01. MT-05

3. when volume becomes $1/8^{th}$ radius becomes $1/2$ so $V_T \to V_T/4$ so time needed will be 4 times $\therefore 40\times4=160$.

7. $\lambda_1=\frac{c}{n}$, $\lambda_2=\frac{c/\sqrt{\epsilon}}{n}$ $\therefore \lambda_2-\lambda_1=\frac{c}{n}\left(\frac{1}{\sqrt{\epsilon}}-1\right)=\frac{3\times10^8}{3\times10^6}\left[\frac{1}{4}-1\right]$; $\epsilon_\delta=1$

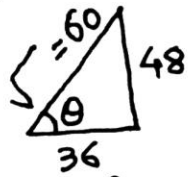
$\therefore -75m$.

13. (C) is incorrect unit is asked not dimension.

17. $P_{AV}=120\times10^3$; $\therefore i=\frac{P}{V}=\frac{120\times10^3}{240}=500A$ $\therefore P_{loss}=i^2R$

$=(500)^2.(0.4)=100kW$.

18. $u_x=36$; $u_y=\frac{96}{2}=48$



$\therefore \cos\theta=\frac{36}{60}$

20. A: is because of quantum condⁿ not classical.

25. $L=\frac{\mu N^2A}{\ell}$

36. A is incorrect minimum is asked so the one which give minimum product.

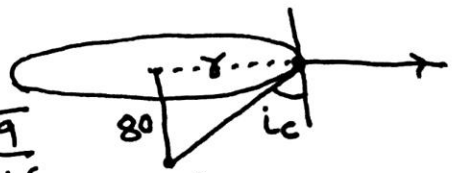
39. $V_h=\frac{-GM}{R+h}$, $g_h=\frac{GM}{(R+h)^2}$ $\therefore R+h=-\frac{V_h}{g_h}$

$\therefore h=-\frac{V_h}{g_h}-R=9\times10^6-6.4\times10^6=2600km$.

40. $\frac{GM_1}{x^2}=\frac{GM_2}{(R-x)^2}$ $\therefore \frac{\sqrt{M_2}}{\sqrt{M_1}}=\frac{R-x}{x}$ $\therefore x=\frac{R\sqrt{M_1}}{\sqrt{M_2}+\sqrt{M_1}}$

& potential $=-\left(\frac{GM_1}{x_1}+\frac{GM_2}{R-x_1}\right)$

43. $\mu=\frac{4}{3}=(\sin i_c)^{-1}$



$\therefore \sin i_c=\frac{3}{4} \Rightarrow \cos i_c=\sqrt{1-\frac{9}{16}}$

$\sqrt{1-\frac{9}{16}}=\frac{80}{\sqrt{\gamma^2+80^2}}$ $\therefore 1-\frac{9}{16}=\frac{(80)(80)}{\gamma^2+(80)^2}=\frac{7}{16}$ $\therefore \gamma=$

48. $\mu=\frac{x}{6}=\frac{15-x}{4}$ $\therefore x=9$ now $\mu=\frac{9}{6}=1.5$

48. Dirⁿ of propogation of EM-wave is $\vec{E}\times\vec{B}$ hence is

$(-j+k)\times(-j-k)=2i$

CHEMISTRY (SECTION – A)

51. How many carbon atoms are present in 0.35 mol of $C_6H_{12}O_6$ -

(A) 6.023×10^{23} carbon atoms (B) 1.26×10^{23} carbon atoms

(C) 1.26×10^{24} carbon atoms (D) 6.023×10^{24} carbon atoms

Sol. (C)

$\therefore$ 1 mol of $C_6H_{12}O_6$ has = 6 N atoms of C

$\therefore$ 0.35 mol of $C_6H_{12}O_6$ has

$= 6 \times 0.35$ N atoms of C

$= 2.1$ N atoms

$= 2.1 \times 6.023 \times 10^{23} = 1.26 \times 10^{24}$ carbon atoms

52. The mass of carbon present in 0.5 mole of $K_4[Fe(CN)_6]$ is

(a) 1.8 g (b) 18 g (c) 3.6 g (d) 36 g

Solution: (d)

