Series : 09

41. $Al^{3+} + 3e^- \longrightarrow Al$ (3F : 1 mole)

1 mole Al → 3F
$\frac{4}{3}$ mole Al → ?

$\frac{4}{3} \times 3 = 4F = 4 \times 96500$ .... Ans: B

42. ΔG is quantitative hence it is extensive whereas E^0_{cell} OR E_{cell} is intensive property .... Ans: C

43. For zero order reaction $t = \frac{[R]_0 - [R]_t}{K}$

& $t_{\frac{1}{2}} = \frac{[R]_0}{2K}$ $\quad t_{100\%} = \frac{[R]_0}{K}$

$\therefore t_{100\%} = 2 \times t_{\frac{1}{2}} = 2 \times 10 = 20 \text{ min}$ ... Ans: D

44. For 1st order reaction, $t_{\frac{1}{2}} = \frac{0.693}{K} \Rightarrow K = \frac{0.693}{t_{\frac{1}{2}}}$

$t = \frac{2.303}{K} \log \frac{[R]_0}{[R]_t}$ Here $[R]_0 = [100]$ & $[R]_t = 80$

$\therefore t = \frac{2.303}{\frac{0.693}{t_{\frac{1}{2}}}} \log \frac{100}{80}$

$t = \frac{5730}{0.3} \log \frac{100}{80}$ $\because \frac{0.693}{2.303} \simeq 0.3$

Ans: (A)

45. Conceptual ..... Ans: A

46. For $n_A \cdot A \rightarrow n_B B$ $\quad$ Rate $= -\frac{1}{n_A}\frac{d[A]}{dt} = +\frac{1}{n_B}\frac{d[B]}{dt}$

$\therefore 6A + 4B \longrightarrow 3C + 4D$ .... Option (A)

47. Actual reason is due to smaller size F repells and unlike "O", F forms single bond with Mn. Hence, correct answer ..... Option (A)

48. M^{2+} ion has same d e's as value of z on the position of ONE $\therefore {}_{25}Mn^{2+} : [Ar]\, 3d^5 4s^0 \therefore n = 5 \Rightarrow \mu_{so} = \sqrt{35}$

.... Option (A)

49. In Acidic med: {Tx BK Example : 9}

$3MnO_4^{2-} + 4H^+ \longrightarrow 2MnO_4^- + MnO_2 + 2H_2O$

∴ Option : (D)

50. Ti has several oxi'n state in Ziggler - Natta catalyst Among these III is the most stable

∴ Option : (D)

51. Complex with formula $[Ma_3b_3]$ are most suitable to show facial - meridional isomers.

∴ In $[Co(NH_3)_x(NO_2)_y]$, x & y should be 3

∴ x = 3, y = 3 ∴ Option : (B)

52. $[NiCl_4]^{2-}$ undergo sp^3 hy'n &

$[Ni(CN)_4]^{2-}$ undergo dsp^2 hy'n. ∴ Option : (A)

53. each $C_2O_4^{2-} = -2$ ∴ trioxalato = −6 } $[Al(ox)_3]^{3-}$

Al has +3 oxi'n state

∴ Formula is $K_3[Al(ox)_3]$ which produces

$K_3[Al(ox)_3] \longrightarrow 3K^+ + [Al(ox)_3]^{3-}$

∴ i = 4 ∴ Option : (D)

54. strong ligand ∝ CFSE ∝ $E_{absorbed}$ ∝ $\frac{1}{\lambda_{Absorbed}}$

∴ $[Co(CN)_6]^{3-} > [Co(NH_3)_6]^{3+} > [Co(NH_3)_5H_2O]^{2+}$

$> [Co Cl(NH_3)_5]^{2+}$ ..... ∴ Option : (C)

55. Allylic halides have common formula $C=C-C-X$

∴ 1 bromobut-2-ene $Br-CH_2-CH=CH-CH_3$ is allylic ∴ Option (A)

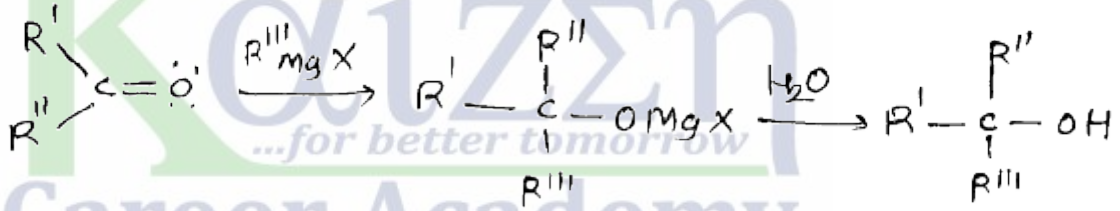
56. mono alkene with optical Isomerism required chiral carbon i.e all four different valancies. $CH_3-\overset{*}{C}H(X)-CH_2-CH_3$

∴ Four "C" required. ∴ Option : (A)

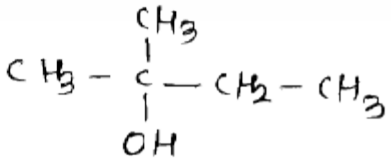
57: Rate of S_N2 is highest in 1° R-X with minimum branching ∴ 1-bromobutane ---∴ Option: (B)

58. Chloroform ($CHCl_3$ Trichloromethane ---∴ Option: (D)

59.

