Vidyamandir Classes
Gurukul for IITJEE & Medical Preparation

SOLUTIONS

Joint Entrance Exam | IITJEE-2018

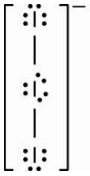
Paper Code - B

8th April 2017 | 9.30 AM – 12.30 PM

PART-C	CHEMISTRY

61.(1) I_3^- is - sp^3d hybridised

- linear shape

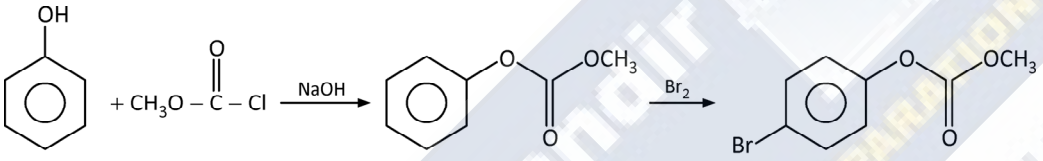


Total number of lone pair of electron = 9

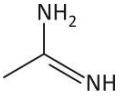
62.(4) CH_3COOK is a salt of a weak acid and a strong base

$\therefore$ Most basic

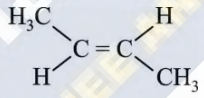
63.(1)



(A)

64.(1) Amidines,  are stronger organic bases.

65.(1) Methyl orange is used for titration of strong acid and weak base.

66.(1) $H_3C - C \equiv C - CH_3 \xrightarrow{\text{Na in liq } NH_3}$ 

Trans alkene

67.(2) $C_xH_yO_z$ has z oxygen atom

$$C_xH_y + \left(x + \frac{y}{4}\right)O_2 \longrightarrow x\,CO_2 + \frac{y}{2}H_2O$$

O atoms required for combustion $= 2\left(x + \frac{y}{4}\right)$

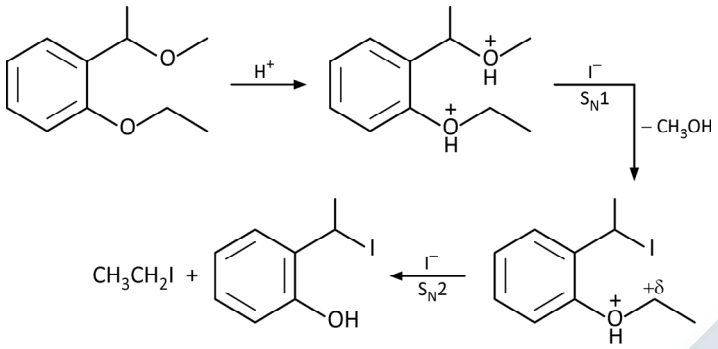
$$z = \frac{1}{2}\left[2\left(x + \frac{y}{4}\right)\right]$$

$$z = x + \frac{y}{4}$$

68.(1) During reduction $H_2O_2 \longrightarrow H_2O$

During oxidation $H_2O_2 \longrightarrow O_2$

69.(2)



Option (2) is correct [NCERT Class XII Part-II, Page No.-340]

70.(1) $B_2H_6 + 3O_2 \longrightarrow B_2O_3 + 3H_2O$

$nB_2H_6 = \dfrac{27.66}{27.66} = 1$

n_{O_2} required = 3

$2H_2O \longrightarrow 2H_2 + O_2$

n-factor for O_2 = 4

$\therefore$ Number of equivalent = $3 \times 4 = 12F = 12 \times 96500\,C$

$i \times t = 12 \times 96500$

$t = \dfrac{12 \times 96500}{100}s = \dfrac{12 \times 96500}{100 \times 3600}h = 3.2\,hr$

71.(3) $\Delta G = \Delta H - T\Delta S$

$-RT\ell nk = \Delta H - T\Delta S$

$\ell nk = \dfrac{-\Delta H}{RT} + \dfrac{\Delta S}{R}$

Slope is $\dfrac{-\Delta H}{R}$

Since ΔH is $-ve$

$\therefore$ Slope is positive.