1 mole of $K_4[Fe(CN)_6] = 6\ gm$ atoms of carbon

0.5 mole of $K_4[Fe(CN)_6] = 3\ gm$ atoms of carbon

$= 3 \times 12 = 36\ g$

53. If the radius of 2nd Bohr orbit of hydrogen atom is r_2. The radius of third Bohr orbit will be

(a) $\frac{4}{9}r_2$ (b) $4r_2$ (c) $\frac{9}{4}r_3$ (d) $9r_2$

Solution : (c) $r = \frac{n^2h^2}{4\pi^2 mZe^2}$ $\therefore \frac{r_2}{r_3} = \frac{2^2}{3^2}$ $\therefore r_3 = \frac{9}{4}r_2$

54. Electron, Proton and Neutron were respectively discovered by -

(A) James Chadwick, John Dalton, J.J. Thomson

(B) J.J. Thomson, Goldstein, John Dalton

(C) J.J. Thomson, William Crookes, Goldstein

(D) J.J. thomson, Goldstein , James Chadwick

55. For a reaction at 25°C enthalpy change and entropy change are $-11.7\times10^3\ J\ mol^{-1}$ and $-105\ J\ mol^{-1}K^{-1}$ respectively, what is the Gibb's free energy.

(a) 15.05 kJ (b) 19.59 kJ (c) 2.55 kJ (d) 22.55 kJ

Solution: (b)

$\Delta G = \Delta H - T\Delta S,\ \ T = 25 + 273 = 298\ K$

$\Delta G = -11.7\times10^3 - 298\times(-105) = 19590\ J = 19.59\ kJ$

56. Given that $C(g) + 4H(g) \rightarrow CH_4(g);\ \ \Delta H = -166\ kJ$. The bond energy $C-H$ will be

(a) 208 kJ/mol (b) -41.5 kJ/mol (c) 832 kJ/mol (d) None of these

Solution:(b)

$C_{(g)} + 4H(g) \rightarrow CH_4(g);\ \ \Delta H = -166\,kJ$

Bond energy for $C-H = -\frac{166}{4} = -41.5\ kJ\ /\ mole$

57. A mixture of 0.3 mole of H_2 and 0.3 mole of I_2 is allowed to react in a 10 litre evacuated flask at 500^0C. The reaction is $H_2 + I_2 \rightleftharpoons 2HI$ the K_c is found to be 64. The amount of unreacted I_2 at equilibrium is

(a) 0.15 *mole* (b) 0.06 *mole* (c) 0.03 *mole* (d) 0.2 *mole*

Solution: (b)

$$K_c = \frac{[HI]^2}{[H_2][I_2]};\ 64 = \frac{x^2}{0.03 \times 0.03}$$

$$x^2 = 64 \times 9 \times 10^{-4};\ x = 8 \times 3 \times 10^{-2} = 0.24$$

x is the amount of HI at equilibrium. Amount of I_2 at equilibrium will be

$$0.30 - 0.24 = 0.06\ mole$$

58. If the solubility product K_{sp} of a sparingly soluble salt MX_2 at 25^0C is 1.0×10^{-11}, the solubility of the salt in mole litre^{-1} at this temperature will be

(a) 2.46×10^{14} (b) 1.36×10^{-4} (c) 2.60×10^{-7} (d) 1.20×10^{-10}

Solution: (b)

$$MX_2 \rightleftharpoons \underset{(S)}{M^{+2}} + \underset{(2S)^2}{2X^-}$$

$$K_{sp} = 4S^3$$

$$S = 3\sqrt{\frac{K_{sp}}{4}} = 3\sqrt{\frac{1 \times 10^{-11}}{4}} = 1.36 \times 10^{-4}$$

