl + CaCl <sub>2</sub> + KF		(B) NaCl		
	(C) NaOH + KCl + KF		(D) NaCl + NaOH		
Ans.	(A)				
21.	The first ionisation poter	ntial (eV) of Be and B respe	ectively are :		
	(A) 8.29, 9.32	(B)9.32,9.32	(C) 8.29, 8.29	(D) 9.32, 8.29	
22.	Sodium carbonate is pre	pared by:			
	(A) Solvay's process	(B) Kolbe's process	(C) Contact process	(D) Nessler's process	
23.	The first ionisation pote	ntial of Na is 5.1 eV. The va	alue of electron gain entha	lpy of Na <sup>+</sup> will be :	
	(A)-2.55 eV	(B)–5.1 eV	(C)-10.2 eV	(D) +2.55 eV	
24.	Which one of the follow oxides?	wing orders presents the c	correct sequence of the in	creasing basic nature of the given	
	$(A) Al_2 O_3 < MgO < Na_2 O_3 < MgO <$	$0 < K_2O$	(B) MgO < $K_2$ O < $Al_2O_3$ < $Na_2O$		
	(C) $Na_2O < K_2O < MgO < MgO$	< Al <sub>2</sub> O <sub>3</sub>	$(D) K_2 O < Na_2 O < Al_2 O$	<sub>3</sub> < MgO	
25.	In which of the followin	g have higher difference in	the value of II <sup>nd</sup> and III <sup>rd</sup> I	.P. –	
	(A) $1s^2 2s^2 2p^6 3s^2 3p^1$	(B) $1s^2 2s^2 2p^6 3s^2$	(C) $1s^2 2s^2 2p^6 3s^1$	(D) $1s^2 2s^2 2p^6 3s^2 3p^2$	
Ans.	(C)				
26.	Which of the following	correctly represents the ord	der of thermal stability of	carbonates ?	
	$(A) BeCO_{3} < MgCO_{3} < Ca$	CO <sub>3</sub> <srco<sub>3 <baco<sub>3</baco<sub></srco<sub>			
	$(B) BeCO_{3} < MgCO_{3} < Ca$	CO <sub>3</sub> <srco<sub>3 <baco<sub>3</baco<sub></srco<sub>			
	$(C) BeCO_{3} < MgCO_{3} < Ca$	CO <sub>3</sub> <srco<sub>3 <baco<sub>3</baco<sub></srco<sub>			
	(D) $BeCO_3 < MgCO_3 < Ca$	CO <sub>3</sub> <srco<sub>3 <baco<sub>3</baco<sub></srco<sub>			
Ans.	(A)				

27.	The correct order of the s	ize is-		
	(A) $Ca^{2+} > K^+ > Ar > Cl^- >$	> S <sup>2-</sup>		
	(B) $K^+ > Ca^{2+} > Cl^- > Ar >$	S <sup>2-</sup>		
	(C) $S^{2-}>Cl^->Ar>K^+>C$	Ca <sup>2+</sup>		
	(D) $S^{2-} > Ar > Cl^{-} > Ca^{2+} >$	$\sim K^+$		
Ans.	(C)			
28.	Which of the following d	oes not give flame coloura	ution -	
	(A) MgCl <sub>2</sub>	(B) BaCl <sub>2</sub>	(C) CaCO <sub>3</sub>	(D) SrCO <sub>3</sub>
Ans.	(A)			
29.	In the Down's method for	r the extraction of sodium,	the melting point of the ele	ectrolyte is lowered by adding -
	(A) Potassium chloride	(B) Calcium chloride	(C) Potassium fluoride	(D) Cryolite
Ans.	<b>(B)</b>			
30.	A blue coloured solution	of sodium in liquid NH <sub>3</sub> a	acts strong reducing agent,	because of -
	(A) ammoniated sodium			
	(B) Ammonia dissociates			
	(C) Sodium nitride is form	ned		
	(D) ammoniated electron			

Ans. (D)

### BY PRINCE SINGH

## SOLID STATE CHEMICAL BONDING



1.	The nitrogen atoms in $NH_3$ , $NH_2^-$ and $NH_4^+$ are all surrounded by eight electrons. When these species are arranged in increasing order of H–N–H bond angle, correct order is –				
	(A) $NH_3$ , $NH_2^-$ , $NH_4^+$	(B) NH <sub>4</sub> <sup>+</sup> , NH <sub>2</sub> <sup>-</sup> , NH <sub>3</sub>	(C) $NH_{3}$ , $NH_{4}^{+} NH_{2}^{-}$	(D) $\rm NH_2^{-}$ , $\rm NH_3^{+}$ , $\rm NH_4^{+}$	
Ans.	(D)				
2.	The ionic radii of A+ and is -	d B- are 1.5A° and 2.3A° res	spectively. The most proba	ble type of structure exhibited by it	
	(A) CsCl	(B) NaCl type	(C) ZnS type	(D) $CaF_2$ type	
Ans.	<b>(B)</b>				
3.	Statement-1 : In ferroma	ignetic substances domains	are aligned in opposite dire	ctions in equal number.	
	<b>Statement-2</b> : $CrO_2$ is fe	rromagnetic in nature			
	(A) Statement-1 is True,	Statement-2 is True; Stater	nent-2 is a correct explana	tion for Statement-1.	
	(C) Statement-1 is True,	Statement-2 is False	nent-2 is NOT a correct ex	planation for Statement-1.	
	(D) Statement-1 is False	statement-2 is True.			
Ans.	(D)	, 			
4.	In a solid "AB" having diagonal are removed, t	NaCl structure "A" atoms then the resultant stoichiome	form the FCC lattice. If all etry of the solid is	the atoms along one of the body	
	$(A) AB_2$	$(B) A_5 B_4$	$(\mathbf{C})\mathbf{A}_4\mathbf{B}_3$	$(D) A_3 B_4$	
Ans.	<b>(B)</b>				
5.	Statement-1 : CI $P$ F, bond angle P is equal to Q but not precisely equal to 90°.				
	Statement-2 : The mol	lecule is T -Shaped and ther	e is repulsion between lone	pairs of electrons	
	(A) Statement-1 is True,	, Statement-2 is True; Stater	nent-2 is a correct explana	tion for Statement-1.	
	(B) Statement-1 is True,	Statement-2 is True; Stater	nent-2 is NOT a correct ex	planation for Statement-1.	
	(C) Statement-1 is Irue,	Statement-2 is False.			
Ans	(A)	, statement-2 is file.			
1 11150	(11)				
6.	In diamond, carbon ator unit cell is 356 pm, then	ns occupy FCC lattice poin radius of carbon atoms is -	ts as well as alternate tetra	hedral voids. If edge length of the	
	(A) 77.07 pm	(B) 154.14 pm	(C) 251.7 pm	(D) 89 pm	
Ans.	(A)				
Q.7	Which of the following	represents an Orthorhombic	c crystal system-		
	(A) $a = b = c, \alpha \neq \beta \neq \gamma$	= 90°	(B) $a = b = c, \alpha \neq \beta = \gamma = \beta$	= 90°	
	(C) $a \neq b = c, \alpha \neq \beta \neq \gamma$		(D) $a \neq b \neq c, \alpha = \beta = \gamma$	= 90°	
Ans.	(D)				

