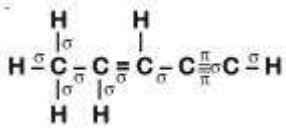
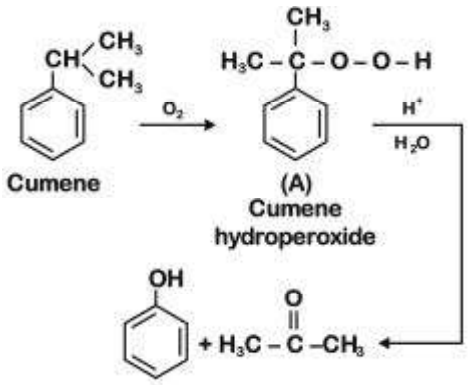
NEET 2019
SOLUTIONS
CHEMISTRY

46.

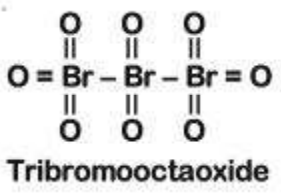


Number of σ bonds = 10
and number of π bonds = 3

47.



48. The correct structure is



49. (n + l) values for, 4d = 4 + 2 = 6
5p = 5 + 1 = 6
5f = 5 + 3 = 8
6p = 6 + 1 = 7
∴ Correct order of energy would be
5f > 6p > 5p > 4d

50. (a) $2\overset{+1}{Cu}^{+1} \rightarrow \overset{+2}{Cu}^{2}(+) + Cu^{0}$ } Disproportionation

(b) $3\overset{+6}{Mn}O_4^{2(-)} + 4H^{(+)} \rightarrow [2\overset{+7}{Mn}O_4^{-} + \overset{+4}{MnO_2} + 2H_2O$ } Disproportionation

(c) $2\overset{+7}{K}MnO_4^{-2} \xrightarrow{\Delta} K_2\overset{+6}{Mn}O_4 + \overset{+4}{Mn}O_2 + \overset{0}{O_2}$ } ∴ Not adisproportionation

(d) $2\overset{+7}{Mn}O_4^{-} + 3\overset{+2}{Mn}^{2(+)} + 2H_2O \rightarrow 5\overset{+4}{Mn}O_2 + 4H^{\oplus}$ }

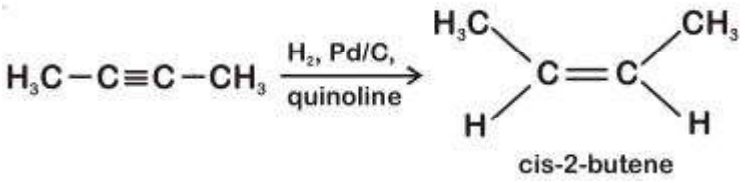
51. $\therefore W_{irr} = -P_{ext}\Delta V$
= – 2 bar × (0.25 – 0.1) L
= – 2 × 0.15 L-bar
= – 0.30 L-bar
= – 0.30 × 100 J
= – 30 J

52. Fact
SO_2
(g) is not a greenhouse gas.

53. $\Delta G^{\ominus} = -nFE^{\ominus}_{cell}$
= – 2 × 96500 × 0.24 J mol^{-1}
= – 46320 J mol^{-1}
= – 46.32 kJ mol^{-1}

54. All enzymes that utilize ATP in phosphate transfer require magnesium(Mg) as the co-factor.

55.



cis-2-butene

56. On going down the group thermal stability order for H_2E decreases because H–E bond energy decreases

$\therefore$ Order of stability would be:-

$H_2Po < H_2Te < H_2Se < H_2S < H_2O$

57. PbF_4 and SnF_4 are ionic in nature.

58. (a) Pure nitrogen : Sodium azide or Barium azide

(b) Haber process : Ammonia

(c) Contact process : Sulphuric acid

(d) Deacon's process : Chlorine

59. MO configuration C_2 is:

$\sigma ls^2, \sigma^* 1s^2, \sigma 2s^2, \sigma^* 2s^2, \pi 2p_x^2 = \pi 2p_y^2$ *

60. $\therefore$ 'Be' and 'N' have comparatively more stable valence sub-shell than 'B' and 'O'.

