Hints and Solutions

1.c, The maximum no. of orbitals in a shell=$n^2=3^2=9$
2.c, In SO_3^{--}-ion there are three bp and 1 lp on S-atom.
3.d, The value of electrode potential doesn't depend upon size of electrode.
4.c, 18g of water=N_A H_2O molecules=$10N_A$ electrons
3.6g water =3.6x10/18 N_A electrons
5.b, oxide of non-metal that doesn't neutralize base is neutral oxide.
6.d, The reducing nature of hydrogen halides is HF<HCl<HBr<HI.
7.d, Cinnabar is HgS and ore of mercury.
8.b, Cu is less electropositive than Fe so it cann't be used as sacrificial anode.
9.d, The possible isomers are 1-halobutane, 2-halobutane, 1-halo-2-methylpropane and 2-halo-2-methylpropane.
10.a, The required reaction is, $CH_3COCH_3 + PCl_5 \rightarrow CH_3CCl_2CH_3 + POCl_3$
11.b, During nitrous acid test primary amines gives N_2 gas.
12.b, Among acid derivatives acid amide is least reactive towards nucleophilic substitution.
13.b, Aldehydes that doesn't contain α-Hydrogen gives Canizzaro's reaction.
14.b, In alcohol primary alcohol with smaller alkyl group is most acidic.
15.c)
16.a) slope of velocity time graph gives acceleration and area under velocity-time graph gives displacement
17.c) $s = \frac{v^2-u^2}{2a}$, which is independent of mass. Hence, both will stop at the same distance
18.b)
19c) KE = F.s
20.c) $R.H. = \frac{SPV\ at\ dew\ point}{SPV\ at\ room\ temp} \times 100\%$
21.d) $f_0 = \frac{v}{2l}; f_c = \frac{v}{4l} = \frac{f_0}{2}$
22.b)
23c) $O = \sqrt{I_1 I_2} = \sqrt{16 \times 4} = 8cm$
24.b)
25.c)
26.b) $M = m(2l)$
2l is the length of bar magnet

2l = M/m = 5/25=0.2m =20cm

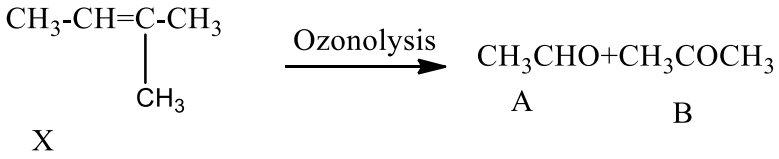
27c) $\frac{\left(\frac{q}{m}\right)_p}{\left(\frac{q}{m}\right)_\alpha} = \frac{\frac{1}{1}}{\frac{2}{4}} = 2$
28.d) $KE \propto \frac{1}{n^2}$

$$\frac{KE_1}{KE_2} = \left(\frac{n_2}{n_1}\right)^2 = \left(\frac{4}{1}\right)^2 = 16:1$$

29. b 30.a 31.d 32.b 33.a 34.c 35.d 36.b 37.d 38.b 39.c 40.d 41.a
42.b 43.a 44.b 45.d 46.d 47.a 48.b
49a) 50d) 51a) 52c) 53c) 54a) 55a) 56b) 57a) 58d) 59c) 60a)
61.c, The salt that gives golden yellow flame is sodium salt and soluble sulphate gives white ppt insoluble in dilute HCl with $BaCl_2$ solution.

62.d, The compound A is nitrobenzene which on reduction in neutral medium gives hydroxylamine.

63.d,The involved reaction is



64.c, When volume of vessel is doubled, the concentration of reactants is halved so the rate of reaction decreases by 8 times.

65.d, The conversion of 0.8M to 0.1M involves 3 half-lives.