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8.	The structure and hybridisation of $Si(NH_3)_4$ is -						
	(A) bent, sp	(B) trigonal, sp <sup>2</sup>	(C) octahedral, sp <sup>3</sup> d	(D) tetrahedral, sp <sup>3</sup>			
Ans.	<b>(B)</b>						
9.	In the conversion of $N_2$ in	nto $N_2^+$ the electron will	be lost from which of the follow	ving molecular orbitals ?			
	(A) $\sigma_{2P_Z}^*$	(B) $\sigma_{2P_Z}$	(C) $\pi_{2P_X}$	(D) $\pi^{*}_{2P_{X}}$			
Ans.	<b>(B)</b>						
10.	The correct order of inc	reasing C-O bond leng	th of CO, $CO_3^{2-}$ , CO, is :				
Ans.	(A) $CO_3^{2-} < CO_2 < CO$ ( <b>D</b> )	(B) $CO_2 < CO_3^{2-} < O_3^{2-}$	CO (C) $CO < CO_3^{2-} < CO_2$	(D) $\rm CO < \rm CO_2 < \rm CO_3^{2-}$			
11.	Which of the following <b>[assuming z-axis to be</b>	overlaps will not result the internuclear axis]	in bond formation ?				
	(1) 2 $p_y$ + 2 $p_y$	(2) 2 $p_z$ + 2 $p_z$	(3) 2 $p_x$ + 2 $p_x$	(4) $1 s + 2 p_y$			
Ang	(A) '1' & '2'	(B) '2' & '4'	(C) only '4'	(D) None of these			
Alls.	(C)						
12.	<ul> <li>Which of the following</li> <li>(A) Increasing Bond An</li> <li>(B) Increasing Stability</li> <li>(C) Increasing Bond ord</li> <li>(D) Increasing Covalent</li> </ul>	is INCORRECT - gle : N : N ler : H t Character : B	$NO_{2}^{-} < NO_{2} < NO_{2}^{+}$ $P_{2}^{-} < N_{2}^{-} < N_{2}^{-}$ $P_{2}^{-} < N_{2}^{-} < N_{2}^{-}$ $P_{2}^{-} < NO < C_{2}^{-2}$ $P_{2}^{-} < NO < C_{2}^{-2}$ $P_{2}^{-} < NO < C_{2}^{-2}$				
Ans.	(D)		2				
13. Ans	<ul> <li>Which of the following is a consequence of Metal Excess Defect:</li> <li>(A) The density of Crystal increases</li> <li>(B) Crystal become coloured</li> <li>(C) Stoichiometry of the crystal remains unchanged</li> <li>(D) Electrical neutrality is disturbed</li> </ul>						
A115.	(B)						
14.	How many units cells ar (A) $6.02 \times 10^{23}$	e there in 1.00 g cube s (B) $1.00 \times 20^{22}$	haped ideal crystal of AB (Mw (C) $2.50 \times 10^{21}$	= 60) which has a NaCl type lattice (D) $6.02 \times 10^{24}$			
Ans.	(C)						
15.	Which among the follow	ving is isostructural wi	th $XeF_4$ ?				
	(A) ICl <sub>3</sub>	(B) $PCl_4^+$	(C) $\operatorname{ICl}_4^-$	(D) XeO <sub>3</sub>			
Ans.	(C)						
16.	Which is a pair of parar	nagnetic species ?					
	(A) $\mathrm{KO}_2$ , $\mathrm{NO}_2$	(B) K <sub>2</sub> O <sub>2</sub> , KO <sub>2</sub>	(C) K <sub>2</sub> O, NO <sub>2</sub>	(D) $NO_2, N_2O_2$			
Ans.	(A)						

