Thus the freezing point of solution will be – 0.654°C.

64. Ans (4)

$$\frac{W_A}{E_A}=\frac{W_B}{E_B};\frac{1.6}{8}=\frac{\text{Wt. of Ag}}{108}$$

$\therefore$ Wt. of Ag = 21.6 g

65. Ans (1)
The given order of reduction potentials (or tendencies) is Z > Y > X. A spontaneous reaction will be have the following characteristics
Z reduced and Y oxidised
Z reduced and X oxidised
Y reduced and X oxidised

66. Ans (2)
Let x torr of C_2H_4O decompose after 20 min. Then, 80 – x + 2x = 120; x = 40 torr = 50% of initial pressure. Hence $t_{1/2}$ = 20 min. For 75% reaction, fraction left $=\frac{25}{100}=\frac{1}{4}=\left(\frac{1}{4}\right)^2$

No. of half lives = 2. Time needed for 75% reaction., 2 × 20 = 40 min

67. Ans (3)

68. Ans (2)
Al_2O_3 cannot be reduced by carbon.

69. Ans (1)
Hypophosphorous acid is H_3PO_2 in which O.S. of P is + 1

70. Ans (1)
$[Co(NH_3)_5CO_3]ClO_4$.Six monodentate ligands are attached to Co hence C. N. of Co = 6;
O.N. = x + 5 × (0) + 1 (–2) + 1 × (–1) = 0 $\therefore$ x = + 3;
electronic configuration of $Co^{3+}[Ar]\ 3d^6 4s^0$
hence number of d electrons is 6. All d electrons are paired due to strong ligand hence unpaired electron is zero

71. Ans (4)

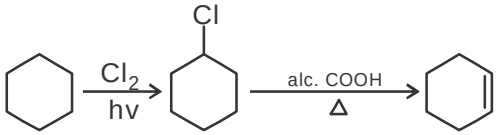
72. Ans (3)

$$FeSO_4.7H_2O \rightarrow FeSO_4 + 7H_2O$$

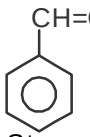
$$2FeSO_4 \xrightarrow{\Delta} Fe_2O_3 + SO_2 + SO_3$$

73. $(C_6H_5COO)_2Ca + (CH_3COO)_2Ca \rightarrow C_6H_5-\overset{O}{\overset{\|}{C}}-CH_3$

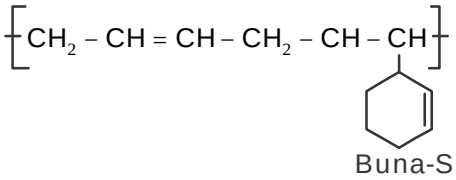
74.

75. 

$$\xrightarrow[(ii)H_2O/Zn]{(i)O_3} CHO-(CH_2)_4-CHO$$

76. $nH_2C=CH-CH=CH_2 + n$  $\rightarrow$

Butadiene Styrene



Buna-S

77. Heat obtained by 1g CH_4 is

$$=\frac{1000}{16}\times 890 = 55625$$

Cal. value $=\frac{\Delta H}{\text{Molar mass}}$

78. Phenol and benzoic acid can be distiguished by $NaHCO_3$

79. $C_2H_5OH \xrightarrow{PI_3} \underset{(A)}{C_2H_5I} \xrightarrow{KCN} \underset{(B)}{C_2H_5CN}$
$\xrightarrow{\text{Hydrolysis}} CH_3CH_2COOH$

80. $CH_3-\underset{\diagdown O \diagup}{CH}-CH_2 \xrightarrow{CH_3MgBr} CH_3-\underset{\displaystyle OMgBr^{\ominus\oplus}}{\underset{|}{CH}}-CH_2-CH_3 \xrightarrow{H_3O^{\oplus}} CH_3-\underset{OH}{\underset{|}{CH}}-CH_2-CH_3$

81. $CHCl_3 \xrightarrow{Air/hv} Cl-\overset{O}{\overset{\|}{C}}-Cl \xrightarrow{C_6H_6/AlCl_3}$
$C_6H_5-\overset{O}{\overset{\|}{C}}-Cl \xrightarrow{C_6H_6/AlCl_2} C_6H_5-\overset{O}{\overset{\|}{C}}-C_6H_5$

82.

