CHEMISTRY

Atomic masses: H = 1, B = 10.8, C = 12, O = 16

51. Which of the following is expected to be least soluble in water?

(a) CH_3NH_2 (b) $(CH_3)_2NH$

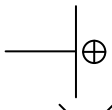
(c) $(CH_3)_3N$ (d) $C_2H_5NH_2$

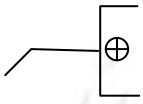
52. Carbon atom of singlet carbine is

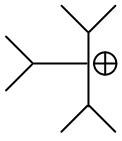
(a) sp^2 hybridised (b) sp^3 hybridised

(c) sp hybridised (d) sometimes sp^3 and sometimes sp^2

53. Which one of the following carbonium ions is the most stable?

(a) 

(b) 

(c) 

(d) $\overset{\oplus}{C}H_3$

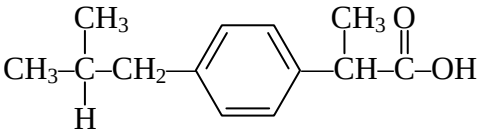
54. Aniline when treated with CH_3COCl followed by Cl_2 / Fe and subsequently H_3O^+, produces …… as the major product.

(a) o-chloroaniline

(b) m-chloroaniline

(c) p-chloroaniline

(d) mixture of ortho and para-chloroaniline in equal amounts

55. 

The compound shows

(a) Geometrical isomerism (b) Optical isomerism

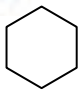
(c) Tautomerism (d) None of these

56. What is A in the following reaction?

$CH_2{=}CH_2 + CH_2N_2 \longrightarrow A$

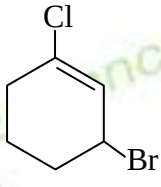
(a)

(b)

(c) 

(d)

57. The IUPAC name of compound shown below is



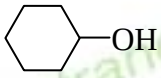
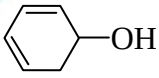
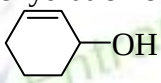
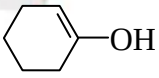
(a) 1-bromo-3-chlorocyclohexene (b) 2-bromo-6-chlorocyclohex-1-ene

(c) 6-bromo-2-chlorocyclohexene (d) 3-bromo-1-chlorocyclohexene

58. Phenyl magnesium bromide reacts with methanol to give

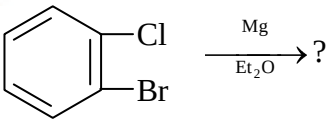
(a) a mixture of phenol and Mg(Me)Br
(b) a mixture of anisole and Mg(OH)Br
(c) a mixture of benzene and Mg(OMe)Br
(d) a mixture of toluene and Mg(OH)br

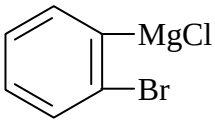
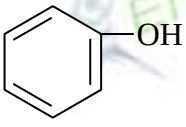
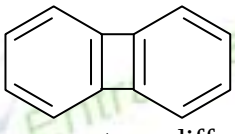
59. Which of the following is the correct order of ease of dehydration of the alcohols:

(I) 
(II) 
(III) 
(IV) 

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

60. What is the end product in the following reaction?



(a) 
(b) 
(c) 
(d) none of these

61. There are two different HCl solutions having concentration 3M and 1 M respectively. How much volume of each solution should be mixed together to form one litre solution of concentration 1.2 M?

(a) 900 ml of 1M and 100 ml of 3M
(b) 100 ml of 1M and 900 ml of 3M
(c) 500 ml of each
(d) 250 ml of 1M and 750 ml of 3M

62. Consider the reaction $N_2 + 3H_2 \rightarrow 2NH_3$.
If molecular weights of NH_3 and N_2 are M_1 and M_2 and their equivalent weights are E_1 and E_2 respectively, then the value of $(E_1 - E_2)$ is:

(a) $\left(\frac{2M_1 - M_2}{6}\right)$
(b) $(M_1 - M_2)$
(c) $(3M_1 - M_2)$
(d) $(M_1 - 3M_2)$

63. The depression in freezing point of 93% aqueous solution of A is equal to that of 9% aqueous solution of B. Molecular weight of A is 60. Assuming both A and B are non volatile and non electrolytes, what would be the molecular weight of B?

(a) 90
(b) 45
(c) 20
(d) 180

64. The vapour pressure of a solution of non volatile solute in benzene is 722 mm Hg and that of solvent is 760 mm Hg at a certain temperature. The molality of the solution in mol kg^{-1} is

(a) 0.67
(b) 6.7
(c) 1.34
(d) 2.68

65. $2H_2S(g) \rightleftharpoons 2H_2(g) + S_2(g)$. At equilibrium there is 1 mole of H_2S, 0.2 mole of H_2 and 0.8 mole of S_2 in a 2L vessel. What is the value of equilibrium constant (K_c) of the given reaction?