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17.	In a face centerd lattice of X and Y, X atoms are present at the corners while Y atoms are at face formula of the compound would be if one of the X atoms is missing from a corner in each unit									
•	(A) X	7 <sup>Y</sup> 24		(B) 2	C <sub>24</sub> Y <sub>7</sub>	(C) $XY_{24}$	(D) $X_{24}Y$			
Ans.	(A)									
18.	Give t	the correc	t order o	finitials	s T (true) or F (	False) for following stater	ments.			
	I. Ir	I. In an anti-fluorite structure anions form FCC lattice and cations occupy all tetrahedral voids.								
	II. If	f the radiu	us of catio	ons and	anions are 0.2	Å and 0.95Å then coordin	nate number of cation in the crystal is 4.			
	III. A	n atom/io	on is tran	sferred	from a lattice s	ite to an interstitial positic	on in Frenkel defect.			
	IV. D	IV. Density of crystal always increases due to substitutinal impurity defect.								
	(A) T	FFF		(B) FT	TF	(C) TFFT	(D) TFTF			
Ans.	(D)									
19.	Which	h of the fo	llowing	contains	s both $p\pi$ - $p\pi$ an	$d p\pi - d\pi$ bonds				
17.	(A) P	$0^{3-}_{1}$	,nowing (	(B) S	50, <sup>2–</sup>	$(C) SO_{a}$	(D) ClO. <sup>-</sup>			
Ans.	(C)	4			4		() 4			
20.	Identi	Identify the correct match.								
	(i) $XeF_2$ (a) Central atom has sp <sup>3</sup> hybridisation and bent ge					t geometry.				
	(ii) $N_3^{-}$ (b)			(b) C	entral atom ha	s sp <sup>3</sup> d <sup>2</sup> hybridisation and o	ctahedral.			
	(iii) $PCl_6^-$ (c) Cer				entral atom has	ntral atom has sp hybridisation and linear geometry.				
	(iv) $\operatorname{ICl}_2^+$			(d) C	(d) Central atom has sp <sup>3</sup> d hybridisation and linear geometry.					
	(A) $(i - a)$ , $(ii - b)$ , $(iii - c)$			- c), (iv -	- d)	(B) $(i - d)$ , $(ii - b)$ ,	(iii - d), (iv - c)			
	(C) (i	– b), (ii –	- c), (iii –	a), (iv -	- d)	(D) $(i - d)$ , $(ii - c)$ ,	(iii - b), (iv - a)			
Ans.	(D)									
21.	What type of crystal defect is indicated in the diagram below ?									
	$Ag^+$	$Ag^+$	Br-	$Ag^+$						
	Br-	$Ag^+$	$Ag^+$	Br-						
	$Ag^+$	Br-	Ag <sup>+</sup>	Br-	$Ag^+$					
	Br-	Ag <sup>+</sup>	Ag <sup>+</sup>	Br-						
	(A) Fr	renkel del	lect			(B) Schottky defec	(B) Schottky defect			
Ans.	(C) In (B)		delect			(D) Both Frenkel a	and Scholiky defects			
22.	In an i radius	In an ionic compound AB anion B <sup>-</sup> forms an FCC lattice and cation A <sup>+</sup> occupies alternate tetrahedral voids. If t radius A <sup>+</sup> is 22.5 pm, then the ideal radius of B <sup>-</sup> would be :-								
	(A) 54	4.35 pm		(B) 1	00 pm.	(C) 145.16 pm	(D) none of thesez			
23	Whicl	h is steam	n volatile	-						
	(A) o -	-nitrophe	nol	(B) A	niline	(C) Glycerol	(D) p-nitrophenol			
Ans.	(A)	-								

Ans.

(A)

24.	Which has maximum dij	pole moment ?			
	$(A) \bigcup_{Cl}^{Cl} Cl$	(B) CI CI	(C) Cl	$(D) \bigcup_{Cl}^{Cl}$	
Ans.	<b>(B)</b>				
25.	The edge length of an fac the radius of the anion is	e centered cubic cell of an :-	ionic substance is 508 pm. If	the radius of the cation is 110 pm,	
	(A) 144 pm	(B) 288 pm	(C) 398 pm	(D) 618 pm	
Ans.	(A)				
26.	In which of the following	g species all bond lengths a	are not identical?		
	(A) $SF_6$	(B) $NH_3$	(C) PCl <sub>5</sub>	(D)XeO <sub>3</sub>	
Ans.	(C)				
27.	The correct order of bon	d angle is :			
	(A) $NH_3 < H_2O < CH_4$		(B) $F_2O > Cl_2O > H_2O$		
Ans	(C) $H_2S < NH_3 < CH_4 < BF_3$		(D) $H_2S < CH_4 < NH_3 < BF_3$		
All5.			C		
28.	How many $\sigma$ and $\pi$ bond	is are there in the molecul	e of tetracyanoethylene -		
	(A) Nine $\sigma$ and nine $\pi$	(B) five $\sigma$ and nine	(C) Nine $\sigma$ and seven $\pi$	(D) Five $\sigma$ and eight $\pi$	
Ans.	(A)				
29.	What would be correct a	bout bonding in chloral hy	drate CCl <sub>3</sub> CH(OH) <sub>2</sub> ?		
	(A) Only intra molecular	H-bonding	(B) Only inter molecular H-bonding		
	(C) Both inter and intra r	nolecular H-bonding	(D) No hydrogen bonding	g	
Ans.	(A)				
30.	Which of the following f	formulas is consistent with	the unit cell of the rhenium	oxide compound shown below?	
			Oxygen Rhenium		
	(A) $\operatorname{Re}_2O_6$	(B) $\operatorname{Re}_2O_3$	(C) ReO <sub>6</sub>	(D) ReO	