Correct order of first ionisation enthalpy is:

$Li < B < Be < C < O < N < F < Ne$

61. Nylon-2-Nylon 6

62. $Ca(OH)_2 \rightleftharpoons Ca^{2+} + 2OH^-$

pH = 9 Hence pOH = 14 – 9 = 5

$[OH^-] = 10^{-5}$ M

Hence $\left[Ca^{2+}\right] = \frac{10^{-5}}{2}$

Thus $K_{sp} = [Ca^{2+}][OH^-]^2$

$= \left(\frac{10^{-5}}{2}\right)\left(10^{-5}\right)^2$

$= 0.5 \times 10^{-15}$

63. First order rate constant is given as,

$$k = \frac{2.303}{t}\log\frac{[A_0]}{[A]_t}$$

99% completed reaction,

$$k = \frac{2.303}{t}\log\frac{100}{1}$$

$$= \frac{2.303}{t}\log 10^2$$

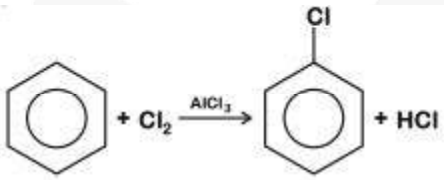
$$k = \frac{2.303}{t}\times 2\log 10$$

$$t = \frac{2.303}{k}\times 2 = \frac{4.606}{k}$$

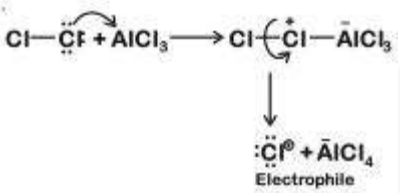
$$t = \frac{4.606}{k}$$

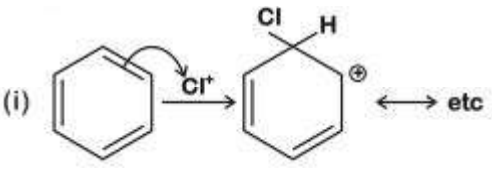
64. Alanine

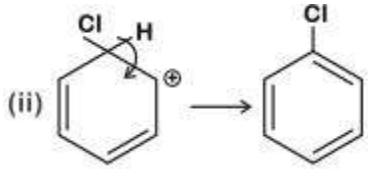
65.



Generation of electrophile:







66. Solutions showing negative deviation from Raoult's law form maximum boiling azeotrope Water and Nitric acid $\rightarrow$ forms maximum boiling azeotrope

67. $N_2 + 3H_2 \rightleftharpoons 2NH_3$

Rate of reaction is given as

$$-\frac{d[N_2]}{dt} = -\frac{1}{3}\frac{d[H_2]}{dt} = +\frac{1}{2}\frac{d[NH_3]}{dt}$$

68. Haber's process

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

20 moles need to be produced

2 moles of $NH_3 \rightarrow 3$ moles of H_2

Hence 20 moles of $NH_3 \rightarrow \frac{3\times 20}{2} = 30$ moles of H_2

69. Due to involvement of lone pair of electrons in resonance in phenol, it will have positive charge (partial), hence incoming proton will not be able to attack easily.

70. For ideal solution,

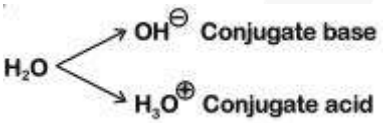
$\Delta_{mix} H = 0$

$\Delta_{mix} S > 0$

$\Delta_{mix} G < 0$

$\Delta_{mix} V = 0$

71.