(a) 0.004 mol L^{-1}
(b) 0.080 mol L^{-1}
(c) 0.016 mol L^{-1}
(d) 0.032 mol L^{-1}

66. For a reaction A $\longrightarrow$ Products, it is found that rate of reaction increases by a factor of 6.25 when concentration of A is increased by a factor of 2.5. The order of reaction with respect to A is

(a) 2 (b) 2.5
(c) 0.5 (d) 1

67. For a first order reaction A $\longrightarrow$ Products, the rate of reaction at [A] = 0.2 mol L^{-1} is 10^{-2} mol L^{-1} min^{-1}. What is the half life of the reaction?

(a) 832 sec (b) 440 sec
(c) 416 sec (d) 14 sec

68. Equal volumes of a solution of pH = 5 and that of pH = 3 are mixed. The pH of the resulting solution is

(a) 4 (b) 3.3
(c) 5.0 (d) 4.5

69. Which one of the following species behaves both as an acid and base?

(a) HCO_3^- (b) NO_3^-
(c) CO_3^{2-} (d) SO_4^{2-}

70. Three faraday of electricity is passed through aqueous solutions of $AgNO_3$, $NiSO_4$ and $CrCl_3$ kept in three different vessels using inert electrodes. The ratio of moles of metals Ag, Ni and Cr deposited at the respective cathodes is

(a) 1 : 2 : 3 (b) 3 : 2 : 1
(c) 6 : 3 : 2 (d) 2 : 3 : 6

71. The hydrogen electrode is dipped in a solution of pH = 3 at 25ºC. The potential of hydrogen electrode would be

(a) 0.177 V (b) –0.177 V
(c) 0.087 V (d) 0.059 V

72. $S + \frac{3}{2}O_2 \longrightarrow SO_3 + 2x$ kcal

$SO_2 + \frac{1}{2}O_2 \longrightarrow SO_3 + y$ kcal

Find out the heat of formation of SO_2 in kcal mol^{-1}.

(a) $2x - y$ (b) $\frac{2x - y}{2}$
(c) $y - 2x$ (d) 2y

73. A monoatomic gas $\left(\gamma = \frac{5}{3}\right)$ is suddenly compressed to $\frac{1}{8}$ of its volume adiabatically, then the pressure of the gas will change to ……. times of its initial pressure.

(a) $\frac{24}{5}$ (b) 8
(c) $\frac{40}{3}$ (d) 32

74. If the reaction $X_2(g) + Y_2(s) \longrightarrow 2XY(g)$ is endothermic and spontaneous then

(a) $\Delta H < O, \Delta S > O$
(b) $\Delta H < O, \Delta S < 0$
(c) $\Delta H > O, \Delta S > O$
(d) $\Delta H > O, \Delta S < 0$

75. Which one of the following aqueous solutions will cause most rapid coagulation of As_2S_3 sol?

(a) 1 N–NaCl
(b) 1 N–$BaCl_2$
(c) 1 N–Na_3PO_4
(d) 1 N–$Al_2(SO_4)_3$

76. NaCl is doped with 2×10^{-3} mole% $SrCl_2$, the concentration of cation vacancies is

(a) 60.2×10^{18} mol^{-1}
(b) 12.04×10^{18} mol^{-1}
(c) 3.01×10^{18} mol^{-1}
(d) 12.04×10^{20} mol^{-1}

77. The coordination number of cation and anion in CaF_2 and TiO_2 are respectively

(a) 6 : 4 and 4 : 4
(b) 4 : 2 and 2 : 4
(c) 8 : 4 and 6 : 3
(d) 6 : 6 and 8 : 8

78. Equal weights of two gases of molecular weight 4 and 40 are mixed. The pressure of mixture is 1.1 atm. The partial pressure of the lighter gas in the mixture is

(a) 0.55 atm
(b) 0.11 atm
(c) 1 atm
(d) 0.1 atm

79. ${}_{83}Bi^{213}$ decays with emission of an α-particle. The resulting nuclide emits a β-particle. The final nuclide is

(a) ${}_{83}Be^{213}$
(b) ${}_{81}Tl^{209}$
(c) ${}_{2}He^{4}$
(d) ${}_{82}Pb^{209}$

80. Which does not give a precipitate with $AgNO_3$ solution?

(a) $[Co(NH_3)_6]Cl_3$
(b) $[Co(NH_3)_5Cl]Cl_2$
(c) $[Co(NH_3)_4Cl_2]Cl$
(d) $[Co(NH_3)_3Cl_3]$

81. $(C_6H_5)_2$ $[Pd(SCN)_4]$ and $(C_6H_5)_2[Pd(NCS)_4]$ are

(a) Linkage isomers
(b) Co-ordination isomers
(c) Ionization isomers
(d) Geometrical isomers

82. Which bond angle θ would result in maximum dipole moment for triatomic molecule YXY?

(a) $\theta = 90^o$
(b) $\theta = 120^o$
(c) $\theta = 180^o$
(d) $\theta = 150^o$