## BY PRINCE SINGH

## THERMODYNAMICS THERMOCHEMISTRY



1.	Statement-1: The en	tropy of system always incl	eases during an irreversibl	e process.		
	<b>Statement-2</b> : $\Delta S_{total} > 0$ , for an Irreversible process.					
	(A) Statement-1 is Tru	e, Statement-2 is True; Stat	ement-2 is a correct explanation	ation for Statement-1.		
	(B) Statement-1 is Tru	e, Statement-2 is True; State	ement-2 is NOT a correct ex	xplanation for Statement-1.		
	(C) Statement-1 is True	e, Statement-2 is False.				
	(D) Statement-1 is Fals	se, Statement-2 is True.				
Ans.	(D)					
2.	One mole of an ideal gas is expanded isothermally and reversibly to half its initial pressure. $\Delta S$ for the process in J K <sup>-1</sup> mol <sup>-1</sup> is [ln2 = 0.693 and R = 8.314, J/(mol/K)] :					
	(A) 10.76	(B) 6.76	(C) 8.03	(D) 5.76		
Ans.	(D)					
2		3				
3.	The reaction NH <sub>2</sub> CN	$(s) + \frac{1}{2}O_2(g) \longrightarrow N_2(g)$	$(1) + CO_2(g) + H_2O(1)$ was	s carried out at 300 K in a bomb		
	calorimeter. The heat r	released was 900 kJ mol <sup>-1</sup> . T	he value of $\Delta H_{300K}$ for this r	eaction would be :-		
	$[\text{take R=8 J K}^{-1} \text{ mol}^{-1}]$					
	(A) 901.2 kJ mol <sup><math>-1</math></sup>	$(B) - 901.2 \text{ kJ mol}^{-1}$	$(C) - 898.8 \text{ kJ mol}^{-1}$	$(D) + 898.8 \text{ kJ mol}^{-1}$		
Ans.	(C)					
4.	The value of $\Delta H$ and $\Delta S$ for the reaction $PCl_{s}(g) \longrightarrow PCl_{3}(g) + Cl_{2}(g)$ are 150 kJ and 750JK-1 respectively reaction will be non-spontaenous at -					
	(A*) 190 K	(B) 210 K	(C) 250K	(D) 300K		
5.	Consider the $\Delta G^{\circ}_{f}$ and the metal and oxygen g	$\Delta \mathrm{H}^{o}_{f}(\mathrm{kJ/mol})$ for the follow gas ?	ring oxides. Which oxide ca	n be most easily decomposed to form		
	(A) ZnO ( $\Delta G^{\circ} = -318.4$	, ΔH°=-348.3)	(B) $Cu_2O(\Delta G^{\circ} = -146.0)$	$0, \Delta H^{\circ} = -168.8)$		
	$(C^*)$ HgO ( $\Delta G^\circ = -58.5$	, ΔH°=-90.8)	(D) PbO ( $\Delta G^{\circ} = -187.9$ ,	, ΔH°=-217.3)		
Ans.	(C)					
6.	A solution of 500 ml of experiment is repreated	0.2 M KOH and 500 ml of 0 d using 250 ml each of solut	0.2 M HCl is mixed and stirr ion, the temperature raised	red; the rise in temperature is $T_1$ . The is $T_2$ . Which of the following is true-		
	(A) $T_1 = T_2$	(B) $T_1 = 2T_2$	(C) $T_1 = 4T_2$	(D) $T_2 = 9T_1$		
Ans.	(A)					
7.	6 moles of an ideal gas of maximum work done is	expand isothermally and reve	ersibly from a volume of 1 lit	re to a volume of 10 litres at 27°C. The		
	(A*)-34.465 kJ	(B)+34.465 kJ	(C)-147.8 kJ	(D)+147.8 kJ		
Ans.	(A)					
	The heat absorbed by a system in going through a cyclic process showing in figure					



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9.	1 mole of $SO_2$ gas at 300 K is expanded under reversible adiabatic condition such that its volume becomes 2 times. The work done in the process is -							
	(A) 300R	(B)-300R	(C)-600R	(D) 600R				
Ans.	(C)							
10.	Determine which of the following reactions at constant pressure represent surrounding that do work on the system:							
	I. $4NH_3(g) + 7O_2(g)$	$\longrightarrow 4NO_2(g) + 6H_2O(g)$	g)					
	II. $CO(g) + 2H_2(g) -$	$\longrightarrow CH_3OH(\ell)$						
	III. C (s, graphite)+ 1	$/2O_2(g) \longrightarrow CO(g)$						
	IV. $H_2O(s) \longrightarrow H_2O(\ell)$							
	(A) III, IV	(B) II and III	(C) II, IV	(D) I and II, IV				
Ans.	(D)							
11.	A certain mass of gas is expanded from (1L, 10 atm) to (4L, 5 atm) against a constant external pressure of 1 atm. If initial temperature of gas is 300 K and the heat capacity of process is 50 J/°C. Then the enthalpy change during the process is ( take 1L atm $\simeq$ 100 J)							
	(A) $\Delta H = 15 \text{ kJ}$	(B) $\Delta$ H = 15.7 kJ	(C) $\Delta$ H = 14.4 kJ	(D) $\Delta H = 14.7 \text{ kJ}$				
Ans.	<b>(B)</b>							
12.	<b>STATEMENT-1 :</b> The magnitude of the work involved in an isothermal expansion is greater than that involved in an adiabatic expansion.							
	compared to reversible isothermal expansion starting from same initial state.							
	(A) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.							
	(B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.							
	(C) Statement-1 is True, Statement-2 is False.							
	(D) Statement-1 is False, Statement-2 is True.							
Ans.	(D)							
13.	(i) $H_2(g) + Cl_2(g) \rightarrow 2$ (ii) $NaCl + H_2SO_4 \rightarrow \Delta H = -y kJ$ (iii) $2H_2O + 2Cl_2 \rightarrow 4H$	2HCl(g); $\Delta$ H= – x kJ NaHSO <sub>4</sub> +HCl; HCl+O <sub>2</sub> ; $\Delta$ H= – z kJ	ſ					
	From the above equa	ations, the value of $\Delta H_f$ of	HCl is -					
	(A) –x kJ	(B) - y kJ	(C) –z kJ	(D) - x/2 kJ				
Ans.	(D)							
14.	From the following p	hysical properties -						
	free energy, viscosit the number of intens	y, kinetic energy , heat ,wo ive properties is-	rk, , density, specific heat	capacity ,dielectric constant				