72.(3) $r = k[A]^n$

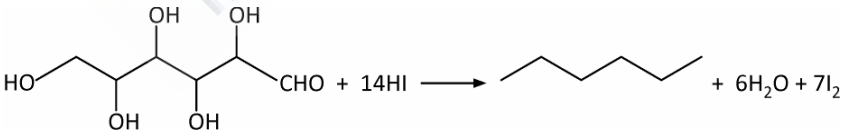
$1 = k(363 \times 0.95)^n$ ....(i)

$0.5 = k(363 \times 0.67)^n$ ....(ii)

From (i) and (ii)

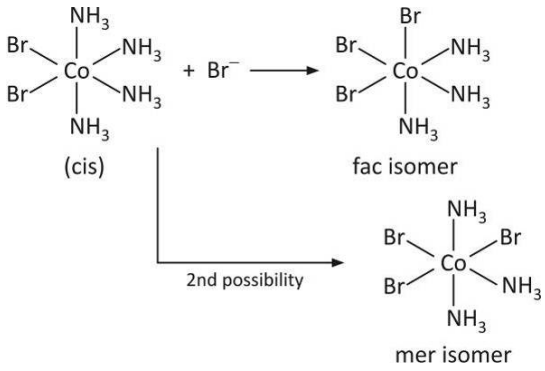
$n = 2$

73.(3)

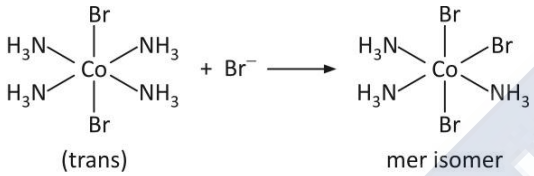


Option (3) is correct [NCERT Class XII Part-II, Page No 405]

74.(4) **Case - I**

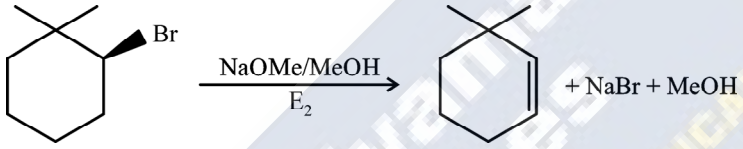


Case - II

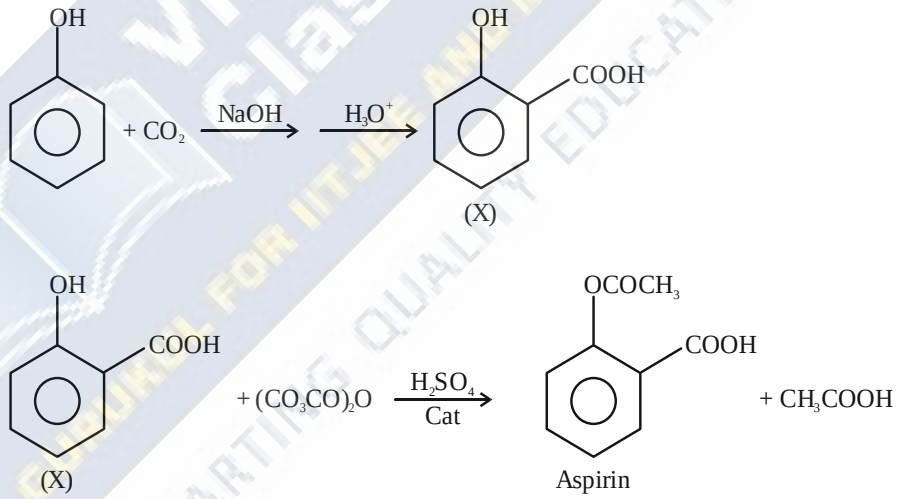


∴ Two isomers (fac and mer) are produced if reactant complex ion is a cis isomer.
Only one isomer (fac) is formed if reactant complex ion is a trans isomer.

75 (4).



76 (3).