83. What is the hybridisation of As in AsF_4^- ?

(a) sp
(b) sp^2
(c) sp^3
(d) sp^3d

84. The ratio of difference in energy between first and second Bohr orbit to that between second and third Bohr orbit is

(a) $\frac{1}{2}$
(b) $\frac{1}{3}$
(c) $\frac{4}{9}$
(d) $\frac{27}{5}$

85. Which electronic level would allow the hydrogen atom to absorb a photon, but not to emit a photon?

(a) 3s (b) 2p
(c) 2s (d) 1s

86. The number of electrons required to balance the following equation

$NO_3^- + 4H^+ + e^- \rightarrow 2H_2O + NO$

(a) 5 (b) 4
(c) 3 (d) 2

87. Lithopone is a mixture of

(a) $BaS + ZnSO_3$ (b) $BaSO_4 + ZnS$
(c) $BaSO_4 + ZnCO_3$ (d) $BaCO_3 + ZnCO_3$

88. The size of given species are such that

(a) $I > I^+ > I^-$ (b) $I^+ > I^- > I$
(c) $I^- > I > I^+$ (d) $I > I^- > I^+$

89. Pb_3O_4 on heating gives

(a) $PbO + O_2$ (b) $PbO + O_3$
(c) $PbO_2 + O_2$ (d) $PbO_2 + O_3$

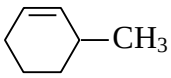
90. Carnallite is an ore of

(a) Cu (b) Fe
(c) Sn (d) Mg

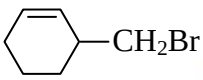
91. $2Na_2S_2O_3 + I_2 \longrightarrow 2NaI + X$

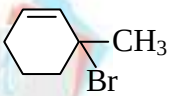
X is

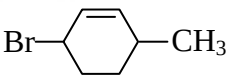
(a) Na_2SO_4 (b) SO_2
(c) $Na_2S_4O_6$ (d) Na_2S

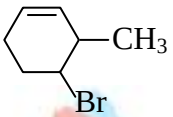
92. 

+ NBS $\longrightarrow$ A. A is:
(major product)

(a) 

(b) 

(c) 

(d) 

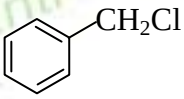
93. Ketene contains

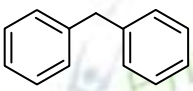
(a) only sp^2 hybridised C-atoms. (b) only sp hybridised C-atoms.
(c) both sp and sp^2 hybridised C-atoms. (d) all sp, sp^2, sp^3 hybridised C-atoms.

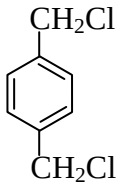
94. Which one of the following compounds is an electrophile?

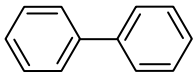
(a) Benzene (b) Water
(c) Ethylene (d) BF_3

95.
(excess) + $CH_2Cl_2 \xrightarrow{AlCl_3}$ X. X is :

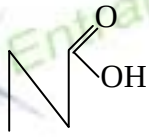
(a) 

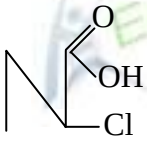
(b) 

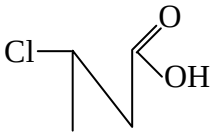
(c) 

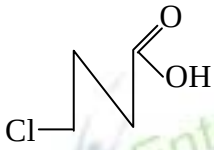
(d) 

96. Among the following organic acids, which is strongest?

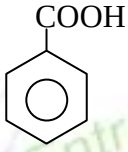
(a) 

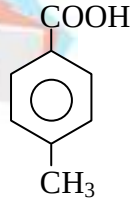
(b) 

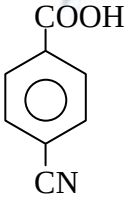
(c) 

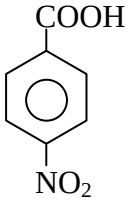
(d) 

97. Which of the following is least acidic?

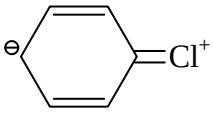
(a) 

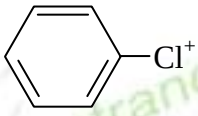
(b) 

(c) 

(d) 

98. Which one of the following structures is most stable?

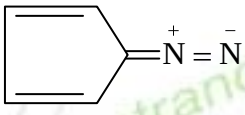
(a) 

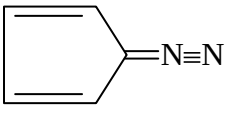
(b) 

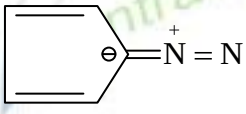
(c) Both have equal stability

(d) Stability can't be compared

99. Which one of the following structures would not make any contribution to resonance hybrid of aliphatic diazo compound?

(a) 

(b) 

(c) 

(d) All have equal stability

100. Which one of the following compounds would have the highest heat of hydrogenation?

(a) $CH_2=CH_2$

(b) $CH_3–CH_2–CH=CH_2$

(c) $CH_3–CH=CH–CH_3$

(d) $(CH_3)_2C=C(CH_3)_2$