(A) 2 (B) 5 (C) 6 (D) 4

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15.	In an isobaric process, the ratio of heat supplied to the system (dQ) and work done by the system (dW) for diatomic							
	gas is							
	(A) 1 : 1	(B)7:2	(C)7:5	(D) 5:7				
Ans.	(B)							
16.	The magnitudes of en reversible adiabatic ex	thalpy changes for irrever spansion for the same expansion	sible adiabatic expansion on $\Delta H_2$ . Then	of a gas from 1L to 2L is $\Delta H_1$ and for				
	$(A) \Delta H_1 > \Delta H_2$ (B) $\Delta H_1 < \Delta H_2$							
	$(C) \Delta H = \Delta H \text{ entbal}$	ny being a state function	$(\Lambda H = \Lambda H \%)$					
	(D) $\Delta H_1 = \Delta E_1 \& \Delta H_2 =$ respectively.	= $\Delta E_2$ where $\Delta E_1 \& \Delta E_2$ are	magnitudes of change in inte	ernal energy of gas in these expansions				
Ans.	(B)							
17. The standard enthalpy of formation of $NH_3$ is $-46.0$ kJ mol <sup>-1</sup> . If the enthalpy of formation of $H_2$ f 436 kJ mol <sup>-1</sup> and that of $N_2$ is $-712$ kJ mol <sup>-1</sup> , the average bond enthalpy of N – H bond in NH <sub>3</sub> is								
	$(A) - 964 \text{ kJ mol}^{-1}$	(B) $+ 352 \text{ kJ mol}^{-1}$	$(C) + 1056  kJ  mol^{-1}$	$(D) - 1102 \text{ kJ mol}^{-1}$				
Ans.	<b>(B)</b>							
18.	Among the following,	the Extensive property is						
	(A) molar Enthalpy		(B) electromotive force	e				
	(C) resistance		(D) specific heat capa	icity				
Ans.	(C)							
19.	What is the free energy 100°C and 1 atm press	y change ( $\Delta G$ ) when 1.0 mo ure ?	ble of water at 100°C and 1 a	tm pressure is converted into steam at				
	(A) 80 cal	(B) 540 cal	(C) 620 cal	(D) Zero				
Ans.	(D)							
20.	The heats of neutraliz	ation of						
	(i) CHC $\ell_2$ – COOH by NaOH is 12830 cals;							
	(ii) $HC\ell$ by NaOH is 13680 calories,							
	than the enthalpy of ic	onisation of $CHC\ell_2$ -COOF	H would be -					
	(A) 13680	(B) -1300 cal	(C)+1300 cal	(D) 0				
Ans.	(C)							
21.	For the reaction,							
	H H H H H H H H H H H H H H H H H H H	$H \longrightarrow H \xrightarrow{H}_{H}$						

	bond energies are given as under –						
	(i) C—C, 34	46 kJ/mol					
	(ii) C—H, 413 kJ/mol						
	(iii) H—H, 437 kJ/mol and						
	(iv) C = C, e	611 kJ/mol					
	What will b	be the value of	$\Delta H 25^{\circ}C$ for the above re	action ?			
	(A) –289 kJ	J mol <sup>-1</sup>	$(B) - 124 \text{ kJ mol}^{-1}$	(C)+124	kJ mol <sup>-1</sup>	(D) $+289 \text{ kJ mol}^{-1}$	
Ans.	<b>(B)</b>						
22.	The heat pr The molari	ocuced by com ty of HNO <sub>3</sub> so	plete neutralisation of 100 lution will be –	ml of HNO <sub>3</sub> v	with 300 ml of de	ecimolar KOH solution is 1.713 kJ.	
	(A) 0.1		(B) 1	(C) 0.3		(D) 0.5	
Ans.	(C)						
23.	In an irreve the change	ersible process in Gibbs free	taking place at constant T energy (dG) and change i	f and P and in n entropy (d	n which only pro S) satisfy the cri	essure-volume work is being done teria -	
	(A) (d	$S)_{V,E} = 0, (dG)$	T,P = 0				
	(B) (d	$S)_{V,E} = 0, (dG)$	$P_{T,P} > 0$				
	(C) (d	$S)_{V,E} < 0, (dG)$	$_{T,P} < 0$				
	(D) (d	$S)_{V,E} > 0, (dG)$	$P_{T,P} < 0$				
Ans.	(D)						
24.	One mole o in internal	f a non-ideal gap energy, $\Delta U = 3$	as undergoes a change of st 30.0 L atm. The change in	tate (2.0 atm, enthalpy ( $\Delta$ )	$3.0L, 95K) \rightarrow (4)$ H) of the process	.0 atm, 5.0L, 245 K) with a change s in L atm is -	
	(A) 40.0			(B) 42.3	(B) 42.3		
	(C) 44.0			(D) not d	lefined, because	pressure is not constant	
Ans.	(C)						
25.	For the foll	owing reaction	ns,				
	CH <sub>3</sub> Cl—	$\rightarrow CH_3^{\oplus} + Cl^{\Theta}$	$\dot{\sigma};\Delta H_1^{\circ}$				
	CH <sub>3</sub> CH <sub>2</sub> C	$Cl \longrightarrow CH_3Cl$	$\mathrm{H}_{2}^{+} + \mathrm{Cl}^{\Theta}; \Delta \mathrm{H}_{2}^{\circ}$				
	(CH <sub>3</sub> ) <sub>2</sub> CH	$HCl \longrightarrow (CH)$	$_{3})_{2}\mathrm{CH}^{+}+\mathrm{Cl}^{\Theta};\Delta\mathrm{H}_{3}^{\circ}$				
	(CH <sub>3</sub> ) <sub>3</sub> CC	$Cl \longrightarrow (CH_3)$	$_{3}\overset{+}{\mathrm{C}}+\mathrm{Cl}^{-};\Delta\mathrm{H}_{4}^{\circ}$				
	The correct	t order of enth	alpies of ionization is-				
	(A) $\Delta H_1^{\circ} >$	$\Delta H_2^{\circ} > \Delta H_3^{\circ} >$	$\Delta H_4^{\circ}$		(B) $\Delta H_1^{\circ} < \Delta H_2^{\circ}$	$<\Delta H_3^{\circ} < \Delta H_4^{\circ}$	
	(C) $\Delta H_1^{\circ} > 1$	$\Delta H_2^{\circ} > \Delta H_3^{\circ} <$	$\Delta H_4^{\circ}$		(D) $\Delta H_1^{\circ} > \Delta H_2^{\circ}$	$<\Delta H_3^\circ < \Delta H_4^\circ$	

Ans. (A)