59. For preparing a buffer solution of *pH* 6 by mixing sodium acetate and acetic acid, the ratio of the concentration of salt and acid should be ($K_a = 10^{-5}$)

(a) 1 : 10 (b) 10 : 1 (c) 100 : 1 (d) 1 : 100

Solution: (b)

$$K_a = 10^{-5};\ pH = 6$$

$$pH = -\log K_a + \log\frac{[salt]}{[acid]} \text{ or } 6 = -\log 10^{-5} + \log\frac{[salt]}{[acid]}$$

$$\text{or } 6 = 5\log 10 + \log\frac{[salt]}{[acid]} \text{ or } 6 = 5 + \log\frac{[salt]}{[acid]}$$

$$\text{or } \log\frac{[salt]}{[acid]} = 6 - 5 = 1 \text{ or } \frac{[salt]}{[acid]} = \frac{10}{1}$$

60. Amongst the following identify the species with an atom in +6 oxidation state –

(a) MnO_4^- (b) $Cr(CN)_6^{3-}$ (c) NiF_6^{2-} (d) CrO_2Cl_2

61. Lowering in vapour pressure is the highest for

(a) 0.2*m* urea (b) 0.1 *m* glucose (c) 0.1*m* $MgSO_4$ (d) 0.1*m* $BaCl_2$

Solution: (d)

$$\frac{P_A^0 - P_A}{P_A^0} = \text{Molality} \times (1 - \alpha x + x\alpha + \gamma x)$$

The value of $P_A^0 - P_A$ is maximum for $BaCl_2$.

62. The molal freezing point constant for water is 1.86^0 *C/m*. Therefore, the freezing point of 0.1 *M NaCl* solution in water is expected to be

(a) $-1.86^o C$ (b) $-0.186^o C$ (c) $-0.372^o C$ (d) $+0.372^o C$

Solution: (c)

$\Delta T_f = iK_f m = 2 \times 1.86 \times 0.1 = 0.372$

$T_f = -0.372^o C$

63. 2.5 Faradays of electricity is passed through a solution of $CuSO_4$. The number of gram equivalents of copper deposited on the cathode would be

(a) 1 (b) 2 (c) 2.5 (d) 1.25

Solution (c) Number of Faraday passed = Number of equivalents deposited.

64. The equivalent conductivity of 0.1 *M* weak acid is 100 times less than that at infinite dilution. The degree of dissociation is

(a) 100 (b) 10 (c) 0.01 (d) 0.001

Solution: (c)

$$\alpha = \frac{\Lambda_m^c}{\Lambda^0} = \frac{x/100}{x} = \frac{1}{100} = 0.01.$$

65. If $3A \rightarrow 2B$ then the rate of reaction of $+\frac{d(B)}{dt}$ is equal to

(a) $+2\frac{d(A)}{dt}$ (b) $-\frac{1}{3}\frac{d(A)}{dt}$ (c) $-\frac{2}{3}\frac{d(A)}{dt}$ (d) $-\frac{3}{2}\frac{d(A)}{dt}$

Solution: (c)

$3A \rightarrow 2B$; Rate $= -\frac{1}{3}\frac{d[A]}{dt} = \frac{1}{2}\frac{d[B]}{dt}$; $\therefore +\frac{d[B]}{dt} = -\frac{2}{3}\frac{d[A]}{dt}$

66. For a reaction $A + 2B \rightarrow C + D$, the following data were obtained

Expt. Initial concentration (*moles litre*$^{-1}$)			**Initial Rate of formation of *D* (*moles litre*$^{-1}$ *min*$^{-1}$)**
S. No.	**[*A*]**	**[*B*]**	
1.	0.1	0.1	6.0×10^{-3}
2.	0.3	0.2	7.2×10^{-2}
3.	0.3	0.4	2.88×10^{-1}
4.	0.4	0.1	2.4×10^{-2}

