CHEMISTRY

61. The plot of a concentration of the reactant versus time for a reaction is a straight line with a negative slope. The reaction follows a
(a) first order rate equation
(b) zero order rate equation
(c) second order reaction
(d) third order rate equation

62. Which of the following element has lowest melting point?
(a) Cr (b) Fe
(c) Ni (d) Cu

63. Maximum number of unpaired electrons are present in
(a) Gd^{3+} (b) Yb^{2+}
(c) Tb^{2+} (d) Pm^{3+}

64. The first ionisation enthalpy of Na, Mg and Si are 496, 737, 776 kJ/mol respectively. What will be the first ionisation enthalpy potential of Al in kJ/mol?
(a) > 766 kJ/mol
(b) > 496 and < 737 kJ
(c) > 737 and < 766 kJ/mol
(d) > 496 kJ/mol

65. When calomel is treated with ammonium hydroxide, a black substance is formed. The black substance is
(a) Hg + HgO (b) $HgO.HgCl_2$
(c) $H_2N - Hg - Cl + Hg$
(d) $Hg(NH_2)_2 + HgO$

66. Total number of antibonding electrons present in O_2 will be
(a) 6 (b) 8
(c) 4 (d) 2

67. In BF_3, the B – F bond length is 1.30 Å, when BF_3 is allowed to be treated with Me_3N, it forms an adduct, $Me_3N \rightarrow BF_3$, the bond length of B — F in the adduct is
(a) greater than 1.30 Å
(b) smaller than 1.30 Å
(c) equal to 1.30 Å
(d) none of these.

68. Oxidation state of iron in haemoglobin is
(a) 0 (b) +2
(c) –2 (d) +3

69. Which of the following statement is not true for hydrolysis of XeF_6?
(a) $XeOF_4$ is formed. (b) XeO_2F_2 is formed.
(c) It is a redox reaction.
(d) XeO_3 is formed.

70. Which of the following is most basic?
(a) $Al(OH)_3$ (b) $Cr(OH)_3$
(c) $La(OH)_3$ (d) $Fe(OH)_3$

71. Bleaching powder does not contain
(a) $CaCl_2$ (b) $Ca(OH)_2$
(c) $Ca(OCl)_2$ (d) $Ca(ClO_3)_2$

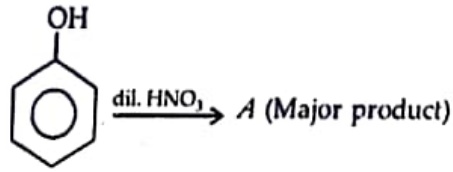
72. Which of the following metal ion forms unstable complex with CN^-?
(a) Ag(I) (b) Zn(II)
(c) Cu(II) (d) Cr(II)

73. Which of the following ion does not exist?
(a) $[CuI_4]^{2-}$ (b) VO_4^{3-}
(c) WO_4^{2-} (d) CrO_4^{2-}

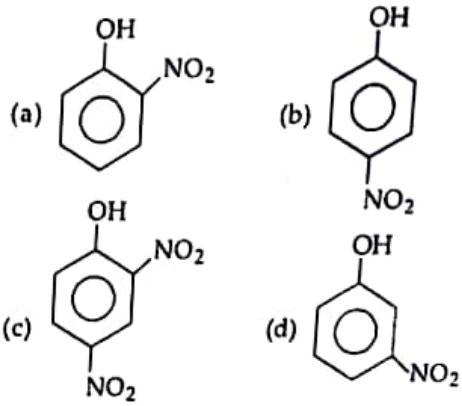
74. $K_2Cr_2O_7$ in acidic medium converts into
(a) Cr^{2+} (b) Cr^{3+}
(c) Cr^{4+} (d) Cr^{5+}

75. Which of the following is not a green house gas?
(a) Hydrogen (b) Carbon dioxide
(c) Methane
(d) Nitrous oxide or N_2O

76.



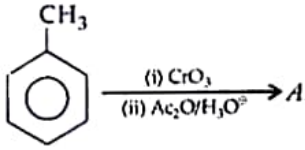
A is



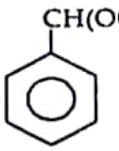
77. Which of the following is a non-reducing sugar?
(a) Sucrose (b) Maltose
(c) Lactose (d) Mannose

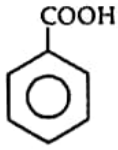
78. Arrange the following compounds in increasing order of reactivity towards nucleophilic addition reaction.

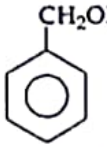
(I) $C_6H_5COCH_3$ (II) $CH_3CO-C_2H_5$
(III) C_6H_5CHO (IV) $Cl-CH_2-CHO$
(a) IV > III > II > I (b) IV > II > III > I
(c) I > II > III > IV (c) III > IV > II > I

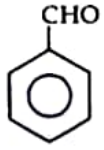
79. 

