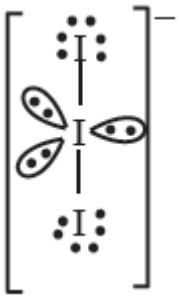
JEE MAIN-2018

CHEMISTRY

61. Ans. (1)

Sol.

I_3^- =  **total number of lone pair of electron** $= 9$

62. Ans. (4)

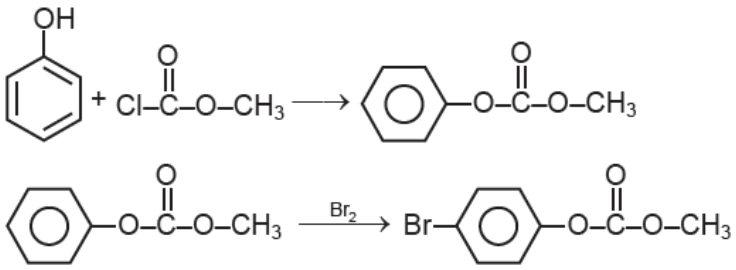
Sol.

most basic salt in aq. solution is CH_3COOK it is salt of WASB

and have $PH = 7 + \frac{\left(P_{ka} + \log c\right)}{2}$ i.e. pH > 7

63. Ans. (1)

Sol.



64. Ans. (1)

Sol.

Imidine is more basic than 2^{o} amine followed by 1^{o} amine.

65. Ans. (1)

Sol.

$NH_4OH + HCl \rightarrow NH_4Cl + H_2O$

Weak base Strong acid

At end point pH will be less than 7

as strong acid weak base salt have $pH = 7 - \frac{(pK_b + \log c)}{2}$

$\therefore$ Methyl orange will change colour from yellow to pinkish red at the end point.

$NH_4OH + HCl \rightarrow NH_4Cl + H_2O$

66. Ans. (1)

Sol.

Na in liquid ammonia carryout anti and partial hydrogenation of alkyne to trans alkene.

67. Ans. (2)

Sol.

Element	C	:	H
Mass ratio	6	:	1
Mole Ratio	6/12	:	1 $\Rightarrow$ $=1:2$

So C_XH_Y have empirical formula : CH_2

for Burning a CH_2 unit ; oxygen required is $\frac{3}{2}$ mol

$$CH_2+\frac{3}{2}O_2 \Rightarrow CO_2+H_2O$$

Empirical formula is $2\times\left(CH_2O_{3/2}\right)\Rightarrow C_2H_4O_3$

68. Ans. (1)

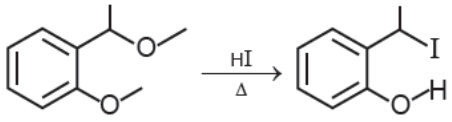
Sol.

$$2\left[Fe(CN)_6\right]^{4-}+H_2O_2+2H^+ \rightarrow 2\left[Fe(CN)_6\right]^{3-}+2H_2O$$

$$2\left[Fe(CN)_6\right]^{3-}+H_2O_2+2OH^- \rightarrow 2\left[Fe(CN)_6\right]^{4-}+O_2+2H_2O$$

69. Ans. (2)

Sol.



70. Ans. (1)

Sol.

$$B_2H_6 + 3O_2 \rightarrow B_2O_3 + 3H_2O$$

1mol 3mol

$3\text{mol}\,O_2$ is required for Burning $1\text{mol}\,B_2H_6$

$$H_2O \xrightarrow{\text{Electrolysis}} H_2 + \frac{1}{2}O_2 \quad (\text{V.F. of } O_2 = 4)$$

$$\frac{\text{Equivalent of } O_2}{\text{V.F. of } O_2} = \text{mol of } O_2 = 3$$

$$\left[\frac{(100A)\times t\,\text{sec.}}{96500}\right]\times\frac{1}{4} = 3$$

$$\therefore t = \frac{3\times 96500\times 4}{100\times 3600}\,\text{hr.} = 3.22\,\text{hrs.}$$

71. Ans. (3)

Sol.