83.

84. Heat of hydrogenation $\alpha \frac{1}{\text{Stability of Alkene}}$

85.

86.

$$C_6H_5-CH_2-COOH \xrightarrow{NH_2} C_6H_5-CH_2-COONH_4 \xrightarrow{\Delta}$$

87. $C_6H_5-CH_2-CN \xleftarrow[-HOH]{P_2O_5} C_6H_5-CH_2-\overset{O}{\overset{\|}{C}}-NH_2$

88. $CH_3-CH_2-\overset{O}{\overset{\|}{C}}-NH_2 \xrightarrow{Br_2/KOH} CH_3CH_2NH_2$

89. $\overset{4}{CH_3}-\overset{3}{CH}(\overset{|}{O}CH_3)-\overset{2}{CH}-\overset{1}{CH_2}-OH$
2-methoxy-1-butanol

90 Ans (1)

$\Rightarrow 2r = \frac{mg}{\pi T} = \frac{96\times10^{-4}}{\pi\times12\times10^{-2}} = 2.5454$ cm

14. $V = av = a\sqrt{2gh} = \pi\times(0.25\times10^{-2})^2\times\sqrt{2\times10\times20}$

$= \pi\times\frac{1}{16}\times10^{-4}\times20 = 4\times10^{-4}\ m^3/sec.$

15. $8000 = nC_V\Delta T = n\times\frac{5}{2}R\times(1200-400)$

$\Rightarrow n = \frac{4}{R}$ $\quad Q = nC_P\Delta T = \frac{4}{R}\times\frac{7}{2}R\times800$

$= 11200$ J

16. $\Delta U_1 = \Delta W_1$, $\Delta W_1 = +60$ J, $\Delta W_2 = -80$ J,
$\Delta U_2 = +80$ J $\quad \Delta U_1 = -60$ J.

17. $\frac{dQ}{dt} = \frac{KA\Delta\theta}{l} \Rightarrow 80\times4.2 = \frac{K\times2\times10^{-4}\times10}{0.2\times10^{-2}}$

$\Rightarrow K = 8\times42 = 336.$

19. $I_1\alpha_1\Delta\theta = I_2\alpha_2\Delta\theta \Rightarrow \frac{I_1}{I_2} = \frac{\alpha_2}{\alpha_1}$

20. $f = \frac{1}{2\pi}\sqrt{\frac{K_{eff}}{m}} \Rightarrow f\propto\sqrt{\frac{5K}{m}}$, $K_{eff} = 2K + 3K = 5K$

21. $n = \frac{1}{2l}\sqrt{\frac{T\times4}{\rho\pi D^2}}$, $n' = \frac{1}{2\times2l}\sqrt{\frac{4\times2T}{\rho\pi(2D)^2}} = \frac{n}{2\sqrt{2}}$

22. $A = \sqrt{a^2+b^2+2ab\cos\left(\frac{\pi}{2}\right)} = \sqrt{a^2+b^2}$

25. $\rho = \frac{V}{Jl} = \frac{136}{8\times10^4\times20} = 8.5\times10^{-5}\Omega m.$

26. $R = \frac{V^2}{P} = \frac{220\times220}{100} = 484\Omega$, $P_1 = \frac{V_1^2}{R} = \frac{98\times98}{484}$

$\Rightarrow P_1 = 19.8$ W.

28. B = 0 at the centroid, O of the triangle.

29. $W = MB(\cos0° - \cos360°) = 0$

30. $M = \mu_0 nAN = 4\pi\times10^{-7}\times3000\times8\times10^{-4}\times20$
$= 602.88\times10^{-7}$ H $= 60.3\ \mu$H.