HF on loss of $H^{\oplus}$ ion becomes $F^{\ominus}$ is the conjugate base of HF

Example :

$$\underset{\text{Acid}}{HF} + \underset{\text{Base}}{H_2O} \rightleftharpoons \underset{\text{Conjugate base}}{F^{\ominus}} + \underset{\text{Conjugate acid}}{H_3O^{\oplus}}$$

72. Generally charge present on the colloid is due to adsorption of common ion from dispersion medium. Millimole of KI is maximum in

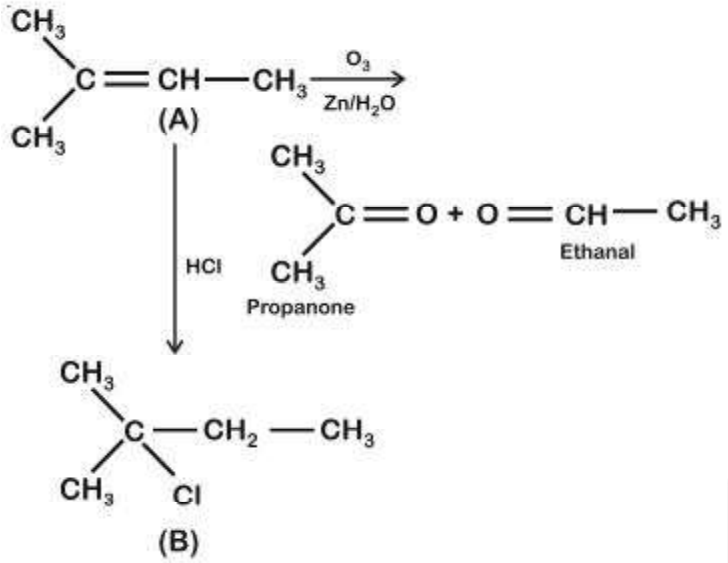
option (2) ($50 \times 2 = 100$) so act as solvent and

anion I^- is adsorbed by the colloid AgI formed

$$\underset{\text{D.P.}}{AgNO_3} + \underset{\text{D.M. (excess)}}{KI} \rightarrow \underset{\substack{\text{Negatively}\\ \text{charged}\\ \text{colloid}}}{AgI} + KNO_3$$

73. Penicillin G

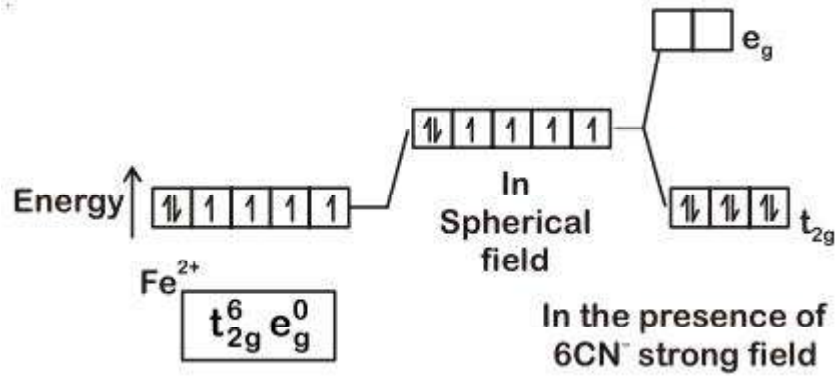
74.



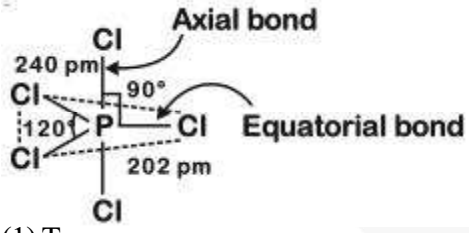
75. $K_4[Fe(CN)_6]$

Fe ground state: $[Ar]3d^6 4s^2$

Fe^{2+} : $3d^6 4s^0$



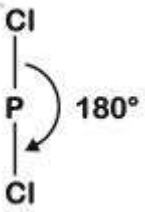
76.



(1) True

(2) True

(3) True



Axial bond : 240 pm

Equatorial bond : 202 pm

(4) False

Due to longer and hence weaker axial bonds, PCl_5 is a reactive molecule.

77. (1) $CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O$

Before	25 mL	50 mL	0
	× 0.1M	× 0.1 M	
	= 2.5 mmol	= 5 mmol	
After	0	2.5 mmol	2.5 mmol

This is basic solution due to NaOH.

This is not basic buffer.

(2) $CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O$

Before	100 mL	100 mL	0
	× 0.1 M	× 0.1 M	
	=10 mmol	=10mmol	
After	0	0	10 mmol

Hydrolysis of salt takes place.