$(A \& B)$

$$\ell nK = \ell nA - \frac{\Delta H}{R}\times\frac{1}{T}$$

$$\text{Slope} = -\frac{\Delta H}{R} \quad ; \Delta H = -\text{ve}$$

72. Ans. (3)

Sol.

$$\text{Rate} = \text{K}\left(\text{pressure}\right)^{n}$$

$$R_1 = K\left(P_1\right)^{n}$$

$$R_2 = K\left(P_2\right)^{n}$$

$$\frac{R_1}{R_2} = \left[\frac{P_1}{P_2}\right]^{n} \quad P_1 = 363 - \frac{363\times 5}{100} = 344.85,\ P_2 = 363 - \frac{363\times 33}{100} = 243.21$$

$$\frac{1}{0.5} = \left(\frac{344.85}{243.21}\right)^{n}$$

$$2 = \left(\sqrt{2}\right)^{n} \quad ;\left(n = 2\right)$$

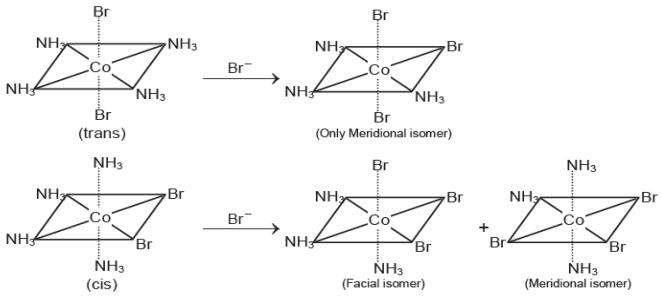
73. Ans. (3)

74. Ans. (4)

Sol.

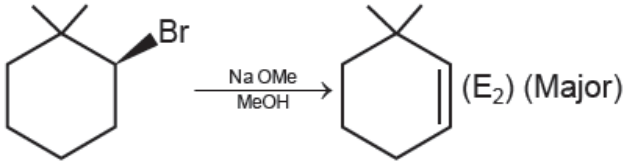
(I & III)

$$\left[\text{Co}\left(\text{NH}_3\right)_4\text{Br}_2\right]^{+} + \text{Br}^{-} \rightarrow \left[\text{Co}\left(\text{NH}_3\right)_3\text{Br}_3\right] + \text{NH}_3$$



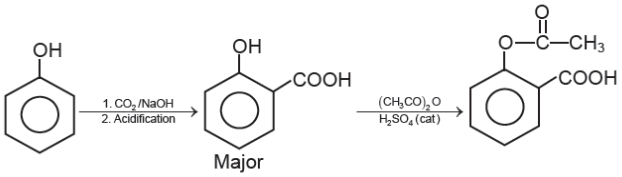
75. Ans. (4)

Sol.



76. Ans. (3)

Sol.



77. Ans. (1)

Sol.

$$Ba^{+2} + SO_4^{2-} \rightleftharpoons \underset{\text{ppt}}{BaSO_{4(s)}}$$

$$\text{final conc. of } \left[SO_4^{2-}\right] = \frac{MV_1}{V_1 + V_2} = \frac{1\times 50}{500} = 0.1M$$

$$\text{Final conc. of } \left[Ba^{2+}\right] \text{ when } BaSO_4 \text{ start precipitating}$$

$$K_{sp} = Q_{sp} = \left[Ba^{+2}\right]\left[SO_4^{2-}\right]$$

$$10^{-10} = \left[Ba^{2+}\right](0.1M)$$

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

initial conc. $\left[Ba^{2+}\right]$; initial volume was $=500-0=450ml$

$M_1V_1 = M_2V_2$

$$M_1 = \frac{M_2V_2}{V_1} = \frac{10^{-9}\times 500}{450}$$

$M_1 = 1.1\times10^{-9}M$

78. Ans. (4)

Sol.

Nitrogen in aniline is estimated by Kjeldahl's method.

79. Ans. (1)

Sol.

$$(A\ell)M + NaOH \longrightarrow \underset{\text{Gelatinous white ppt}}{(X)A\ell(OH)_3\downarrow} \xrightarrow{\Delta} \underset{\text{Silica Gel. used as adsorbent in chromatography}}{A\ell_2O_{3(s)}}$$

$$(X)A\ell(OH)_3\downarrow \xrightarrow[\text{Excess}]{NaOH} \underset{\text{soluble in water}}{Na[Al(OH)_4]_{aq}}$$

80. Ans. (4)

Sol.