## BY PRINCE SINGH

# LIQUID SOLUTION COLLIGATIVE PROPERTIES



1. The exact mathematical expression of Raoult's law for a dilute solution is

	(A) $\frac{P^0 - P_s}{r^0} = \frac{n}{N}$		(B) $\frac{P^0 - P_s}{P_s^0} = \frac{N}{P_s^0}$			
	P° N		P° n			
	(C) $\frac{P^0 - P_s}{P_s} = \frac{n}{N}$	(D)	$\frac{P^0 - P_s}{P^0} = n \times N$			
2.	One mole of an ideal g $K^{-1}$ mol <sup>-1</sup> is [ln2 = 0.69	as is expanded isothermall 3 and R = 8.314, J/(mol/K)]	y and reversibly to half its in	nitial pressure. $\Delta S$ for the process in J		
	(A) 10.76	(B) 6.76	(C) 8.03	(4) 5.76		
Ans.	<b>(D)</b>					
3.	The reaction NH <sub>2</sub> CN	$(s) + \frac{3}{2}O_2(g) \longrightarrow N_2(g)$	$(g) + CO_2(g) + H_2O(l)$ wa	as carried out at 300 K in a bomb		
	calorimeter. The heat r [take R=8 J K <sup>-1</sup> mol <sup>-1</sup> ]	zeleased was 900 kJ mol <sup>-1</sup> . T	The value of $\Delta H_{300K}$ for this	reaction would be :-		
	(A) 901.2 kJ mol <sup>-1</sup>	(B) $-901.2 \text{ kJ mol}^{-1}$	(C) -898.8 kJ mol <sup>-1</sup>	(D)+898.8 kJ mol <sup>-1</sup>		
Ans.	(C)					
4.	The value of $\Delta H$ and $\Delta S$ for the reaction $PCl_5(g) \longrightarrow PCl_3(g) + Cl_2(g)$ are 150 kJ and 750JK-1 respectively, th reaction will be non-spontaenous at -					
	(A) 190 K	(B) 210 K	(C) 250K	(D) 300K		
Ans.	(A)					
5.	Consider the $\Delta G^{o}_{f}$ and the metal and oxygen a	$\Delta H^{o}_{f}$ (kJ/mol) for the follow gas ?	wing oxides. Which oxide c	an be most easily decomposed to form		
	(A) ZnO ( $\Delta G^{\circ} = -318.4$	, ΔH°=-348.3)	<b>(B)</b> $Cu_2O(\Delta G^\circ = -146.$	0, ΔH°=-168.8)		
	(C) HgO ( $\Delta G^{\circ} = -58.5$ ,	$\Delta \mathrm{H}^{\mathrm{o}} = -90.8)$	<b>(D)</b> PbO ( $\Delta G^{\circ} = -187.9$	0, ΔH°=-217.3)		
Ans.	(C)					
6.	An ideal gas is allowed to expand both reversibly and irreversibly in an perfect adiabatic container. If $T_i$ is the initial temperature and $T_f$ is the final temperature, which of the following statements is correct? (A) $T_f > T_i$ for reversible process but $T_f = T_i$ for irreversible process (B) $(T_f)_{rev} = (T_f)_{irrev}$ (C) $T_f = T_i$ for both reversible and irreversible processes (D) $(T_i) = \sum_{i=1}^{n} (T_i)$					
Ans.	(D)					
	~ /					
7.	6 moles of an ideal gas of maximum work done is	expand isothermally and rev -	versibly from a volume of 1 li	tre to a volume of 10 litres at 27°C. The		
	(A)-34.465 kJ	(B)+34.465 kJ	(C)-147.8 kJ	(D)+147.8 kJ		

Ans. (A)

8. The heat absorbed by a system in going through a cyclic process showing in figure

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	(in L) (in L) 10	10 30 P (in KP <sub>a</sub> )						
	(A) 100	)	(B) 100 π	(C) 900	(d) 900 π			
Ans.	(A)							
9.	1 mole times. <sup>2</sup>	e of $SO_2$ gas at The work done	300 K is expanded under in the process is -	reversible adiabatic	condition such that its volume becomes 27			
	(A) 300	)R	(B)-300R	(C)-600R	(D) 600R			
Ans.	(C)							
10.	Determine which of the following reactions at constant pressure represent surrounding that do work on the system: I $4NH_3(g) + 7O_2(g) \longrightarrow 4NO_2(g) + 6H_2O(g)$ II $CO(g) + 2H_2(g) \longrightarrow CH_3OH(\ell)$ III $C(s, graphite) + 1/2O_2(g) \longrightarrow CO(g)$ N $H_2O(s) \longrightarrow H_2O(\ell)$							
Ans.	(D)	,	(=) == ========	(-),	(_),,			
11.	A certa initia 50 J/°C (A) ΔH	ain mass of gas l temperatu C. Then the enth I=15 kJ	is expanded from (1L, 10 a re of gas is 30 halpy change during the pro (B) $\Delta H = 15.7 \text{ kJ}$	tm) to (4L, 5 atm) age 0 K and the process is ( take 1L atm (C) $\Delta$ H = 14.4 k	ainst a constant external pressure of 1 atm. If heat capacity of process is $\simeq 100 \text{ J}$ J (D) $\Delta \text{H} = 14.7 \text{ kJ}$			
Ans.	<b>(B)</b>							
12.	STAT an adia	<b>STATEMENT-1</b> : The magnitude of the work involved in an isothermal expansion is greater than that involved in an adiabatic expansion.						
	stat: compa	<b>STATEMENT-2</b> : P–V curve (P on y-axis and V on x-axis) decrease more rapidly for reversible adiabatic expansion compared to reversible isothermal expansion starting from same initial state						
	(A) Sta	atement-1 is Tru	ue, Statement-2 is True; Sta	itement-2 is a correct	explanation for Statement-1.			
	(B) Sta	(B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.						
	(C) Sta	atement-1 is Tru	ie, Statement-2 is False.					
	(D) Sta	atement-1 is Fal	se, Statement-2 is True.					
Ans.	(D)							

