CBSE - 2008 (Pre)

CHEMISTRY — SET-B

1. Equal volumes of three acid solutions of pH 3, 4 and 5 are mixed in a vessel. What will be the H^+ ion concentration in the mixture?

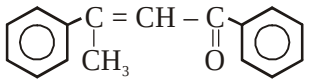
(1) 1.11×10^{-4} M (2) 3.7×10^{-4} M

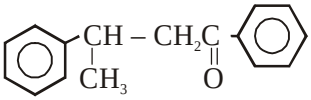
(3) 3.7×10^{-3} M (4) 1.11×10^{-3} M

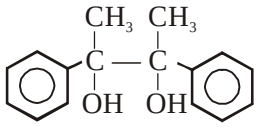
Sol: Ans [4]

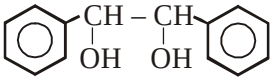
$$[H^+] = \frac{10^{-3}\,V + 10^{-4}\,V + 10^{-5}\,V}{3\,V} = 10^{-5}(10^2 + 10 + 1) = 1.11 \times 10^{-3}\ M$$

2. Acetophenone when reacted with a base, C_2H_5ONa, yields a stable compound which has the structure:

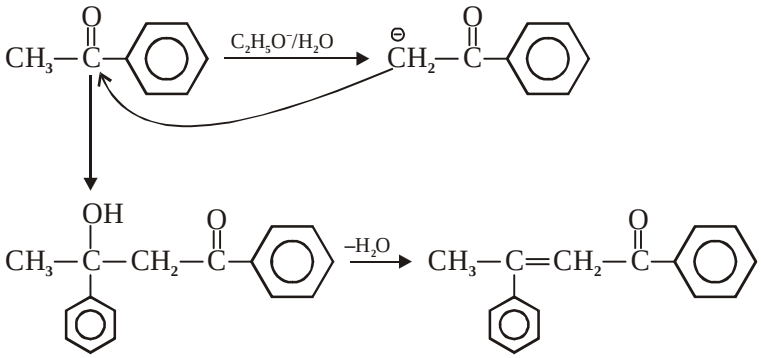
(1) 

(2) 

(3) 

(4) 

Sol: Ans [1]



3. The angular shape of ozone molecule (O_3) consists of

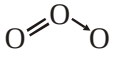
(1) 1 sigma and 2 pi bonds

(2) 2 sigma and 2 pi bonds

(3) 1 sigma and 1 pi bonds

(4) 2 sigma and 1 pi bonds

Sol: Ans [4]



4. On the basis of the following E° values, the strongest oxidizing agent is:

$[Fe(CN)_6]^{4-} \rightarrow [Fe(CN)_6]^{3-} + e^{-1}$; E° = – 0.35 V

$Fe^{2+} \rightarrow Fe^{3+} + e^{-1}$; E° = – 0.77 V

(1) $[Fe(CN)_6]^{4-}$ (2) Fe^{2+} (3) Fe^{3+} (4) $[Fe(CN)_6]^{3-}$

Sol: Ans [3]

Lesser the oxidation potential better the oxidising agent.

Better the reduction potential poorer the oxidising agent.

5. Green Chemistry means such reactions which

(1) produce colour during reactions

(2) reduce the use and production of hazardous chemicals

(3) are related to the depletion of ozone layer

(4) study the reactions in plants

Sol: Ans [2]

Factual

6. Which of the following are not state functions?

(I) $q + w$ (II) q (III) w (IV) H – TS

(1) (I) and (IV) (2) (II), (III) and (IV) (3) (I), (II) and (III) (4) (II) and (III)

Sol: Ans [4]

Factual

7. If uncertainty in position and momentum are equal, then uncertainty in velocity is

(1) $\frac{1}{2m}\sqrt{\frac{h}{\pi}}$ (2) $\sqrt{\frac{h}{2\pi}}$ (3) $\frac{1}{m}\sqrt{\frac{h}{\pi}}$ (4) $\sqrt{\frac{h}{\pi}}$

Sol: Ans [1]

$$x^2 = \frac{h}{4\pi} \quad \therefore \quad x = \frac{h}{4\pi} \ \& \ x = m\Delta V$$

$$\therefore \quad \Delta V = \frac{1}{m}\sqrt{\frac{h}{4\pi}} = \frac{1}{2m}\sqrt{\frac{h}{\pi}}$$