The correct rate law expression will be

(a) Rate $= k[A][B]$ (b) Rate $= k[A]\,[B]^2$

(c) Rate $= k[A]^2[B]^2$ (d) Rate $= k[A]^2[B]$

Solution: (b)

From 1 and 4, keeping [*B*] constant, [*A*] is made 4 times, rate also becomes 4 times. Hence rate $\propto [A]$. From 2 and 3 keeping [*A*] constant, [*B*] is doubled, rate becomes 4 times. Hence rate $\propto [B]^2$. Overall rate law will be : rate = $k[A][B]^2$.

67. Match list-I with list-II and select the correct answer using the codes given below:

List-I (element)	**List-II (electronic configuration)**
(a) Gallium	i. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^1$
(b) Vanadium	ii. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10}$
(c) Zinc	iii. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^1$
(d) Scandium	iv. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^3$

Codes -

	(a)	(b)	(c)	(d)
(a)	ii	i	iii	iv
(b)	iii	iv	i	ii
(c)	iii	iv	ii	i
(d)	i	ii	iv	iii

68. The incorrect statement among the following is-

(a) The properties of elements are periodic function of their atomic numbers

(b) Among the isoelectric species, Na^+, Mg^{2+} and Al^{3+} ion having smalles radius is Al^{3+} ion

(c) The outer most electronic configuration of group 15 elements is ns^2np^5

(d) Electronegativity of an element depend upon its atomic size

69. Four elements A (with one valence electron), B (with three valence electrons), C (with five valence electrons) and D (with seven valence electrons) are lying in the second period which of periodic table which of the following is/are diatomic at room temperature:

(a) Only C_2 (b) Only A_2 (c) C_2 and D_2 (d) Only B_2

70. The bond angless of NH_3,and are in the order:

(a) $NH_2^- > NH_3 > NH_4^+$ (b) $NH_4^+ > NH_3 > NH_2^-$ (c) $NH_3 > NH_2^- > NH_4^+$ (d) $NH_3 > NH_4^+ > NH_2^-$

71. $T\ell I_3$ is an ionic compound which furnishes the following ions in solution :

(a) $T\ell^{3+}$ and I^- ions (b) $T\ell^+$ and I_3^- ions (c) $T\ell^+$, I^- ions and I_2 (d) $T\ell^+$ and I^- ions

72. Carbon has no tendency to form complex compounds because of :

(a) Its small size (b) The availability of vacant d-orbitals

(c) Non availability of vacant d-orbitals (d) No tendency to form covalent bonds

73. The chemical name of bleaching powder is -

(a) Calcium hypochlorite (b) Calcium chlorohypochlorite

(c) Calcium chlorate (d) Calcium perchlorate

74. The increasing thermal stability of the hydrides of group 16 follows sequence -

(a) $H_2O < H_2S < H_2Se < H_2Te$ (b) $H_2Te < H_2Se < H_2S < H_2O$

(c) $H_2S < H_2O < H_2Se < H_2Te$ (d) $H_2Se < H_2O < H_2S < H_2Te$

75. Lanthanide contraction is due to increase in -

(a) Shielding by 4f electrons (b) Atomic number

(c) Effective nuclear charge (d) size of 4 f-orbital

76. From the stability constant (hypothatical values) given below, predict which is the strongest ligand –

(a) $Cu^{2+} + 4NH_3 \rightleftharpoons [Cu(NH_3)_4]^{2+}$, $(K = 4.5\times10^{11})$

(b) $Cu^{2+} + 4CN^- \rightleftharpoons [Cu(CN)_4]^{2-}$, $(K = 2.0\times10^{27})$

(c) $Cu^{2+} + 2en \rightleftharpoons [Cu(en)_2]^{2+}$, $(K = 3.0\times10^{15})$

(d) $Cu^{2+} + 4H_2O \rightleftharpoons [Cu(H_2O)_4]^{2+}$, $(K = 9.5\times10^{8})$