This is not basic buffer.

(3) $HCl + NH_4OH \rightarrow NH_4Cl + H_2O$

Before	100 mL	200 mL	0
	× 0.1 M	× 0.1 M	
	=10 mmol	=20 mmol	
After	0	10 mmol	10 mmol

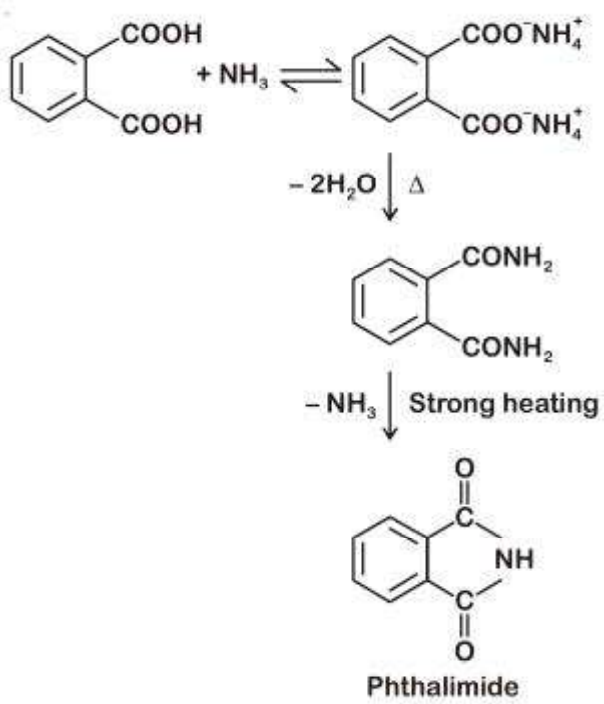
This is basic buffer

(4) $HCl + NaOH \rightarrow NaCl + H_2O$

Before	100 mL	100 mL	0
	× 0.1 M	× 0.1 M	
	10 mmol	10 mmol	
After	0	0	10 mmol

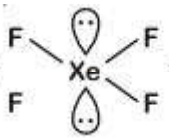
$\Rightarrow$ Neutral solution

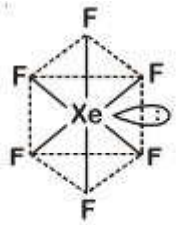
78.

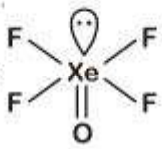


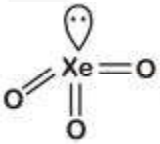
Phthalimide

79.

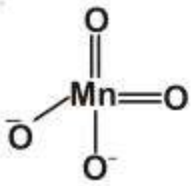
(a) XeF_4 :  ⇒ Square planar

(b) XeF_6 :  ⇒ Distorted octahedral

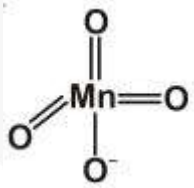
(c) $XeOF_4$:  ⇒ Square pyramidal

(d) XeO_3 :  ⇒ Pyramidal

80. Manganate $\left(MnO_4^{2-}\right)$:



⇒ π-bonds are of dπ–pπ type

• Permanganate (MnO^{4-}) : 

⇒ π-bonds are of dπ–pπ type

81. • Due to presence of d-orbital in Si, Ge and Sn they form species like SiF_6^{2-}, $[GeCl_6]^{2-}$, $[Sn(OH)_6]^{2-}$

• $SiCl_6^{2-}$ does not exist because six large chloride ions cannot be accommodated around Si^{4+} due to limitation of its size.

82. $E_{cell} = E^{\circ}_{cell} - \dfrac{0.059}{n}\log Q$

(At equilibrium, $Q = K_{eq}$ and $E_{cell} = 0$)

$0 = E^{\circ}_{cell} - \dfrac{0.059}{1}\log K_{eq}$ (from equation (i))

$$\log K_{eq} = \frac{E^{\circ}_{cell}}{0.059} = \frac{0.59}{0.059} = 10$$

$K_{eq} = 10\ 10 = 1 \times 10\ 10$

83. $Be(OH)_2$ amphoteric in nature, since it can react both with acid and base

$$Be(OH)_2 + 2HCl \rightarrow BeCl_2 + 2H_2O$$

$$Be(OH)_2 + 2NaOH \rightarrow Na_2\left[Be(OH)_4\right]$$

84. • Compressibility factor(Z) $= \frac{V_{real}}{V_{ideal}}$

$\therefore V_{real} < V_{ideal}$; Hence $Z < 1$

• If $Z < 1$, attractive forces are dominant among gaseous molecules and liquefaction of gas will be easy.