8. The correct order of decreasing second ionisation enthalpy of Ti (22), V(23), Cr (24) and Mn (25) is

(1) Cr > Mn > V > Ti (2) V > Mn > Cr > Ti (3) Mn > Cr > Ti > V (4) Ti > V > Cr > Mn

Sol: Ans [1]

Factual

9. The relative reactivities of acyl compounds towards nucleophilic substitution are in the order of

(1) Acyl chloride > Acid anhydride > Ester > Amide

(2) Ester > Acyl chloride > Amide > Acid anhydride

(3) Acid anhydride > Amide > Ester > Acyl chloride

(4) Acyl chloride > Ester > Acid anhydride > Amide

Sol: Ans [1]

Between ester and acid anhydride, anhydride is more reactive towards nucleophilic substitution as **'leaving group RO^-** in ester is stronger base than $RCOO^-$.

10. Kohlrausch's law states that at

(1) finite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte, whatever be the nature of the other ion of the electrolyte.

(2) infinite dilution each ion makes definite contribution to equivalent conductance of an electrolyte depending on the nature of the other ion of the electrolyte.

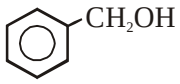
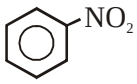
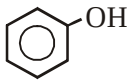
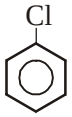
(3) infinite dilution, each ion makes definite contribution to conductance of an electrolyte whatever be the nature of the other ion of the electrolyte.

(4) infinite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte, whatever be the nature of the other ion of the electrolyte.

Sol: Ans [4]

Factual

11. Which one of the following is most reactive towards electrophilic attack?

(1)  (2)  (3)  (4) 

Sol: Ans [3]

–OH is a strong activating group.

12. Volume occupied by one molecule of water (density = 1 g cm^{-3}) is

(1) 9.0×10^{-23} cm^3 (2) 6.023×10^{-23} cm^3 (3) 3.0×10^{-23} cm^3 (4) 5.5×10^{-23} cm^3

Sol: Ans [3]

$$\text{Volume occupied by one water molecule} = \frac{18}{6.023 \times 10^{23}} \text{ cm}^3$$

$$\simeq 3 \times 10^{-23} \text{ cm}^3$$

13. Which of the following complexes exhibits the highest paramagnetic behaviour?

(1) $[V(gly)_2(OH)_2(NH_3)_2]^+$ (2) $[Fe(en)(bpy)(NH_3)_2]^{2+}$

(3) $[Co(OX)_2(OH)_2]^-$ (4) $[Ti(NH_3)_6]^{3+}$

Where gly = glycine, en = enthylenediamine and bpy = bipyriddyl moities

(At. nos. Ti = 22, V = 23, Fe = 26, Co = 27)

Sol: Ans [3]

$x - 4 - 2 = -1 \quad \therefore \quad x = +5$

$\Rightarrow$ $Co^{+5} : 3d^4$

$\Rightarrow$ $4e^-$(s) are unpaired

14. If a gas expands at constant temperature, it indicates that

(1) kinetic energy of molecules decreases (2) pressure of the gas increases

(3) kinetic energy of molecules remains the same (4) number of the molecules of gas increases

Sol: Ans [3]

KE $\propto$ T, here the process is isothermal.

15. For the gas phase reaction $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$

which of the following conditions are correct?

(1) $\Delta H = O$ and $\Delta S < O$ (2) $\Delta H > O$ and $\Delta S > O$

(3) $\Delta H < O$ and $\Delta S < O$ (4) $\Delta H > O$ and $\Delta S < O$

Sol: Ans [4]

As process is endothermic end due to breaking randomness will increases.

16. In a S_N2 substitution reaction of the type $R - Br + Cl^- \xrightarrow{DMF} R - Cl + Br^-$,

which ne of the following has the highest relative rate?

(1) $CH_3 - CH_2 - CH_2Br$ (2) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2Br$

(3) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-CH_2Br$ (4) CH_3CH_2Br

Sol: Ans [4]

As formation of $CH_3CH_2^+$ from CH_3CH_2Br will be most infavourable.