32. $R = \frac{120}{20} = 6\Omega$,

$Z = \frac{220}{20} = 11\Omega$,

$6^2 + X_L^2 = 11^2$

$\Rightarrow X_L = \sqrt{85}\ \Omega$; $L = \frac{\sqrt{85}}{2\pi\times100} = 1.468\times10^{-2}$H

$= 14.7$ mH

34. $\frac{\mu_l}{\mu_g} = \frac{\sin i}{\sin r}$, $\mu_l = \frac{1}{\sin r}$

$\Rightarrow \mu_l\sin r = 1 \Rightarrow \frac{\mu_l}{\mu_g} = \mu_l\sin i \Rightarrow \mu_g = \frac{1}{\sin i}$

35. $\frac{f_1}{f_2} = \frac{3}{4}, \frac{1}{f_1} - \frac{1}{f_2} = \frac{1}{F} = \frac{1}{60}$,

$\frac{1}{\frac{3}{4}f_2} - \frac{1}{f_2} = \frac{1}{60} = \frac{4}{3f_2} - \frac{1}{f_2}, \frac{4-3}{3f_2} = \frac{1}{60}$

$\Rightarrow 3f_2 = 60, \quad f_2 = 20, \quad f_1 = 15$

36. $(\mu-1)t = \frac{\lambda}{2} \Rightarrow (1.5-1)t = \frac{\lambda}{2} \Rightarrow t = \lambda$

38. $I_m = \left(\sqrt{I_1}+\sqrt{I_2}\right)^2 = \left(\sqrt{I_1}+\sqrt{9I_1}\right)^2 = 16\,I_1 \Rightarrow I_1 = \frac{I_m}{16}$

$I = I_1 + I_2 + 2\sqrt{I_1I_2}\cos\phi = I_1 + 9I_1 + 2\sqrt{I_1\times9I_1}\cos\phi$

$= 10\,I_1 + 6\,I_1\cos\phi = 10\,I_1 + 6I_1\left(2\cos^2\frac{\phi}{2}-1\right)$

$= 10\,I_1 + 12\,I_1\cos^2\frac{\phi}{2} - 6I_1 = 4I_1 + 12I_1\cos^2\frac{\phi}{2}$

$= 4I_1\left(1+3\cos^2\frac{\phi}{2}\right)$

$= 4\times\frac{I_m}{16}\left(1+3\cos^2\frac{\phi}{2}\right) = \frac{I_m}{4}\left(1+3\cos^2\frac{\phi}{2}\right)$

39. $\lambda = \frac{hc}{E} = \frac{6.6\times10^{-34}\times3\times10^8}{6\times1.6\times10^{-19}} = 2.0625\times10^{-7}$ m

$= 2062$ Å

40. $\Delta m = (4\times4.0026 - 15.9994) = 0.011$ amu,
$E = \Delta m\times931.5$ MeV $= 10.24$ MeV.

41. $\frac{3h}{2\pi} = \frac{nh}{2\pi}$, $n = 3$, ; $4.5\,a_0 = \frac{3^2}{z}\times a_0$

$\Rightarrow z = 2, \quad \frac{1}{\lambda} = Rz^2\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right)$

$\frac{1}{\lambda_{3\to2}} = R\times2^2\left(\frac{1}{2^2} - \frac{1}{3^2}\right) = \frac{5R}{9}$,

$\lambda_{3\to2} = \frac{9}{5R}$, $\frac{1}{\lambda_{2\to1}} = R\times2^2\left(\frac{1}{1^2} - \frac{1}{2^2}\right) = 3R$

$\lambda_{2\to1} = \frac{1}{3R}$, $\frac{1}{\lambda_{3\to1}} = R\times2^2\left(\frac{1}{1^2} - \frac{1}{3^2}\right) = \frac{32R}{9}$,

$\lambda_{3\to1} = \frac{9}{32R}$