77. Which statement is incorrect –

(a) $Ni(CO)_4$ – Tetrahedral, paramagnetic

(b) $[Ni(CN_4)]^{-2}$ – Square planar, diamagnetic

(c) $Ni(CO)_4$ – Tetrahedral, diamagnetic

(d) $[NiCl_4]^{-2}$ – Tetrahedral, paramagnetic

78. A salt gives violet vapours when treated with conc. H_2SO_4. It contains

(a) Cl^- (b) I^- (c) Br^- (d) NO_3^-

79. The ion that cannot be precipitated by both HCl and H_2S is

(a) Pb^{2+} (b) Cu^+ (c) Ag^+ (d) Sn^{2+}

80. The IUPAC name for -

$CH_2=\underset{\underset{Br}{|}}{C}-\underset{\underset{Cl}{|}}{CH}-\underset{\underset{H}{|}}{C}=O$

(a) 2-chloro-3- bromo-3-butenal

(b) 2-chloro-3-bromo-3-butene carbaldehyde

(c) 3-bromo-2-chloro-3-butenal

(d) 3-bromo-2-chloro-3-butenone

Sol. (C)

$\overset{4}{C}H_2=\overset{3}{\underset{\underset{Br}{|}}{C}}-\overset{2}{\underset{\underset{Cl}{|}}{CH}}-\overset{1}{\underset{\underset{H}{|}}{C}}=O$

3-bromo-2-chloro-3-butenal

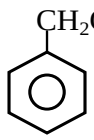
81. Tautomerism will be explained by -

(a) $(CH_3)_2NH$ (b) $(CH_3)_3CNO$ (c) R_3CNO_2 (d) RCH_2NO_2

82. In organic compounds P is estimated as-

(a) H_3PO_4 (b) P_2O_5 (c) $Mg_3(PO_4)_2$ (d) $(NH_4)_3\ PO_4.\ 12MoO_3$

83.



(I)

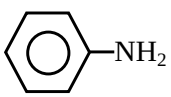
$CH_2=CHCH_2COOH$ (II)

CH_3CH_2COOH (III)

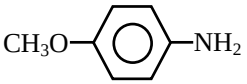
Arrange following acid in decreasing order of $[H^+]$ conc.

(a) I > II > III (b) II > III > I (c) II > I > III (d) III > II > I

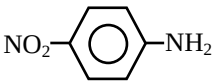
84. **(I)**



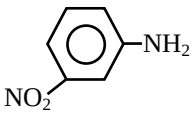
(II)



(III)



(IV)



The correct order of decreasing basicity of the above compound is -

(a) I > II > III > IV (b) II > I > IV > III (c) III > IV > II > I (d) II > I > III > IV

85. Lindlar's catalyst consists of -
(a) Metallic nickel + nickel boride
(b) Metallic platinum
(c) Metallic palladium deposited on calcium carbonate containing lead acetate and quinoline
(d) Sodium borohydride in ethanol.

SECTION – B (Attempt any 10 questions)

86. Ethylene forms ethylene chlorohydrin by the action of -
(a) Dry HCl gas
(b) Dry chlorine gas
(c) Solution of chlorine gas in water
(d) None

87. $CH_3Br \xrightarrow{KCN} A \xrightarrow{+4H} CH_3CH_2NH_2$
IUPAC name of A is -
(a) Methyl cyanide (b) Mehyl isonitrile (c) Acetonitrile (d) Ethane nitrile

88. Kolbe's reaction consists in obtaining –
(a) Anisol from phenol
(b) Salicylaldehyde from phenol and CHI_3
(c) Salicylic acid from sodium phenate and CO_2
(d) Salicylic acid from phenol and CO_2

89. In Cannizzaro reaction-
(a) Aldehyde is converted into alcohol
(b) Alcohol is converted into aldehyde
(c) Primary amine is converted into isocyanide
(d) Acid is converted into amine

