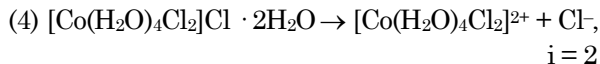
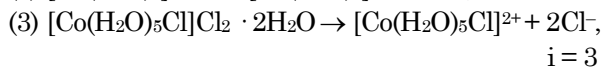
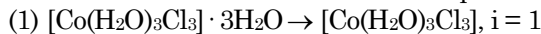




**CHEMISTRY**

61. (1)

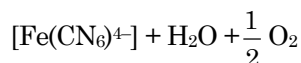
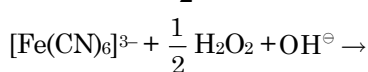
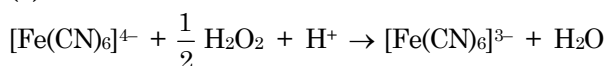
The solution which shows maximum freezing point must have minimum number of solute particles.



So, solution of 1 molal  $[\text{Co}(\text{H}_2\text{O})_3\text{Cl}_3] \cdot 3\text{H}_2\text{O}$  will have minimum number of particles in aqueous state.

Hence, option (1) is correct.

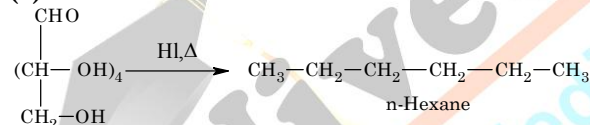
62. (4)



63. (3)

Kjeldahl method is not applicable for compounds containing nitrogen in nitro, and azo groups and nitrogen in ring, as N of these compounds does not change to ammonium sulphate under these conditions. Hence only aniline can be used for estimation of nitrogen by Kjeldahl's method.

64. (2)

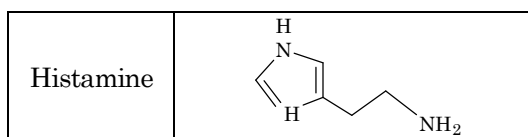


65. (4)

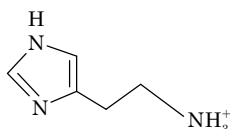


Weak base is having pH greater than 7. When methyl orange is added to weak base solution, the solution becomes yellow. This solution is titrated by strong acid and at the end point pH will be less than 3.1. Therefore solution becomes pinkish red.

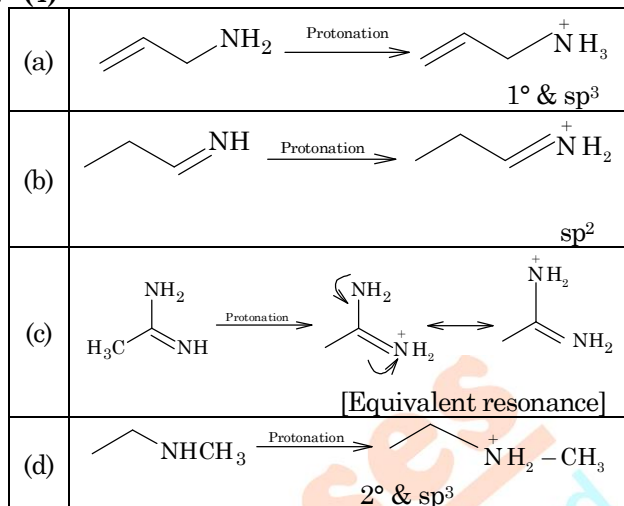
66. (1)



At pH (7.4) major form of histamine is protonated at primary amine.



67. (4)



∴ Correct order of basicity :  $b < a < d < c$ .

68. (2)

$$\text{Equilibrium constant } K = \left( \frac{A_t}{A_b} \right) e^{-\frac{\Delta H^\circ}{RT}}$$

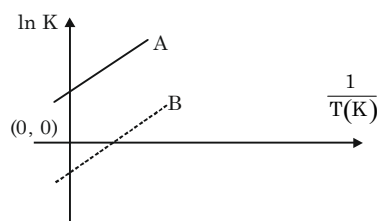
$$\ln K = \ln \left( \frac{A_t}{A_b} \right) - \frac{\Delta H^\circ}{R} \left( \frac{1}{T} \right)$$

$$y = c + mx$$

Comparing with equation of straight line,

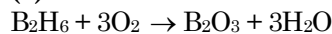
$$\text{Slope} = -\frac{\Delta H^\circ}{R}$$

Since, reaction is exothermic,  $\Delta H^\circ = -ve$ , therefore, slope = +ve.