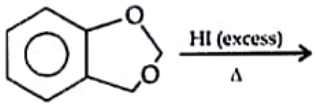
A; Product A is

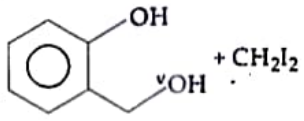
(a) 

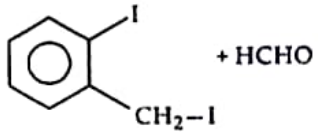
(b) 

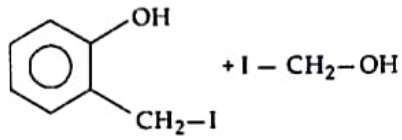
(c) 

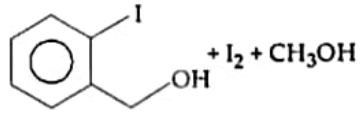
(d) 

80. 

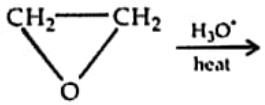
(a) 

(b) 

(c) 

(d) 

81. Which of the following reaction will not produce ethylene glycol?

(a) 

(b) $ClCH_2CH_2Cl \xrightarrow[\text{heat}]{OH^-}$

(c) $HO-CH_2-CH_2-OCH_3 \xrightarrow[\text{heat}]{OH^-}$

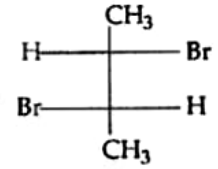
(d) $CH_2=CH_2 \xrightarrow[KMnO_4]{\text{alkaline}}$

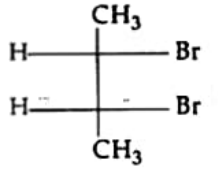
82. Salicylic acid can be easily prepared by reaction between
(a) phenol and CO_2
(b) benzoic acid and H_2O_2
(c) benzene diazonium chloride and CO_2
(d) phenol and formic acid.

83. Reaction of aniline with HNO_2 followed by treatment of dilute acid gives
(a) C_6H_5NHOH (b) C_6H_5OH
(c) $C_6H_5NHNH_2$ (d) C_6H_6

84. Which of the following will give carbylamine test?
(a) CH_3NH_2 (b) CH_3NHCH_3
(c) $CH_3N(CH_3)CH_3$ (d) CH_3CONH_2

85. When *trans*-2-butene is reacted with Br_2 then product formed is

(a) 

(b) 

(c) Meso compounds (d) both (b) and (c)

86. Which of the following does not give nitroalkane?

(a) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{N}}}}-CH_3 \xrightarrow{KMnO_4}$

(b) $C_2H_5I \xrightarrow{\text{alc. } AgNO_2}$

(c) $CH_3-CH_3 \xrightarrow{\text{Fuming } HNO_3}$

(d) Both (a) and (b)

87. A compound containing two –OH groups attached with one carbon atom is unstable but which one of the following is stable?

(a) $CH_3CH(OH)_2$ (b) $CH_3-\underset{\displaystyle OH}{\overset{\displaystyle OH}{\overset{|}{\underset{|}{C}}}}-OH$

(c) $Cl_3CH(OH)_2$ (d) None of these.

88. Which of the following is true for an ideal solution?
(a) $\Delta H_{(mix)} = 0$ (b) $\Delta S_{(mix)} = 0$
(c) $\Delta G_{(mix)} = 0$ (d) None of these

89. Boiling point of benzene is 353.23 K. When 1.8 g of non-volatile solute is dissolved in 90 g of benzene. Then boiling point is raised to 354.11 K. Given K_b (benzene) = 2.53 kg mol^{-1}. The molecular mass of non-volatile substance is
(a) 58 g mol^{-1} (b) 120 g mol^{-1}
(c) 116 g mol^{-1} (d) 60 g mol^{-1}

90. In a solid, atom M occupies *ccp* lattice and 1/3rd of tetrahedral voids are occupied by atom N. Find the formula of solid formed by M and N.
(a) M_3N_2 (b) M_2N_3
(c) M_4N_3 (d) M_3N_4

91. Hair cream is
(a) gel (b) emulsion
(c) solid sol (d) sol.

92. A particle is moving 3 times faster than the speed of electron. If the ratio of wavelength of particle and electron is 1.8×10^{-4}, then particle is
(a) Neutron (b) α-particle
(c) Deuteron (d) Tritium

93. Electrode potential of hydrogen electrode is 18 mV, then [H$^+$] is
(a) 0.2 (b) 1
(c) 2 (d) 5

94. What will be the solubility product of AX_3?
(a) $27S^4$ (b) $4S^3$
(c) $36S^4$ (d) $9S^3$

95. Which thermodynamic parameter is not a state function?
(a) q at constant pressure
(b) q at constant volume
(c) W at adiabatic
(d) W at isothermal

96. According to Hardy schulze law, the flocculating power of an ion increases with
(a) decreases in size
(b) increase in size
(c) decrease in charge
(d) increase in charge.