85. • Anions(A) are in hcp, so number of anions (A) = 6

Cations(C) are in 75% O.V., so number of cations (C)

$$= 6 \times \frac{3}{4} = \frac{18}{4} = \frac{9}{2}$$

• So formula of compound will be

$$C_{\frac{9}{2}}A_6 \Rightarrow C_9A_{12}$$

$$C_9A_{12} \Rightarrow C_3A_4$$

86. $H_2O(\ell) \rightleftharpoons H_2O(v), \Delta S > 0$

• Expansion of gas at constant temperature, $\Delta S > 0$

• Sublimation of solid to gas, $\Delta S > 0$

$2H(g) \rightarrow H_2(g), \Delta S < 0 \left(\because \Delta n_g < 0\right)$

87. In H-spectrum, Balmer series transitions fall in visible region.

88. Clark's method is used to remove temporary hardness of water, in which bicarbonates of calcium and magnesium are reacted with slaked lime $Ca(OH)_2$

$$Ca\left(HCO_3\right)_2 + Ca(OH)_2 \rightarrow 2CaCO_3 \downarrow + 2H_2O$$

$$Mg\left(HCO_3\right)_2 + 2Ca(OH)_2 \rightarrow 2CaCO_3 \downarrow + Mg(OH)_2 \downarrow 2H_2O$$

89. Malachite : $CuCO_3.Cu(OH)_2$ (Green colour)

90. In aqueous solution, electron donating inductive effect, solvation effect (H-bonding) and steric hindrance all together affect basic strength of substituted amines Basic character :

$$\underset{2^\circ}{(CH_3)_2}NH > \underset{1^\circ}{CH_3NH_2} > \underset{3^\circ}{(CH_3)_3}N$$

91. Earth Summit (Rio Summit)-1992, called upon all nations to take appropriate measures for conservation of biodiversity and sustainable utilisation of its benefits

92. Colostrum, the yellowish fluid secreted by the mother during initial days of lactation is very essential to impart immunity to the new born infant because it contains Immunoglobulin A.It will impart naturally acquired passive immunity to the newborn

93. Bulliform cells become flaccid due to water loss. This will make the leaves to curl inward to minimise water loss

94. Sub metacentric chromosome is Heterobrachial.
Short arm designated as 'p' arm
(p = petite i.e. short)
Long arm designated as 'q' arm

95. $$\underset{(RQ)}{\text{Respiratory Quotient}} = \frac{\text{Amount of } CO_2 \text{ released}}{\text{Amount of } O_2 \text{ consumed}}$$

$$2\underset{\text{Tripalmitin}}{(C_{51}H_{98}O_6)} + 145O_2 \rightarrow \underset{+\ \text{Energy}}{102CO_2 + 98H_2O}$$

$$RQ = \frac{102CO_2}{145O_2} = 0.7$$

96. Statin is obtained from a yeast (Fungi) called Monascus purpureus.
It acts by competitively inhibiting the enzyme responsible for synthesis of cholesterol.

97. Crypts of Lieberkuhn are present in small intestine. Glisson's capsule is present in liver.
Islets of langerhans constitutes the endocrine portion of pancreas. Brunner's glands are found in submucosa of duodenum.

98. Habitat loss and fragmentation is the most important cause driving animals and plants to extinction.
eg: Loss of tropical rainforest reducing the forest cover from 14 % to 6 %.

99. Hypothalamus in the thermoregulatory centre of our brain. It is responsible for maintaining constant body temperature.

100. True segmentation is present in Annelida, Arthropoda and Chordata. They also have organ system level of organisation, bilateral symmetry and are true coelomates