Hence, option (2) is correct.

69. (4)



27.66 of  $\text{B}_2\text{H}_6 = 1$  mole of  $\text{B}_2\text{H}_6$  which requires three moles of oxygen ( $\text{O}_2$ ) for complete burning  
 $6\text{H}_2\text{O} \rightarrow 6\text{H}_2 + 3\text{O}_2$  (On electrolysis)

Number of faradays = 12 = Amount of charge

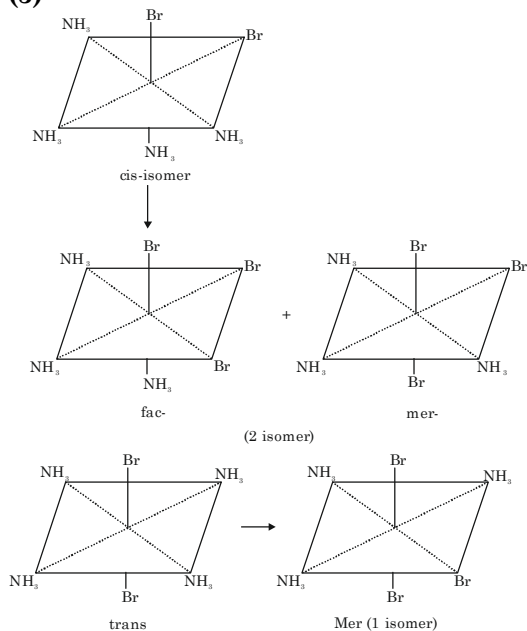
$$12 \times 96500 = i \times t$$

$$12 \times 96500 = 100 \times t$$

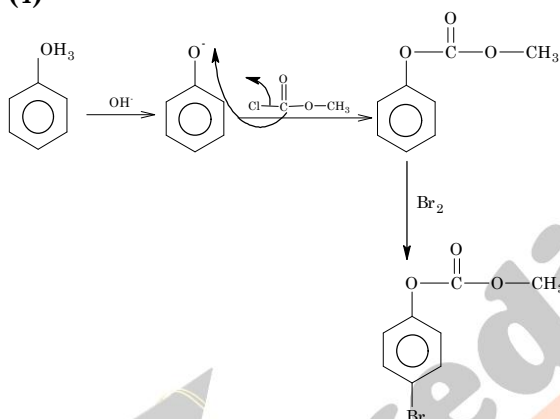
$$t = \frac{12 \times 96500}{100} \text{ second}$$

$$t = \frac{12 \times 96500}{100 \times 3600} \text{ hour} \Rightarrow t = 3.2 \text{ hours}$$

70. (3)



71. (4)



72. (4)

$$\text{Final concentration of } [\text{SO}_4^{2-}] = \frac{[50 \times 1]}{500} = 0.1 \text{ M}$$

$K_{\text{sp}}$  of  $\text{BaSO}_4$ ,

$$[\text{Ba}^{2+}][\text{SO}_4^{2-}] = 1 \times 10^{-10}$$

$$[\text{Ba}^{2+}][0.1] = \frac{10^{-10}}{0.1} = 10^{-9} \text{ M}$$

Concentration of  $\text{Ba}^{2+}$  in final solution =  $10^{-9} \text{ M}$

Concentration of  $\text{Ba}^{2+}$  in the original solution.

$$M_1V_1 = M_2V_2$$

$$M_1(500 - 50) = 10^{-9}(500)$$

$$M_1 = 1.11 \times 10^{-9} \text{ M}$$

So, option (4) is correct.

73. (2)

Assume the order of reaction with respect to acetaldehyde is  $x$ .

**Condition-1:**

$$\text{Rate} = k[\text{CH}_3\text{CHO}]^x$$

$$1 = k[363 \times 0.95]^x$$

$$1 = k[344.85]^x \quad \dots(i)$$

**Condition-2:**

$$0.5 = k[363 \times 0.67]^x$$

$$0.5 = k[243.21]^x \quad \dots(ii)$$

Divide equation (i) by (ii),

$$\frac{1}{0.5} = \left(\frac{344.85}{243.21}\right)^x \Rightarrow 2 = (1.414)^x$$

$$\Rightarrow x = 2$$

74. (1)



$$\Delta n_g = 6 - \frac{15}{2} = -\frac{3}{2}$$

$$\Delta H = \Delta U + \Delta n_g RT$$

$$= -3263.9 + \left(-\frac{3}{2}\right) \times 8.314 \times 298 \times 10^{-3}$$

$$= -3263.9 + (-3.71)$$

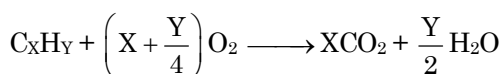
$$= -3267.6 \text{ kJ mol}^{-1}$$

75. (1)