97. Strength of H_2O_2 is 15.18 g L^{-1}, then it is equal to
(a) 1 volume (b) 10 volume
(c) 5 volume (d) 7 volume

98. Energy of activation of forward reaction for an endothermic process is 50 kJ. If enthalpy change for forward reaction is 20 kJ then enthalpy change for backward reaction will be
(a) 30 kJ (b) 20 kJ
(c) 70 kJ (d) 50 kJ

99. What is the role of aniline or cresol when added in a froth floatation process?
(a) Stabilizer (b) Depressant
(c) Wetting agent (d) All of these.

100. Non-stick cookwares generally have a coating of a polymer, whose monomer is
(a) $CH_2 = CH_2$ (b) $CH_2 = CHCN$
(c) $CH_2 = CHCl$ (d) $CF_2 = CF_2$

Directions : In the following questions (101-120), a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as :
(a) If both assertion and reason are true and reason is the correct explanation of assertion.
(b) If both assertion and reason are true but reason is not the correct explanation of assertion.
(c) If assertion is true but reason is false.
(d) If both assertion and reason are false.

101. Assertion : Bond dissociation energy is $F_2 > Cl_2$.
Reason : Cl_2 has more electronic repulsion than F_2.

102. Assertion : Bond lengths of P—Cl bonds in gaseous PCl_5 and solid PCl_5 are not equal.
Reason : Because in solid state two PCl_5 molecules are associated.

103. Assertion : EDTA forms complex with divalent metals of 3*d*-series in the ratio of 1:1
Reason : EDTA has 4 —COOH groups.

104. Assertion : In a mixture of Cd(II) and Cu(II), Cd^{2+} gets precipitated in presence of KCN by H_2S.
Reason : The stability constant of $[Cu(CN)_4]^{3-}$ is greater than $[Cd(CN)_4]^{2-}$.

105. Assertion : Aq. solution of $CoCl_2$ is pink in colour. It turns blue in presence of conc. HCl.
Reason : It is due to the formation of $[CoCl_4]^{2-}$.

106. Assertion : Acetamide on reaction with KOH and bromine gives acetic acid.
Reason : Bromine catalyses hydrolysis of acetamide.

107. Assertion : Mixture of benzaldehyde and acetaldehyde in hot alkaline medium gives cinnamaldehyde.
Reason : Benzaldehyde is strong electrophile than acetaldehyde.

108. Assertion : *cis*-3-chloroprop-2-enoic acid is less stable than its *trans*-form.
Reason : Dipole moment of *cis*-form is greater than *trans*-form.

109. Assertion : Aryl sulphonic acid gives phenol on reacting with NaOH at high temperature.
Reason : This reaction is electrophilic substitution reaction.

110. Assertion : All enzymes are made up of proteins and all proteins have three dimensional structures.
Reason : Secondary structures of protein are sequence of amino acids.

111. Assertion : The presence of a large number of Schottky defects in NaCl lowers its density.
Reason : In NaCl, there are approximately 10^6 Schottky pairs per cm^3 at room temperature.

112. Assertion : For an isolated system, q is zero.
Reason : In an isolated system, change in U and V is zero.

113. Assertion : At critical point the densities of substance in gaseous and liquid states are same.
Reason : Critical temperature is the temperature at which the real gas exhibit ideal behaviour for considerable range of pressure.

114. Assertion : Entropy of system increases for a spontaneous reaction.
Reason : Enthalpy of reaction always decreases for spontaneous reaction.

115. Assertion : Catalyst changes Gibbs free energy of system.
Reason : Catalyst changes pre-exponential factor of a chemical reaction.

116. Assertion : A process is called adiabatic if the system does not exchange heat with the surroundings.
Reason : It does not not involve increase or decrease in temperature of the system.

117. Assertion : Number of radial and angular nodes for $3p$-orbital are 1, 1 respectively.
Reason : Number of radial and angular nodes depends only on principal quantum number.

118. Assertion : Cu is stronger reducing agent than H_2.
Reason : E° of Cu^{2+}/Cu is negative.

119. Assertion : Magnesium is extracted by the electrolysis of fused mixture of $MgCl_2$, NaCl and $CaCl_2$.
Reason : Calcium chloride acts as a reducing agent.

120. Assertion : Phosphoric acid has no reducing properties.
Reason : Phosphoric acid does not contain P—H bonds.

BIOLOGY

121. Stinging capsules (nematocysts) are found in
(a) wasp and honeybee
(b) scorpion and cobra
(c) sea pen and sea fan
(d) cactus and Venus flytrap.

122. Which of the following is a cloning vector?
(a) DNA of *Salmonella typhimurium*
(b) *Ti* plasmid
(c) Amp^r and Tet^r loci
(d) *Ori* minus pBR322

123. India is one of the twelve megadiversity countries with ____ of genetic resources of the world.
(a) 12.1% (b) 18.1% (c) 38.1% (d) 8.1%

124. Which of the following is not an invasive species?
(a) *Parthenium hysterophorus*
(b) *Nelumbo* (lotus)
(c) *Lantana camara* (d) *Eichhornia crassipes*