17. Number of moles of MnO_4^- required to oxidize one mole of ferrous oxalate completely in acidic medium will be

(1) 0.6 moles (2) 0.4 moles (3) 7.5 moles (4) 0.2 moles

Sol: Ans [1]

$$\underset{(VF=5)}{MnO_4^-} + \underset{(VF=3)}{FeC_2O_4} \xrightarrow{H^+} Mn^{2+} + Fe^{3+} + C^{4+}$$

$\Rightarrow$ 5 mols of FeC_2O_4 $\equiv$ 3 moles of $KMnO_4$

$\therefore$ 1 mole $\equiv 3/5 \equiv 0.6$ mole

18. If the concentration of OH^- ions in the reaction $Fe(OH)_3(s) \rightleftharpoons Fe^{3+}(aq) + 3OH^-(aq)$ is decreased by (1/4) times, then equilibrium concentration of Fe^{3+} will increase by

(1) 8 times (2) 16 times (3) 64 times (4) 4 times

Sol: Ans [3]

$$K_C = x(3x)^3 = x'\left(\frac{3}{4}x\right)^3$$

$\Rightarrow$ $x' = 64x$

19. The sequence of ionic mobility in aqueous solution is

(1) $K^+ > Na^+ > Rb^+ > Cs^+$ (2) $Cs^+ > Rb^+ > K^+ > Na^+$

(3) $Rb^+ > K^+ > Cs^+ > Na^+$ (4) $Na^+ > K^+ > Rb^+ > Cs^+$

Sol: Ans [2]

Due to greater charge density smaller cations hydrate heavily giving larger sized hydrated ions.

$\therefore$ Mobility order becomes as

$Cs^+_{(aq.)} < Rb^+_{(aq.)} < K^+_{(aq.)} < Na^+_{(aq.)}$

20. The alkali metals form salt-like hydrides by the direct synthesis at elevated temperature. The thermal stability of these hydrides decreases in which of the following orders?

(1) CsH > RbH > KH > NaH > LiH

(2) KH > NaH > LiH > CsH > RbH

(3) NaH > LiH > KH > RbH > CsH

(4) LiH > NaH > KH > RbH > CsH

Sol: Ans [4]

Factual

21. Which one of the following arrangements does not give the correct picture of the trends indicated against it?

(1) $F_2 > Cl_2 > Br_2 > I_2$: Oxidizing power (2) $F_2 > Cl_2 > Br_2 > I_2$: Electron gain enthalpy

(3) $F_2 > Cl_2 > Br_2 > I_2$: Bond dissociation energy (4) $F_2 > Cl_2 > Br_2 > I_2$: Electronegativity

Sol: Ans [2, 3]

Magnitude of "$\Delta_{eg}H$" for Cl is more than F due to greater screening in F

Due to smaller size of F and presence of ep of e^-, F–F bond is weaker than Cl–Cl bond.

22. Standard free energies of formation (in kJ/mol) at 298 K are – 237.2, –394.4 and –8.2 for $H_2O(l)$, $CO_2(g)$ and pentane (g), respectively. The value of $E°_{cell}$ for the pentane-oxygen fuel cell is

(1) 1.968 V (2) 2.0968 V (3) 1.0968 V (4) 0.0968 V

Sol: Ans [3]

$C_5H_{12(g)} + 8O_{2(g)} \rightarrow 5CO_{2(g)} + 6H_2O_{(l)}$

$\Delta rG^-_{(298K)} = 5(-394.4) + 6(-237.2) - (-8.2) = -3387.2 \times 10^3$ J/mole

$\Delta rG^- = nFE°_{cell}$

$$\Rightarrow \quad E°_{cell} = \frac{+3387.2 \times 10^3}{32 \times 96500} = 1.0968 \text{ V}$$

23. $H_3C-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH=CH_2 + HBr \rightarrow A$; A (predominantly) is

(1) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2-CH_2Br$ (2) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle Br}{\overset{|}{\underset{|}{C}}}}-CH_2CH_3$

(3) $CH_3-\underset{\displaystyle Br}{\underset{|}{CH}}-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_3$ (4) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-\underset{\displaystyle Br}{\underset{|}{CH}}-CH_3$