$$\begin{array}{lllll} HCl \rightarrow & H^+ & + & Cl^- & \\ & (0.2+x+y) & & 0.2 & \\ H_2S \rightleftharpoons & H^+ & + & HS^- : Ka_1 = 10^{-7} & \\ 0.1-x & (0.2+x+y) & & (x-y) & \\ H_2S \rightleftharpoons & H^+ & + & S^{2-} : Ka_2 = 1.2\times10^{-13} & \\ (x-y) & (0.2+x+y) & & (y) & \end{array}$$

$$\left[H^+\right] = (0.2+x+y)0.2M$$

$$K_{a1} = \frac{\left[H^+\right]\left[HS^-\right]}{\left[H_2S\right]} = \frac{0.2\times\left[HS^-\right]}{0.1-x} = \frac{0.2\times\left[HS^-\right]}{0.1} (x = \text{negligible})$$

$$\left[HS^-\right] = \frac{Ka_1\times0.1}{0.2} = \frac{1}{2}\times10^{-7}$$

$$K_{a2} = \frac{\left[H^+\right]\left[S^{2-}\right]}{\left[HS^-\right]} = \frac{[0.2M]\left[S^{2-}\right]}{\frac{1}{2}\times10^{-7}}$$

$$\left[S^{2-}\right] = \frac{K_{a2}\times\frac{1}{2}\times10^{-7}}{0.2} = \frac{1.2\times10^{-13}\times\frac{1}{2}\times10^{-7}}{0.2} = 3\times10^{-20}\,M$$

81. Ans. (1)

82. Ans. (2)

Sol.

(1) $NH_4NO_2 \xrightarrow{\Delta} N_{2(g)} + 2HO_{(\ell)}$

(2) $(NH_4)_2SO_4 \xrightarrow{\Delta} 2NH_{3(g)} + H_2SO_4$

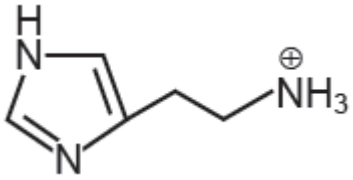
(3) $Ba(N_3)_2 \xrightarrow{\Delta} Ba(S) + 3N_{2(g)}(\text{Pure})$

(4) $(NH_4)_2Cr_2O_7 \xrightarrow{\Delta} N_{2(g)} + Cr_2O_{3(s)} + 4H_2O_{(\ell)}$

83. Ans. (2)

Sol.

The pH of blood is approx. 7.0, therefore the acids with pK_a less than 7 will loose H^+ .



84. Ans. (1)

Sol.

$(+3, 0, +6)$

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

$x + 0 \times 6 + 3 \times (-1) = 0 \qquad x = +3$

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

$y + 2 \times 0 = 0 \qquad y = 0$

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

$+2 \times 1 + z + 2(-1) + 2(-2) + (-2) + 0 = 0$

$z = +6$

85. Ans. (1)

Sol.

Frenkel Defect.

86. Ans. (2)

Sol.

$$C_6H_{6(liq)} + 7.5O_{2(g)} \rightarrow 6CO_{2(g)} + 3H_2O_{(liq)}$$

$$\Delta n_{(g)} = 6 - 7.5 = -1.5$$

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

$$\Delta H = -3263.9\,kJ - \frac{1.5 \times 8.314 \times 298}{1000}\,kJ = -3267.6\,kJ$$

87. Ans. (2 or 4)

Sol.

BCl_3 and $AlCl_3$ both have incomplete octate and act as Lewis acid

88. Ans. (1)

Sol.

KCl is ionic compound.

89. Ans. (2)

Sol.

The complex having minimum value of vant Hoff's factor (i) will give minimum concentration and highest freezing point.

(1) $\left[Co(H_2O)_4Cl_2\right]Cl.2H_2O \rightarrow \left[Co(H_2O)_4Cl_2\right]^{+} + Cl^{-} \quad (i = 2)$

(2) $\left[Co(H_2O)_3Cl_3\right]3H_2O \rightarrow$ No dissociation $\quad (i = 1)$

(3) $\left[Co(H_2O)_6\right]Cl_3 \rightarrow \left[Co(H_2O)_6\right]^{+3} + 3Cl^{-} \quad (i = 4)$

(4) $\left[Co(H_2O)_5Cl\right]Cl_2H_2O \rightarrow \left[Co(H_2O)_5Cl\right]^{+2} + 2Cl^{-} \quad (i = 3)$

90. Ans. (2)

Sol.

H_2^{2-} have bond order zero $\therefore$ do not exist

$$H_2^{2-} \rightarrow \sigma 1S^2, \sigma^* 1S^2, \quad \text{B.O.} = \frac{2-2}{2} = 0$$