90. $A + 2Na + ICH_3 \xrightarrow[ether]{dry} C_6H_5CH_3 + NaBr + NaI$

$C_6H_5CH_3 \xrightarrow[Cr_2O_3]{(CH_3CO)_2O} B$

Identify A and B –
(a) A is C_6H_5Cl and B is C_6H_5COOH
(b) A is C_6H_5Br and B is C_6H_5COOH
(c) A is C_6H_5Cl and B is C_6H_5CHO
(d) A is C_6H_5Br and B is C_6H_5CHO

91. Which of the following compounds possesses a chiral nitrogen atom ?
(a) $CH_3CH_2\underset{\displaystyle NH_2}{\underset{|}{C}}HCH_3$
(b) $CH_3CH_2NHCH_2CH_3$
(c) $CH_3CH_2CH_2\underset{\displaystyle CH_3}{\underset{|}{N}}CH_2CH_3$
(d) $CH_3CH_2\underset{\displaystyle CH_3}{\underset{|}{N}}CH_2CH_3$

92. In RNA, which base is found in place of thymine of DNA-
(a) Adenine (b) Uracil (c) Pyridine (d) Guanine

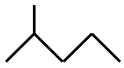
93. $B \xleftarrow[Catalyst]{Lindlar's} R-C\equiv C-R \xrightarrow{Na/NH_3} A$
A and B are geometrical isomers (R–CH = CH – R) -
(a) A is trans, B is cis
(b) A and B both are cis
(c) A and B both are trans
(d) A is cis, B is trans

94. $C_6H_5OH \xrightarrow{(A)} C_6H_6 \xrightarrow[anhy.\ AlCl_3]{CO+HCl} (B)$
In the above reaction sequence A and B are-
(a) Red P + HI and benzoic acid
(b) Red P + HI and benzaldehyde
(c) Zn powder and benzaldehyde
(d) Zn powder and benzoic acid

95. Acetone gives test with

(a) 2, 4-dinitrophenyl hydrazine (b) Fehling solution

(c) Schiff's reagent (d) All of these

96.  $\xrightarrow[25°C]{AlCl_3.HCl}$ A, A is -

(a)  (b) 

(c)  (d) 

97. Carbon suboxide [C_3O_2] has :

(a) Bent structure (b) Trigonal planar structure

(c) Linear structure (d) Distorted tetrahedral structure

98. One mole of a solute *A* is dissolved in a given volume of a solvent. The association of the solute takes place according to $nA \rightleftharpoons (A)_n$ The Van't Hoff factor '*i*' is expressed as

(a) $i = 1 - x$ (b) $i = 1 + \frac{x}{n}$ (c) $i = \frac{1 - x + \frac{x}{n}}{1}$ (d) $i = 1$