Sol: Ans [2]

$$CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH=CH_2 + \overset{+}{H}\overset{-}{Br} \longrightarrow CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-\overset{\oplus}{C}H-CH_3 + Br^-$$

$$\underset{\text{rearrange}}{\rightleftharpoons} CH_3-\underset{\displaystyle CH_3}{\overset{\oplus}{\underset{|}{C}}}-CH_2CH_3 \xrightarrow{Br^-} CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle Br}{\overset{|}{\underset{|}{C}}}}-CH_2CH_3$$

24. Base strength of

(a) $H_3C^-CH_2$ (b) $H_2C = {}^-CH$ (c) $H - C \equiv C^-$

is in the order of

(1) (b) > (a) > (c) (2) (c) > (b) > (a) (3) (a) > (c) > (b) (4) (a) > (b) > (c)

Sol: Ans [4]

Conjugate base of stronger acid is always weaker so $HC \equiv C^-$ will be weakest base here.

25. Which of the following statements is *not* correct?

(1) The fraction of the total volume occupied by the atoms in a primitive cell is 0.48

(2) Molecular solids are generally volatile

(3) The number of carbon atoms in an unit cell of Diamond is 4

(4) The number of Bravais lattices in which a crystal can be categorized is 14

Sol: Ans [1]

Packing Fraction of primitive cubic unit cell is 0.52.

26. If 'a' stands for the edge length of the cubic systems: simple cubic, body centred cubic and face centred cubic, then the ratio of radii of the spheres in these systems will be respectively,

(1) $\frac{1}{2}$ a : $\frac{\sqrt{3}}{4}$ a : $\frac{1}{2\sqrt{2}}$ a (2) $\frac{1}{2}$ a : $\sqrt{3}$ a : $\frac{1}{\sqrt{2}}$ a

(3) $\frac{1}{2}$ a : $\frac{\sqrt{3}}{2}$ a : $\frac{\sqrt{2}}{2}$ a (4) 1 a : $\sqrt{3}$ a : $\sqrt{2}$ a

Sol: Ans [1]

sc : $r = \frac{a}{2}$. *fcc* : $r = \frac{a}{2\sqrt{2}}$, bcc : $r = \frac{4\sqrt{3}}{4}$

27. The rate constants k_1 and k_2 for two different reactions are $10^{16}\ e^{-2000/T}$ and $(10^{15}e^{-1000/T}$, respectively. The temperature at which $k_1 = k_2$ is

(1) 1000 K (2) $\frac{2000}{2.303}$ K (3) 2000 K (4) $\frac{1000}{2.303}$ K

Sol: Ans [4]

$k_1 = 10^{16}e^{-2000/T}$, $k_2 = 10^{15}e^{-2000/T} = 10^{15} \cdot e^{-1000/T}$.

If $k_1 = k_2$ then $10^{16} \cdot e^{-2000/T} = 10^{15} \cdot e^{-1000/T}$.

$\Rightarrow \quad 10^{16} \cdot e^{-2000/T} = e^{-1000/T}$

$\Rightarrow \quad \ln 10 - \frac{2000}{T} = -\frac{1000}{T} \quad \therefore \ln 10 = \frac{2000}{T} - \frac{1000}{T} = \frac{1000}{T}$

$\therefore \quad T = \frac{1000}{\ln 10} = \frac{1000}{2.303}$

28. What volume of oxygen gas (O_2) measured at 0°C and 1 atm, is needed to burn completely 1 L of propane gas (C_3H_8) measured under the same conditions?

(1) 7 L (2) 6 L (3) 5 L (4) 10 L

Sol: Ans [3]

$C_3H_8 + 5O_2 \longrightarrow 3CO_2 + 4H_2O$

1 vol $C_3H_8 \equiv 5$ volumes of $O_2 \Rightarrow 1\ L \equiv 5\ L$

29. The *correct* order of increasing bond angles in the following triatomic species is

(1) $NO_2^- < NO_2^+ < NO_2$ (2) $NO_2^- < NO_2 < NO_2^+$

(3) $NO_2^+ < NO_2 < NO_2^-$ (4) $NO_2^+ < NO_2^- < NO_2$

Sol: Ans [2]

$NO_2^-(120°) < NO_2(\text{bent}) < NO_2^{\oplus}(180°)$

30. How many stereoisomers does this molecule have? $CH_3CH = CHCH_2CHBrCH_3$

(1) 4 (2) 6 (3) 8 (4) 2

Sol: Ans [1]

Number of geometrical isomers = 2

number of chiral carbons =1 $\Rightarrow$ optical isomer = 2

31. Equimolar solutions of the following were prepared in water separately. Which one of the solutions will record the highest pH?