[NCERT class XII part II/Page No. 330]

77.(1) $BaSO_4(s) \rightleftharpoons Ba^{2+}(aq) + SO_4^{2-}(aq) \qquad K_{sp} = 10^{-10}$

$Na_2SO_4 \rightarrow 2Na^+ + SO_4^{2-}$

Conc. of SO_4^{2-} in final solution $= \dfrac{50\times1}{500} = 0.1M$

For final solution

$\Rightarrow \qquad \left[Ba^{2+}\right]\left[SO_4^{2-}\right] = 10^{-10} \quad \Rightarrow \quad \left[Ba^{2+}\right] = 10^{-9}M$

$M_iV_i = M_fV_f$

$C \times 450 = 10^{-9} \times 500 \Rightarrow C = 1.1 \times 10^{-9}\,M$

78.(4) Kjeldahl method is not applicable to compounds containing nitrogen in nitro (NO_2) and azo (N = N –) groups and nitrogen present in the ring (pyridine) as nitrogen of these compounds does not change to ammonium sulphate.

[NCERT Class XI part II/Page No. 358]

79.(1) $\underset{(M)}{Al} + NaOH \longrightarrow \underset{\substack{\text{white gel ppt}\\(X)}}{Al(OH)_3} \xrightarrow{NaOH} NaAlO_2$

$Al(OH)_3 \xrightarrow{\Delta} Al_2O_3$

Al_2O_3 is used in chromatography as an absorbent. (Refer NCERT Class XIth/Part-II, Page-352)

80.(4) $HCl \longrightarrow \underset{0.2M}{H^+} + \underset{0.2\,M}{Cl^-}$

$H_2S \rightleftharpoons H^+ + HS^- \qquad K_1 = 10^{-7}$

$HS^- \rightleftharpoons H^+ + S^{2-} \qquad K_2 = 1.2 \times 10^{-13}$

$H_2S \rightleftharpoons 2H^+ + S^{2-} \qquad K = K_1 \cdot K_2$

$= 1.2 \times 10^{-20}$

$K = \dfrac{\left[H^+\right]^2\left[S^{2-}\right]}{\left[H_2S\right]} \qquad \left[H^+\right] = 0.2M\,,\ \left[H_2S\right] = 0.1$

$1.2 \times 10^{-20} = \dfrac{(0.2)^2\left[S^{2-}\right]}{0.1} \Rightarrow \left[S^{2-}\right] = 3 \times 10^{-20}\,M$

81.(1) (Refer NCERT Class XIth Part-II, Page-407)

The F^- ions make the enamel on teeth much harder by converting hydroxyapatite, $\left[3Ca(PO_4)_2 \cdot Ca(OH)_2\right]$, into much harder fluorapatite i.e. $\left[3Ca(PO_4)_2 \cdot CaF_2\right]$

82.(2) $NH_4NO_2 \xrightarrow{\Delta} N_2 + 2H_2O$

$(NH_4)_2SO_4 \xrightarrow{\Delta} NH_3 + H_2SO_4$

$Ba(N_3)_2 \xrightarrow{\Delta} Ba + 3N_2$

$(NH_4)_2Cr_2O_7 \xrightarrow{\Delta} N_2 + 4H_2O + Cr_2O_3$

83.(3) NCERT Class XII/Part-II, Page No. 443

84.(1) $\left[Cr(H_2O)_6\right]Cl_3$

$x + 0 - 3 = 0$

$x = +3$

$\left[Cr(C_6H_6)_2\right]$

$x + 0 = 0$

$x = 0$

$K_2\left[Cr(CN)_2(O)_2(O_2)(NH_3)\right]$

$2 + x - 2 - 4 - 2 + 0 = 0$

$x = +6$

85.(1) Pressure of cation in interstitial sites is 'Frenkel' defect.

86.(2) $C_6H_6(\ell) + \frac{15}{2}O_2(g) \longrightarrow 6CO_2(g) + 3H_2O(\ell)$

$\Delta n_{(g)} = -\frac{3}{2}$

$\Delta H = \Delta U + \Delta n_{(g)}\, RT$

$= -3263.9 - \frac{1.5 \times 8.314 \times 298}{1000} = -3267.6 \text{ kJ/mol}$

87.(2) BCl_3 and $AlCl_3$ are e^- deficient and thus act as Lewis acid

88.(1) KCl exist as K^+ and Cl^-

89.(2) Depression in freezing pt

$\Delta T_f = i K_f m$

Less the value of i,

Higher the value of freezing pt.

For (2) i = 1 (min)

90.(2) H_2^{2-} does not exist as Bond order is zero

Electronic configuration of H_2^{2-} : $\sigma_{1s}^2\, \sigma^{*2}_{1s}$

$B.O = \frac{2-2}{2} = 0$