99. Leaving one system, rest solar system is known as

(a) Open system (b) Isolated system (c) Surroundings (d) None of these

100. Which of the following aqueous solutions remains neutral after electrolysis

(a) $CuSO_4$ (b) $AgNO_3$ (c) K_2SO_4 (d) $NaCl$

101 – b, spindle fibres for mitosis consist of microtubules. So if microtubules are depolymerized, chromosomes cannot be brought at equator or chromatids cannot be separated
102 – c, NCERT 11th , page 19
103 - d
104 – b, In any type of cell, aerobic respiration will produce maximum number of ATP
105 – b, NCERT 11th , page 210, fig. 13.3.Terrestrial plants do not absorb green light but reflect it.
106 – c, NCERT 11th , page 208
107 – d, NCERT 11th , page 33
108 – b, NCERT 11th , page 43
109 – c, NCERT 11th , page 36
110 – c, NCERT 11th , page 81
111 – c, as mature mRNA can have UTRs also, so not always 99 amino acids can be coded . A single stop codon will not code for any amino acid
112 – c, NCERT 12th , page 111
113 – c, Cytokinesis breaks finally one cell into 2 thus generating 2 new cells from parent cell
114 – b, NCERT 11th , page 170
115 – a, NCERT 12th , page 76
116 – c, Cross will be between parents X^hX and XY then the given progeny will be produced
117- b
118 – d, Only in sex –linked trait , the offspring genotypes will not be same in F1 generation of reciprocal cross
119 – b, NCERT 12th , page 100, 109, 121
120 – c
121- d, NCERT 12th , page 101
122 – c, NCERT 12th , page 118
123 –d, NCERT 12th , page 32, fig. 2.12 d and e
124- a, NCERT 12th , page 25
125- b, NCERT 12th , page 29
126 - c, NCERT 12th , page 265
127 - d, NCERT 12th , page 265
128 - b, NCERT 12th , page 267
129 - d
130 - c, NCERT 12th , page 234
131 – b, NCERT 12th , page 182, NCERT 11th , page 230
132 – d, NCERT 11th , page 247
133 – c, NCERT 11th , page 248
134 – d, NCERT 11th , page 88, 89
135 – c, NCERT 11th , page 91
136 – d, as genus is same
137 – a, NCERT 12th , page 115
138 – d
139 – b, NCERT 12th , page 247, 10% law
140 – c, NCERT 12th , page 250
141 – d, NCERT 12th , page 231, lag phase is first phase in growth curve when organism first introduced to habitat

142 – a, NCERT 12th , page 236
143 – c, NCERT 12th ,Page 21,23
144 – c ,NCERT 12th , page 6
145 - d
146 – c, NCERT 11th , page 245
147 – b, NCERT 11th , page 97, 192
148 – a, NCERT 12th , page 262
149 – d, NCERT 11th
150 – a
151 – c, Lactose is made up of galactose and glucose with glycosidic bond between them, NCERT 12th , page 116
152 – d
153 – c
154 – d, NCERT 11th , page 287, 336
155 – c
156 – b, NCERT 11th , page 144
157 – c, NCERT 12th , page 152
158 – a, as oxygen brought in is utilized by kidney cells and urea removed by excretion
159 – d, NCERT 11th , page 316
160 – b, NCERT 12th , page 195
161 – a, NCERT 12th , page 61
162 – b, NCERT 11th , page 158, transfer of amino group from one substrate to other
163 – c, NCERT 12th , page 151
164 – c, NCERT 12th , page 149
165 – d, NCERT 12th , page 151
166 – d, NCERT 12th , page 50
167 – c, NCERT 12th , page 53
168 – a, NCERT 12th , page 43 fig. 3.1 a and b
169 – b,
170 – d, NCERT 12th , page 50
171 – d, NCERT 12th , page 62
172 – b, NCERT 11th , page 334
173 – b, NCERT 11th , page 339
174 – c, NCERT 11th , page 337, 338
175 – d, NCERT 11th , page 270
176 – b, NCERT 11th , page 50
177 – d, NCERT 11th , page 57
178 – c, NCERT 12th , page 64
179 – c, NCERT 11th , page 318
180 – b, NCERT 11th , page 49
181 – b
182 – c, NCERT 12th , page 212
183 – b, NCERT 11th , page 294, 297
184 – d, NCERT 11th , page 303

185 – b, NCERT 11th , page 303
186 – b, NCERT 12th , page 129
187 – d, NCERT 12th , page 128
188 – c, NCERT 12th , page 132
189 – d, NCERT 12th , page 139, fig. 7.10
190 – b, NCERT 12th , page 201
191 – b
192 – a, NCERT 11th , page 113
193 – b, NCERT 11th , page 113, 114
194 – a
195 – b, NCERT 11th , page 312
196 – c, NCERT 11th , page 310
197 – c, NCERT 11th , page 117, 118
198 – d, NCERT 11th , page 102
199 – b
200 – d