(1) $SrCl_2$ (2) $BaCl_2$ (3) $MgCl_2$ (4) $CaCl_2$

Sol: Ans [2]

$BaCl_2 \rightleftharpoons Ba^{2+} + 2Cl^-$

with water up to some extent Ba^{2+} will form $Ba(OH)_2$ that is highly soluble giving highest pH.

32. Four diatomic species are listed below in different sequences. Which of these presents the *correct* order of their increasing bond order?

(1) $O_2^- < NO < C_2^{2-} < He_2^+$ (2) $NO < C_2^{2-} < O_2^- < He_2^+$

(3) $C_2^{2-} < He_2^+ < NO < O_2^-$ (4) $He_2^+ < O_2^- < NO < C_2^{2-}$

Sol: Ans [4]

$He_2^+(0.5) < O_2^-(1.5) < NO\ (2.5) < C_2^{2-}(3)$

33. Percentage of free space in a body centred cubic unit cell is

(1) 30% (2) 32% (3) 34% (4) 28%

Sol: Ans [2]

Packing friction of bcc = 0.68.

34. With which one of the following elements silicon should be doped so as to give p-type of semiconductor?

(1) Germanium (2) Arsenic

(3) Selenium (4) Boron

Sol: Ans [4]

Boron has 3 valence electrons.

35. An organic compound contains carbon, hydrogen and oxygen. Its elemental analysis gave C, 38.71% and H, 9.67%. The empirical formula of the compound would be

(1) CH_3O (2) CH_2O (3) CHO (4) CH_4O

Sol: Ans [1]

$$\frac{38.71}{12} = 3.226 \quad = \frac{3.226}{3.226} = 1$$

$$\frac{9.67}{1} = 9.67$$

$$C = \frac{38.71}{12} = 3.226 = \frac{3.226}{3.226} = 1$$

$$H = \frac{9.67}{1} = 9.67 = \frac{9.67}{3.226} \approx 3$$

$$O = \frac{51.72}{16} = 3.23 \quad \frac{3.23}{3.226} \approx 1$$

hence empirical formula is CH_3O

36. The measurement of the electron position is associated with an uncertainty in momentum, which is equal to 1×10^{-18}g cms^{-1}. The uncertainty in electron velocity is, (mass of an electron is 9×10^{-28}g)

(1) 1×10^9 cms^{-1} (2) 1×10^6 cms^{-1}

(3) 1×10^5 cms^{-1} (4) 1×10^{11} cms^{-1}

Sol: Ans [1]

$m\Delta v = 1 \times 10^{-18}$ gm cms^{-1}

$$\Delta v = \frac{1\times10^{-18}\ \text{gm cms}^{-1}}{9\times10^{-28}\ \text{gm}}$$

$= 0.1 \times 10^{10}$ cm s^{-1}

$= 109$ cms^{-1}

37. How many moles of lead (II) chloride will be formed from a reaction between 6.5 g of PbO and 3.2 g of HCl?

(1) 0.044 (2) 0.333 (3) 0.011 (4) 0.029

Sol: Ans [4]

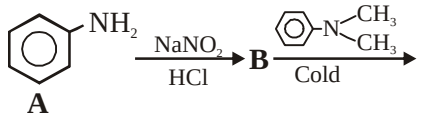
$$PbO + 2HCl \longrightarrow PbCl_2 + H_2O$$

wt	6.5	3.2
moles.	$\frac{6.5}{222}$	$\frac{3.2}{36.5}$
	0.0281	0.0876

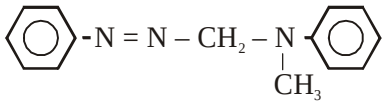
so PbO is limiting reagent

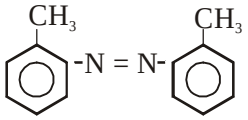
moles aq $PbCl_2$ = 0.029

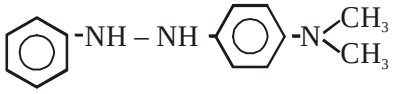
38. In a reaction of aniline a coloured product C was obtained.