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13.	Which of the following	g is correct						
	(A) Entropy of a gas decreases with increase in temperature							
	(B) Entropy is always	constant for a closed system						
	(C) For an Adiabatic p	$rocess q_{surr} = 0$						
	(D) Water in liquid sta	te has lower entropy than Ice.						
Ans.	(C)							
14.	From the following ph	ysical properties -						
	free energy, viscosity,	kinetic energy, heat, work,,	density, specific heat cap	pacity, dielectric constant				
	the number of intensiv	e properties is-						
	(A) 2	(B)5	(C)6	(D) 4				
15.	In an isobaric process, gas is	the ratio of heat supplied to th	e system (dQ) and work	done by the system (dW) for diatomic				
	(A) 1 : 1	(B)7:2	(C)7:5	(D) 5:7				
Ans.	<b>(B)</b>							
	(A) $\Delta H_1 > \Delta H_2$ (B*) $\Delta H_1 < \Delta H_2$ (C) $\Delta H_1 = \Delta H_2$ , enthall (D) $\Delta H_1 = \Delta E_1 \& \Delta H_2 =$ respectively.	by being a state function ( $\Delta E_2$ ) $\Delta E_2$ where $\Delta E_1 \& \Delta E_2$ are ma	$H_1 = \Delta H_2 h$ gnitudes of change in interval	ernal energy of gas in these expansions				
Ans.	(B)							
17.	The standard enthalpy 436 kJ mol <sup>-1</sup> and that o	of formation of NH <sub>3</sub> is $-46.0$ of N <sub>2</sub> is $-712$ kJ mol <sup>-1</sup> , the ave	kJ mol⁻¹. If the enthalpy rage bond enthalpy of N	of formation of $H_2$ from its atoms is – – H bond in $NH_3$ is				
	$(A) - 964 \text{ kJ mol}^{-1}$	$(B) + 352 \text{ kJ mol}^{-1}$	$(C) + 1056 \text{ kJ mol}^{-1}$	$(D) - 1102 \text{ kJ mol}^{-1}$				
Ans.	<b>(B)</b>							
18.	Among the following,	the Extensive property is :						
	(A) molar Enthalpy	(B) electromotive force	(C) resistance	(D) specific heat capacity				
Ans.	(C)							
19.	What is the free energy 100°C and 1 atm press	we change ( $\Delta G$ ) when 1.0 mole our e	of water at 100°C and 1 a	tm pressure is converted into steam at				
	(A) 80 cal	(B) 540 cal	(C) 620 cal	(D) Zero				
Ans.	(D)							

**20.** The heats of neutralization of

(i)  $CHC\ell_2$ -COOH by NaOH is 12830 cals;

(ii) HC $\ell$  by NaOH is 13680 calories,

than the enthalpy of ionisation of CHC  $\ell_2-$  COOH would be -

(A) 13680 (B) -1300 cal (C) +1300 cal (D) 0

Ans. (C)

## BY PRINCE SINGH

# ATOMIC STRUCTURE CHEMICAL KINETICS



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1.	An electron in an atom jumps in such a way that its kinetic energy changes from x to $\frac{x}{9}$ . The change in its potential					
	energy will be-			,		
	(A) $\frac{x}{9}$	(B) $\frac{16x}{9}$	(C)9x	(D) $\frac{9}{16}$ x		
Ans.	(A)					
2.	The potential energy of ar	the electron in He <sup>+</sup> ion is $-12$ .	09 eV. Indicate in which ex	cited state, the electron is present-		
	(A) First	(B) Second	(C) Third	(D) Fourth		
Ans.	<b>(B)</b>					
3.	An electron has velocity approximately-	$v \ge ms^{-1}$ . For a proton to h	nave the same de-Broglie	wavelength, the velocity will be		
	$(A) \frac{1840}{x}$	(B) $\frac{x}{1840}$	(C) 1840x	(D)x		
Ans.	<b>(B)</b>					
4.	Photoelectric emission is observed from a surface for frequencies $v_1$ and $v_2$ of incident radiations $(v_1 > v_2)$ . If the maximum K.E. of photoelectrons in two cases are in the ratio of 2 : 1, then threshold frequency $v_0$ is given by -					
Ans.	(C) 2	(2-1)	(2-1)			
5. Ans.	Which excited state of $Be^{3+}$ has the same orbit radius as that of the ground state of hydrogen atom ? (A) 3 (B) 2 (C) 4 (D) 1 (D)					
6.	If uncertainty in position	and momentum are equal t	hen uncertainty in velocity	is:		
	(A) $\frac{1}{m}\sqrt{\frac{h}{\pi}}$	(B) $\sqrt{\frac{h}{\pi}}$	(C) $\frac{1}{2m}\sqrt{\frac{h}{\pi}}$	(D) $\sqrt{\frac{h}{2\pi}}$		
Ans.	(C)					
7.	The wavelengths of electro	ons waves in two orbits is 3 :	5. The ratio of kinetic energ	y of electrons will be :		
	(A) 25 : 9	(B) 5 : 3	(C)9:25	(D) 3 : 5		
Ans.	(A)					

8. Which of the following graphs is incorrect?



Ans. (D)

9. The transitions from the state n = 4 to n = 3 in a H like atom results in UV radiation. The infra-red radiations will be obtained in the transition :

 $(A) 2 \rightarrow 1 \qquad (B) 3 \rightarrow 2 \qquad (C) 4 \rightarrow 2 \qquad (D) 5 \rightarrow 4$ 

Ans. (D)

**10.** An electron, a proton and an alpha particle have kinetic energies of 16E, 4E and E respectively. What is the qualitative order of their de-Broglie wavelengths?

$$(A) \lambda_e > \lambda_p = \lambda_\alpha \qquad (B) \lambda_p = \lambda_\alpha > \lambda_e \qquad (C) \lambda_p > \lambda_e > \lambda_\alpha \qquad (D) \lambda_\alpha < \lambda_e > > \lambda_p$$
**Ans.** (A)

- 11. The ionization energy of hydrogen atom (in the ground state) is x kJ. The energy required for an electron to jump from 2nd orbit to the 3rd orbit will be :
  - (A) x/6 (B) 5x (C) 7.2x (D) 5x/36

Ans. (D)

12. If the shortest wavelength of H atom in Lyman series is x. then longest wavelength in Balmer series of He<sup>+</sup> is -

(A) 
$$\frac{9x}{5}$$
 (B)  $\frac{36x}{5}$  (C)  $\frac{x}{4}$  (D)  $\frac{5x}{9}$ 

Ans. (A)

