CHEMISTRY (SECTION – A)

51.

Sol. (C)

$\because$ weight of 1 atom of element

$= 6.644 \times 10^{-23}$ gm

$\therefore$ weight of 'N' atoms of element

$= 6.644 \times 10^{-23} \times 6.023 \times 10^{23} = 40$ gm

$\because$ 40 gm of element has 1 gm atom.

$\therefore$ 40×10^3 gm of element has $\frac{40 \times 10^3}{40}$

$= 10^3$ gm atom.

52.

Solution: (a)

$\because$ 6.02×10^{23} atoms of C = 1 mole of C

$\therefore$ 2.65×10^{22} atoms of $C = \frac{1 \times 2.65 \times 10^{22}}{6.02 \times 10^{23}}$ mole

$= \frac{2.65}{6.02 \times 10} = 0.044$ mole

Now,

Element	Relative number of moles	Simplest ratio of moles
Na	0.0887	$\frac{0.0887}{0.044} = 2$
O	0.132	$\frac{0.132}{0.044} = 3$
C	0.044	$\frac{0.044}{0.044} = 1$

Thus, the empirical formula of the compound is Na_2CO_3

53.

Solution : (d) The Bohr radius for hydrogen atom (n = 1) = 0.530Å

The radius of first excited state (n = 2) will be =

$$0.530 \times \frac{n^2}{Z} = 0.530 \times \frac{(2)^2}{1} = 2.120 Å$$

54. Sol (a)

55.

Solution:(c)

$H_2(g) + I_2(g) \rightarrow 2HI(g)$

For $2M, \Delta H = -12.40\ kcal$

$1M, \frac{-12.40}{2} = -6.20\ kcal$

56.

Solution:(a)

$$\underbrace{N \equiv N + 3H - H}_{\underbrace{945 + 3 \times 436}_{\text{energy absorbed}}} \longrightarrow \underbrace{\begin{array}{c} H \\ | \\ 2\,N - H \\ | \\ H \end{array}}_{\underbrace{2 \times (3 \times 391) = 2346}_{\text{energy released}}}$$

Net energy (enthalpy) = $BE_{reactants} - BE_{products} = 2253 - 2346 = -93$

$\Delta H = -93 kJ$

57.

Solution: (b) If $\Delta G^0 = 0$ and

$\Delta G^0 = -2.303\,RT \log K_p$

$\log K_p = 0$, $K_p = 1$

58.

Solution: (b)

$[H^+]_{Initial} = 10^{-5}; [H^+]_{final} = 10^{-2}$

Increase in $[H^+] = \frac{10^{-2}}{10^{-5}}$ = 1000 times

59.

Solution: (c)

For the salt of weak acid and weak base,

$[H^+] = \sqrt{\frac{K_w . K_a}{K_b}}$ or pH =

$-\frac{1}{2}[\log K_a + \log K_w - \log K_b]$

$= \frac{1}{2}[pK_a + pK_w - pK_b] = \frac{1}{2}[3.8 + 14 - 4.8] = 6.5$

60. Sol (c)

61.

Solution: (c)

$\Delta T_b = K_b \times m = 0.513\left(\frac{0.1}{200} \times 1000\right) = 0.2565$

; $\Delta T_b = 100.2565^{o} C$

62. Sol (b)

63.

Solution (a)

$C_6H_5NO_2 + 6H^+ + 6e^- \rightarrow C_6H_5NH_2$

i.e., 1 mole (123 g) require $6 \times 96500\ C$.

Hence 12.3 g will require $= 6 \times 9650\ C$. As current efficiency is 50%, quantity of electricity actually required $= 2 \times 6 \times 9650 = 115800\ C$.

64.

Solution: (b)

$$Ni^{2+} + 2e^- \rightleftharpoons Ni; E^o = -0.25 \ volt$$

$$Zn^{2+} + 2e^- \rightleftharpoons Zn \ ; \ E^0 = -0.77 \ volt$$

E_{cell} = Reduction potential of cathode– Reduction potential of anode

$= -0.25 - (-0.77)$

$= -0.25 + 0.77 = 0.52 \ V$

65.

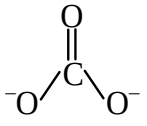
Solution : (a)

$$k = \frac{0.693}{t_{1/2}} = \frac{0.693}{100 \ \text{sec}} = 6.93 \times 10^{-3} \ \text{sec}^{-1}$$

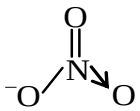
66 **B**
67 **A**
68 **C**
69 **C**
70 **A**
71 **D**
72 **B**
73 **D**

74.

Sol. (A) NO_3^- and CO_3^{2-} both have same number of electrons (32 electrons) and central atom in each being sp^2 hybridized.



structure of CO_3^{2-}



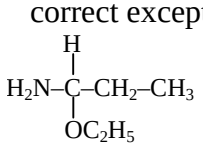
structure of NO_3^-

SO_3 = 40 electrons
ClO_3^- = 42 electrons

75 **A**
76 **C**
77 **C**
78 **C**
79 **D**

80.

Sol. (B) All the given I.U.P.A.C. names are correct except 1-amino-1-ethoxypropane



It's correct I.U.P.A.C. name is ethoxy -1- amino propane.