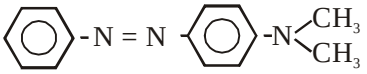


A **C**; The structure of C would be

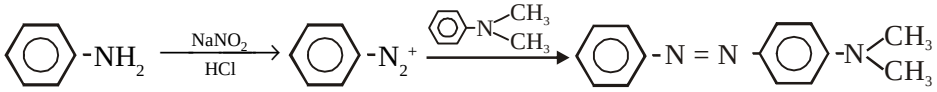
(1) 

(2) 

(3) 

(4) 

Sol: Ans [4]



A **B** **C**

39. A strong base can abstract an α-hydrogen from

(1) Alkene (2) Amine (3) Ketone (4) Alkane

Sol: Ans [3]

α-hydrogen of ketone are acidic due to resonance stabilisation aq. carbanion formed.

40. The stability of carbanions in the following

(a) $RC = \overset{\ominus}{C}$ (b)  (c) $R_2C = \overset{\ominus}{C}H$ (d) $R_3C - \overset{\ominus}{C}H_2$

is in the order of

(1) (a) > (b) > (c) > (d) (2) (b) > (c) > (d) > (a) (3) (d) > (b) > (c) > (a) (4) (a) > (c) > (b)> (d)

Sol: Ans [2]

RC = $\overset{\ominus}{C}$ due to incompleted octet will be least stable, while  max stable.

41. Bond dissociation enthalpy of H_2, Cl_2 and HCl are 434, 242 and 431 kJ mol^{-1} respectively. Enthalpy of formation of HCl is

(1) 93 kJ mol^{-1} (2) –245 kJ mol^{-1} (3) –93 kJ mol^{-1} (4) 245 kJ mol^{-1}

Sol: Ans [3]

$$\Delta H_f\,(HCl) = \frac{434 + 242 - (2\times 431)}{2} = -93 \text{ kJ mol}^{-1}$$

42. The dissociation equilibrium of a gas AB_2 can be represented as

$$2AB_2(g) \rightleftharpoons 2AB(g) + B_2(g)$$

The degree of dissociation is '*x*' and is small compared to 1. The expression relating the degree of dissociation (*x*) with equilibrium constant K_p and total pressure P is

(1) $(2K_p/P)$ (2) $(2K_p/P)^{1/3}$ (3) $(2K_p/P)^{1/2}$ (4) (K_p/P)

Sol: Ans [2]

	$2AB_2(g)$	$\rightleftharpoons$	$2AB(g)$	+	$B_2(g)$
t = 0	1		0		0
t = eq	$1-x$		x		$x/2$

$$Kp = \frac{\left(\frac{x}{1+x/2}\times P\right)\left(\frac{x/2}{1+x/2}\times P\right)}{\left(\frac{1-x}{1+x/2}\times P\right)^2} = \frac{x^2\times x\times 1}{2\times(1-x)\times(1+x/2)}\times P$$

$\because x <<< 1$

$$Kp = \frac{x^3\times P}{2}$$

$$x = \left(\frac{2Kp}{P}\right)^{1/3}$$

43. Which one of the following is an amine hormone?

(1) Thyroxine (2) Oxypurin (3) Insulin (4) Progesterone

Sol: Ans [1]

Factual

44. Which one of the following statements is *not true*?

(1) In vulcanization, the formation of sulphur bridges between different chains make rubber harder and stronger

(2) Natural rubber has the *trans*-configuration at every double bond

(3) Bona-S is a copolymer of butadiene and styrene

(4) Natural rubber is a 1, 4-polymer of isoprene

Sol: Ans [2]

Natural rubber is cis-isomer

45. In the hydrocarbon

$CH_3 - CH = CH - CH_2 - C \equiv CH$

6 5 4 3 2 1

The state of hybridization of carbons 1, 3 and 5 are in the following sequence:

(1) sp^2, sp, sp^3 (2) sp, sp^3, sp^2 (3) sp, sp^2, sp^3 (4) sp^3, sp^2, sp

Sol: Ans [2]

sp, sp^3, sp^2 for triple, single and double bond respectively.