66.a, Since both ΔH andΔs is +ve, The process is spontaneous when $T\Delta S>\Delta H$

$T>\Delta H/\Delta S$

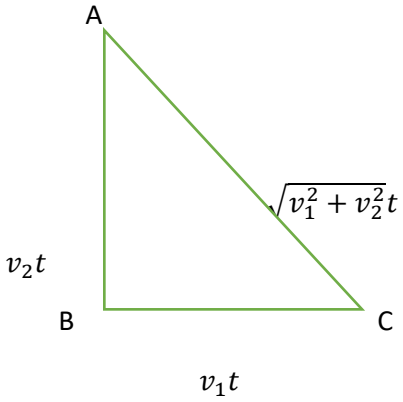
67.c, $[H^+]=C\alpha=10^{-pH}$

68.c, $N_a=\frac{V_bN_b}{V_a}=\frac{15x0.2}{20}=0.15N$

$N_{conc}=\frac{1000x0.15}{5}=30N\rightarrow N=\frac{\%by\ wtxsp.gravityx10}{eq.wt}$

$\%by\ wt.=\frac{30x49}{1.7x10}=86.47\%$

69. d)



Average velocity = $\frac{AC}{2t}=\frac{\sqrt{v_1^2+v_2^2}\,t}{2t}=\frac{1}{2}\sqrt{v_1^2+v_2^2}$

70. a) $R=\frac{u^2\sin 2\theta}{g}$ and $T=\frac{2usin\theta}{g}$

or, $R=\frac{2u^2sin\theta cos\theta}{g}=ucos\theta T$

or, $200\times\frac{1}{5}=ucos\theta$

$ucos\theta=40m/s$

71. d) $\frac{KE}{PE}=\frac{\frac{1}{2}m\omega^2(r^2-y^2)}{\frac{1}{2}m\omega^2y^2}=\frac{r^2-y^2}{y^2}=\frac{r^2-\left(\frac{r}{2}\right)^2}{\left(\frac{r}{2}\right)^2}=3:1$

72. c) Time taken to fall water level from h_1 to h_2 is

$t\propto\sqrt{h_1}-\sqrt{h_2}$

$$\frac{t_1}{t_2} = \frac{\sqrt{h} - \sqrt{\frac{h}{4}}}{\sqrt{\frac{3h}{4}} - 0} = \frac{1}{\sqrt{3}}$$

73. d) Loss or gain in time $\Delta t = \alpha t_0 \Delta\theta$

$$5 = \alpha t_0(\theta - 16)$$

$$15 = \alpha t_0(40 - \theta)$$

$$\frac{15}{5} = \frac{40 - \theta}{\theta - 16}$$

Solving, $\theta = 22^0 C$

74. b) $\frac{v_{27}}{v_0} = \sqrt{\frac{273+27}{273}}$

$$v_{27} = 348\ m/s$$

Since velocity of light is much faster than sound, the distance can be calculated as
D = v x t =348 x 6 = 2088 m

75. a) $d = t\left(1 - \frac{1}{\mu}\right) = 6\left(1 - \frac{1}{1.5}\right) = 2cm$ upwards
76. c) $\beta_m = \frac{\beta_a}{\mu} = \frac{0.4}{\frac{4}{3}} = 0.3mm$
77. c)
78. d) $R_{eq} = 2r + \frac{r}{3} = \frac{7r}{3}$
79. d) Magnetic field at a distance x from the center of the coil

$$B_a = \frac{(\mu_0 I a^2)}{2(x^2 + a^2)^{\frac{3}{2}}}$$

Field at center $B_c = \frac{\mu_0 I}{2a}$

According to the question, $B_a = \frac{1}{8} B_c$

$$\frac{(\mu_0 I a^2)}{2(x^2 + a^2)^{\frac{3}{2}}} = \frac{1}{8}\frac{\mu_0 I}{2a}$$

$$x = \sqrt{3}a$$

80. c) $I_c = 10mA, \alpha = \frac{90}{100} = 0.9$

$$I_c = \alpha \times I_E$$

$$I_E = \frac{I_c}{\alpha} = \frac{10}{0.9} = 11mA$$

81. b) $eV = hc\left(\frac{1}{\lambda} - \frac{1}{\lambda_0}\right)$
82. c
83. d
84. c
85. a
86. a
87. b
88. c

89. b
90. d
91. d
92. c
93. a
94. b
95. a
96. c
97. d
98. c
99. a
100. a