80 **B**
81 **B**
82 **C**
83 **D**
84 **A**
85 **D**

SECTION – B (Attempt any 10 questions)

86 **B**
87 **A**
88 **C**
89 **D**
90 **B**
91 **B**
92 **C**
93 **C**
94 **D**
95 **D**
96 **A**
97 **B**
98 **B**
99 **B**
100 **C**

101 – b, NCERT 12th , page 115
102 – d, I^Ai and I^AI^A gives blood group A, I^AI^B= blood grp. AB, I^Bi= blood grp. B
103 - b NCERT 11th , page 232
104 – d
105 – a, NCERT 11th, page 233
106 – c, NCERT 11th, page 216, 217
107 – b, NCERT 11th , page 212, fig. 13.5
108 – a
109 – d, NCERT 11th , page 168, exchange of alleles takes place between homologous chromosomes during crossing over – genetic recombination
110 – b, NCERT 12th , page 85
111 – a
112 – b, NCERT 12th, page 119
113 – a, NCERT 11th, page 23
114 – c, NCERT 12th, page 107, 108
115 – a
116 – d, NCERT 12th , page 87
117- d, NCERT 12th, page 114
118 – b, NCERT 11th , page 170
119 – b, NCERT 12th, page 117
120 – d
121- c, the resultant zygote will have XXY genotype i.e. for Klinefelter's syndrome

122 – b, Pleiotropy is where one gene controls more than one character
123 –c, NCERT 11th , page 223
124- d, NCERT 11th , page 233, fig.14.4
125- b, zygospore is diploid , all others are haploid
126 - d, NCERT 11th, page 26
127 - a, NCERT 11th, page 32, 33
128 - c, NCERT 12th, page 183
129 - d, NCERT 11th, page 138, 139
130 - c, NCERT 11th, page 131, 132
131 – a, Growth rate = b-d/ t= 25-55/10= -3
132 – a, NCERT 11th, page 213, 214
133 – d, NCERT 11th, page 79 for Soyabean ; 10 stamens in 10 flowers = 100 stamens total, In each anther 4 microsporangium present so total = 100 x 4 = 400
In each microsporangium , 10 PMC, so in all, 400 x 10= 4000 PMC
Each PMC on meiosis gives 4 microspores, so total microspores = 4000 x 4 = 16,000
134 – b, NCERT 12th, page 33
135 – b, nucellus, suspensor, cotyledon and integument diploid
136 – b, Cell- the unit of life; In plant cells, DNA is found in nucleus, mitochondria and in chloroplast
137 – c, NCERT 11th, page 250
138 – a, NCERT 12th, page 249
139 – d,
140 – b, family includes a group of genera
141 – d
142 – a
143 – b,
144 – a
145 - c, NCERT 11th, page 76
146 – c, NCERT 11th , page 94
147 – a, NCERT 11th, page 10, if order is same, it must be placed in one larger class
148 – c, NCERT 12th, page 263
149 – c, NCERT 12th , page 265
150 – c, NCERT 11th, page 91
151 – d, NCERT 11th, page 145
152 – b, NCERT 11th, page 285
153 – d, NCERT 12th, page 152
154 – a, NCERT 11th, page 156, fig. 9.6
155 – a, NCERT 11th, page 150, fig. 9.3
156 – a, NCERT 11th, page 293
157 – b, NCERT 12th, page 48, 49
158 – c, NCERT 11th, page 318, 319, 320
159 – d, NCERT 11th, page 321
160 – d, NCERT 11th, page 145
161 – a, NCERT 12th, page 212
162 – b, NCERT 12th, page 51
163 – d, NCERT 11th, page 297
164 – c, NCERT 12th, page 157
165 – a, NCERT 12th, page 162
166 – a, NCERT 11th, page 317, 320, 321
167 – d, Aedes is an arthropod with chitinous exoskeleton while all others have endoskeleton
168 – a
169 – c, NCERT 11th, page 59
170 – a, NCERT 12th, page 153
171 – b, NCERT 11th , page 55
172 – c, NCERT 11th, page 102
173 – b, NCERT 11th, page 104
174 – c, NCERT 12th , page 64
175 – a, NCERT 12th, page 59
176 – b, NCERT 11th, page 339
177 – b, NCERT 12th, page 47, 48
178 – b
179 – c, NCERT 12th , page 43, fig. 3.1a
180 – c, NCERT 11th , page 340
181 – d, NCERT 11th , page 335
182 – b, CO binds to hemoglobin at O2 binding site and so reduces O2 carried by hemoglobin in blood
183 – b,
184 – d, NCERT 11th , page 298
185 – d, NCERT 11th , page 294, 295 fig. 19.5
186 – b,
187 – b, NCERT 11th , page 112, fig 7.15
188 – b, NCERT 11th , page 111, fig.7.14
189 – c, NCERT 11th , page 302, 303
190 – c, NCERT 12th , page 130, 131
191 – b, NCERT 12th , page 139, fig. 7.10
192 – c, for percentage of heterozygous individuals ,
2pq= 2 x 0.19 x0.81 = 0.31 or 31%
193 – d, NCERT 12th, page 141
194 – a, NCERT 11th, page 144
195 – a, NCERT 12th, page 204, fig.11.7
196 – d, NCERT 12th, page 60, fig. 4.2
197 – a, NCERT 12th, page 51
198 – a, NCERT 12th, page 59, 60
199 – d, NCERT 11th, page 309
200 – c, NCERT 12th, page 213