46. The values of Kp_1 and Kp_2 for the reactions

$X \rightleftharpoons Y + Z$ .....(1)

$A \rightleftharpoons 2B$ .....(2)

are in ratio of 9 : 1. If degree of dissociation of X and A be equal, then total pressure at equilibrium (1) and (2) are in the ratio:

(1) 3 : 1 (2) 1 : 9 (3) 36 : 1 (4) 1 : 1

Sol: Ans [3]

$X \rightleftharpoons Y + Z$

1 0 0

$1-x$ x x

$$Kp_1 = \frac{\left(\frac{x}{1+x}\times P\right)^2}{\left(\frac{1-x}{1+x}\times P\right)} = \frac{x^2}{(1+x)(1-x)} \times P_1$$

$A \rightleftharpoons 2B$

1 0

$1-x'$ $2x'$

$$Kp_2 = \frac{\left(\frac{2x'}{1+x'} \times P\right)^2}{\left(\frac{1-x'}{1+x'} \times P\right)} = \frac{4x'^2 \times P_2}{(1+x')(1-x')}$$

$$\frac{K_{P_1}}{K_{P_2}} = \frac{9}{1} = \frac{x^2}{4x^2} \times \frac{P_1}{P_2}$$

$$\frac{P_1}{P_2} = \frac{4x^2 \times 9}{x^2} = 36 : 1$$

47. In DNA the complimentary bases are

(1) Adenine and thymine; guanine and cytosine (2) Adenine and thymine; guanine and uracil

(3) Adenine and guanine; thymine and cytosine (4) Uracil and adenine; cytosine and guanine

Sol: Ans [1]

In DNA thymine is found in place at uracil found in RNA.

48. The bromination of acetone that occurs in acid solution is represented by this equation.

$CH_3COCH_3(aq) + Br_2(aq) \rightarrow CH_3COCH_2Br(aq) + H^+(a) + Br^-(aq)$

These kinetic data were obtained for given reaction concentrations.

Initial Concentrations, M

$[CH_3COCH_3]$	$[Br_2]$	$[H^+]$
0.30	0.05	0.05
0.30	0.10	0.05
0.30	0.10	0.10
0.40	0.05	0.20

Initial Rate, disappearance of Br_2, Ms^{-1}

5.7×10^{-5}

5.7×10^{-5}

1.2×10^{-4}

3.1×10^{-4}

Based on these data, the rate equation is:

(1) Rate = $k[CH_3COCH_3][H^+]$ (2) Rate = $k[CH{=}COCH_3][Br_2]$

(3) Rate = $k[CH_3COCH_3][Br_2][H^+]^2$ (4) Rate = $k[CH_3COCH_3][Br_2][H^+]$

Sol: Ans [1]

From set (1) and (2) if cncentration of Br_2 is changed rate is not changed so $[Br_2]$ should not be in rate law.

49. The value of equilibrium constant of the reaction

$HI\ (g) \rightleftharpoons \frac{1}{2}H_2(g) + \frac{1}{2}I_2$ is 8.0

The equilibrium constant of the reaction $H_2(g) + I_2(g) \rightleftharpoons 2HI\ (g)$ will be

(1) $\frac{1}{16}$ (2) $\frac{1}{64}$ (3) 16 (4) $\frac{1}{8}$

Sol: Ans [2]

$Kc' = \frac{1}{(K_c)^2} = \frac{1}{(8)^2} = \frac{1}{64}$.

50. In which of the following coordination entities the magnitude of ΔO (CFSE in octahedral field) will be maximum?

(1) $[Co(H_2O)_6]^{3+}$ (2) $[Co(NH_3)_6]^{3+}$ (3) $[Co(CN)_6]^{3-}$ (4) $[Co(C_2O_4)_3]^{3-}$

Sol: Ans [3]

Stronger the ligand high is the CFSE.