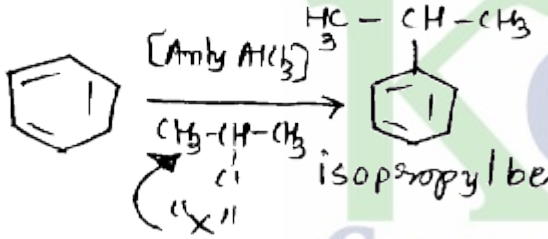


The product has structure ∴ $R' = CH_3$, $R'' = C_2H_5$, $R''' = CH_3$



As this is the one option with total 4 "C" other options have 3, 5 total "C" ---Option(A)

60.



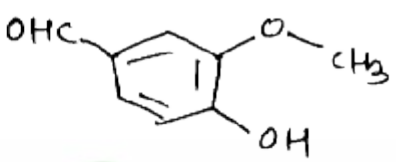
isopropylbenzene ∴ ---- Option (B)

61. Glucose $\xrightarrow{\text{Zymase}}$ ethanol + CO_2 ---- Option (B)

62. Ethanol $\xrightarrow[\text{Ht}]{\text{[Acid]}}$ Diethylether is S_N2

--- Option (D)

63. Vanillin is



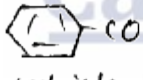
∴ It has —Phenyl
—OCH_3
—CHO
—OH

---- Option (A)

64. PCC is better oxidizing agent to convert $-CH_2-OH$ into $-CHO$

∴ $C_5H_5\overset{\oplus}{N}HCrO_3Cl^{\ominus}$ is correct ---- Option (C)

65. Both can be distinguished by iodoform test.

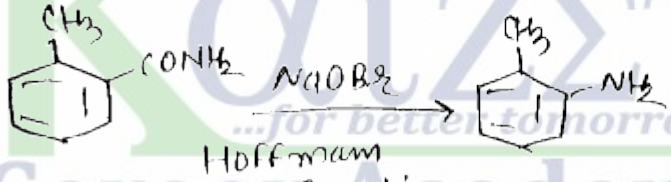

($COCH_3$ (Acetophenone) will perform the test which req. $NaOH + I_2 \longrightarrow NaOI$ ∴ ---- Option (B)

66. $pK_a \propto \frac{1}{\text{Acidic strength}}$

Acidic strength: $HCOOH > Cl\text{-}CH_2CH_2COOH > C_6H_5CH_2COOH > CH_3CH_2COOH$

pK_a is inverse ..... ∴ Option (A)

67.



Hoffmann Reaction

It is soluble in Acid like HCl but insoluble in base like NaOH ..... ∴ Option (C)

68. greater the basic strength, more the reactivity towards HCl ..... ∴ Option (C)

69. Both "A" & "R" are correct and "R" is correct explanation ..... ∴ Option (A)

70. Phenol is acidic so during azo coupling its soln is prepared in NaOH .. Option (D)

71. Conceptual ..... Thymine is not present ∴ Option (B)

72.

73. Due to deficiency of Vitamin C ∴ Option (A)
i.e Ascorbic Acid causes scurvy

74. glucose $\xrightarrow{NH_2OH}$ Its oxime ∴ Option (A)

75. $x_2 = 0.2 \quad \therefore x_1 = 0.8$

$$\frac{x_2}{x_1} = \frac{n_2}{n_1} = \frac{W_2 \times M_1 \times 1000}{M_2 \times W_1 \times 1000} = \frac{2}{8} = \frac{m \times 18}{1000}$$

$$\therefore m = 13.88$$

∴ On solving y. w/w 35.71 ..... ∴ Option (A)

76. $\Delta_{mix}H > 0$ For ethanol + Acetone ..... ∴ Option (C)

77. n-octane is non-polar solvent so nonpolar solutes are soluble easily

$$\underset{II}{KCl} < \underset{CH_3OH}{III} < \underset{CH_3CN}{IV} < \underset{\bigcirc}{I}$$ ..... Option (77)

78. Hypertonic means higher concentration

0.9% $\frac{w}{v}$ NaCl is isotonic

As 1.2% $\frac{w}{v}$ > 0.9% $\frac{w}{v}$; 1.2% $\frac{w}{v}$ will be hypertonic

.... Option (B)

79.

$$\Lambda^\circ_{H_2O} = \lambda^\circ_{H^+} + \lambda^\circ_{\ominus OH}$$

$$= \Lambda^\circ_{HCl} + \Lambda^\circ_{NaOH} - \Lambda^\circ_{NaCl}$$

$$= \lambda^\circ_{H^+} + \lambda^\circ_{Cl^-} + \lambda^\circ_{Na^+} + \lambda^\circ_{-OH} - \lambda^\circ_{Na^+} - \lambda^\circ_{Cl^-}$$

.... ∴ Option (A)

80.

$$K_c = \text{A.L. of } \frac{n \times E^\circ_{cell}}{0.059}$$

$$= 10^{n \times E^\circ cell/0.059}$$

$$= 10^{2 \times 1.1/0.059}$$

.... ∴ Option (D)