13. If  $\varepsilon_0$  be the permittivity of vaccum and r be the radius of orbit of H-atom in which electron is revolving then velocity of electron is given by :

(A) 
$$v = \frac{e}{\sqrt{4\pi\varepsilon_0 rm}}$$
 (B)  $v = e \times \sqrt{4\pi\varepsilon_0 rm}$  (C)  $v = \frac{4\pi\varepsilon_0 rm}{e}$  (D)  $v = \frac{4\pi\varepsilon_0 rm}{e^2}$ 

Ans. (A)

14. If the energy of H-atom in the ground state is -E, the velocity of photo-electron emitted when a photon having energy  $E_p$  strikes a stationary  $Li^{2+}$  ion in ground state, is given by :

(A) 
$$v = \sqrt{\frac{2(E_p - E)}{m}}$$
 (B)  $v = \sqrt{\frac{2(E_p + 9E)}{m}}$  (C)  $v = \sqrt{\frac{2(E_p - 9E)}{m}}$  (D)  $v = \sqrt{\frac{2(E_p - 3E)}{m}}$ 

Ans. [C]

15. In the following two figures ( $\psi^2$ ) is plotted against (r), the distance from nucleus



will

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20.	The rate constant of the reaction $A \rightarrow 2B$ is $1.0 \times 10^{-3}$ mol lit <sup>-1</sup> min <sup>-1</sup> , if the initial concentration of A is 1.0 mole lit <sup>-1</sup> what would be the concentration of B after 100 minutes.					
	(A) 0.1 mol lit <sup>-1</sup>	(B) $0.2 \text{ mol lit}^{-1}$	(C) 0.9 mol lit <sup>-1</sup>	(D) 1.8 mol lit <sup>-1</sup>		
Ans.	<b>(B)</b>					
21.	What will be the order of reaction for a chemical change having log $t_{50\%}$ vs log a curves as : (where a = initial concentration)					







Ans. (I

23. Which of the following statements about the arrhenius equation are INCORRECT?

(A) The pre exponential factor become equal to the rate constant of the reaction at temperature T

(B) When the activation energy of the reaction zero, the rate becomes independent of temperature.

(C) The term e-Ea/RT represents the fractions of the molecules having energy is excess of the threshold value.

(D) On raising temperature, rate constant of the reaction of greater activation energy increases less rapidly than that of the reaction of smaller activation energy.

Ans. (D)

Ans.

24. A hypothetical reaction  $X_2 + Y_2 \longrightarrow 2XY$  follows the mechanism given below.

	$X_2 \longrightarrow X + X$	[Fast]					
	$X+Y_2 \longrightarrow XY+Y$	[Slow]					
	$X+Y \longrightarrow XY$ [Fast]						
The order of overall reaction is							
(A) 2	(B) 1		(C) 1.5	(D) Zero			
(C)							

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25.	The rate of a first order reaction is 0.04 mole litre <sup>-1</sup> s <sup>-1</sup> at 10 minutes and 0.03 mol litre <sup>-1</sup> s <sup>-1</sup> at 20 minutes after initiation. The rate constant of the reaction is-							
	take [ log	$4=0.6$ and $\log_{102}$	$g_{3} = 0.5$					
	(A) 0.023	03	(B)0.04606	(C) 0.2303	(D) 0.4606			
Ans.	(A)							
26.	The rate constant for the reaction $2N = 0$							
	$2N_2O_5 \longrightarrow 4NO_2 + O_2$							
	$183.0 \times 1$	$0^{\circ}$ sec <sup>-1</sup> , if the	rate is $2.4 \times 10^{-9}$ mol 1	itre 'sec', then the concentra $(C) = 0.004$	ation of $N_2O_5$ (in mol litre <sup>1</sup> ) is.			
<b>A</b>	(A) 1.4		(B)1.2	(C) 0.004	(D)0.8			
Ans.	(D) Consider	the reaction.						
27.	Consider the reaction. $C[a(aa) + HaS(aa) + S(a) + 2H^{+}(aa) + 2CI^{-}(aa)$							
	$C_12(aq) + \Pi_2S(aq) \rightarrow S(s) + 2\Pi_1(aq) + 2C_1(aq)$ The rate equation for this reaction is							
	The fate	rate = k[Cla][H						
	Which of these mechanisms is/are consistent with this rate equation $?$							
	which of	which of these mechanisms is/are consistent with this rate equation ?						
	A. $Cl_2 + H_2S \longrightarrow H^+ + Cl^- + Cl^+ + HS^-$ (slow)							
	$Cl^+ + HS^- \longrightarrow H^+ + Cl^- + S(fast)$							
	B. $H_2S \rightleftharpoons H^+ + HS^-$ (fast equilibrium)							
	$Cl_2 + HS^- \longrightarrow 2Cl^- + H^+ + S(slow)$							
	(A) A on	ly	(B) B only	(C) Both A and B	(D) Neither A nor B			
Ans.	(A)							
28.	H, gas is	adsorbed on th	ne metal surface like t	ungsten. This follows o	order reaction -			
	(A) Third	l	(B) Second	(C) Zero	(D) First			
Ans.	(C)							
29.	In a fi 0.8 M 0.025 M	rst order r in 15 minu s	eaction, the conc utes. The time ta	entration of the reacta ken for the concentrat	nt, decreases from 0.16 M to ion to change from 0.1 M to			
	(A) 7.5 m	in	(B) 15 min	(C) 30 min	(D) 60 min			
Ans.	(C)							
30.	The mecl	nanism of the r	eaction $2NO + O_2$ —	$\rightarrow 2NO_2$ is:				
	NO + NO $\underbrace{\mathbf{k}_1}_{\mathbf{k}_1}$ N <sub>2</sub> O <sub>2</sub> (fast);							
	$N_2O_2 + O_2 \xrightarrow{k_2} 2NO_2$ (slow)							
	The rate constant of the reaction is							
	(A) k <sub>2</sub>		(B) $k_2 k_1 (k_{-1})$	(C) $k_2 k_1$	(D) $k_2 \left( \frac{k_1}{k_{-1}} \right)$			
Ans.	(D)							