Element	Relative mass	Relative mole	Simplest whole number ratio
C	6	$\frac{6}{12} = 0.5$	1
H	1	$\frac{1}{1} = 1$	2

So,  $X = 1$ ,  $Y = 2$

Equation for combustion of  $\text{C}_x\text{H}_y$



$$\text{Oxygen atoms required} = 2 \left(X + \frac{Y}{4}\right)$$

As per information,

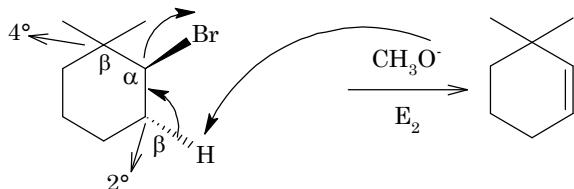


84. (3)

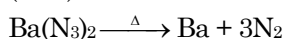
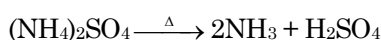
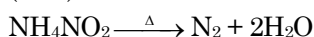
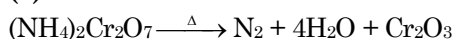
$\text{CH}_3\text{O}^-$  is a strong base and strong nucleophile, so favourable condition is  $\text{S}_\text{N}2/\text{E}2$ .

Given alkyl halide is  $2^\circ$  and  $\beta$  C's are  $4^\circ$  and  $2^\circ$ , so sufficiently hindered, therefore,  $\text{E}2$  dominates over  $\text{S}_\text{N}2$ .

Also polarity of  $\text{CH}_3\text{OH}$  (solvent) is not as high as  $\text{H}_2\text{O}$ , so  $\text{E}1$  is also dominated by  $\text{E}2$



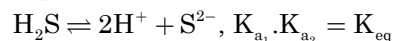
85. (1)



Among all the given compounds, only  $(\text{NH}_4)_2\text{SO}_4$  do not form dinitrogen on heating, it produces ammonia gas.

86. (3)

In presence of external  $\text{H}^+$



$$\therefore \frac{[\text{H}^+]^2[\text{S}^{2-}]}{[\text{H}_2\text{S}]} = 1 \times 10^{-7} \times 1.2 \times 10^{-13}$$

$$\frac{[0.2]^2[\text{S}^{2-}]}{[0.1]} = 1.2 \times 10^{-20}$$

$$[\text{S}^{2-}] = 3 \times 10^{-20}$$

87. (4)

$$[\text{Cr}(\text{H}_2\text{O})_6\text{Cl}_3] \Rightarrow x + 0 \times 6 - 1 \times 3 = 0$$

$$\therefore x = +3$$

$$[\text{Cr}(\text{C}_6\text{H}_6)_2] \Rightarrow x + 2 \times 0 = 0$$

$$x = 0$$

$$\text{K}_2[\text{Cr}(\text{CN})_2(\text{O}_2)(\text{O}_2)\text{NH}_3]$$

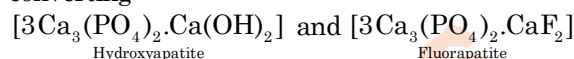
$$\Rightarrow 1 \times 2 + x - 1 \times 2 - 2 \times 2 - 2 \times 1 = 0$$

$$\Rightarrow x - 6 = 0$$

$$x = +6$$

88. (4)

$\text{F}^-$  ions make the teeth enamel harder by converting



Hydroxyapatite

Fluorapatite

89. (3)



$\text{FeCl}_3$  – Acidic solution

$\text{Al}(\text{CN})_3$  – Salt of weak acid and weak base

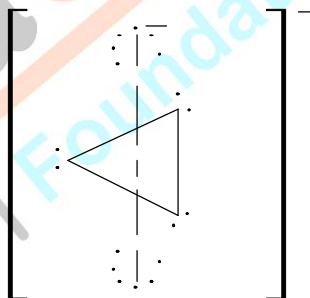
$\text{Pb}(\text{CH}_3\text{COO})_2$  – Salt of weak acid and weak base

$\text{CH}_3\text{COOK}$  is salt of weak acid and strong base.

Hence solution of  $\text{CH}_3\text{COOK}$  is basic.

90. (4)

Structure of  $\text{I}_3^-$



Number of lone pairs in  $\text{I}_3^-$  is 9.