FIITJEE
SOLUTION TO AIEEE-2005

CHEMISTRY

76. Which of the following oxides is amphoteric in character?
(1) CaO (2) CO_2
(3) SiO_2 (4) SnO_2

76. (4)
$CaO \longrightarrow$ basic
SiO_2 & $CO_2 \longrightarrow$ acidic
$SnO_2 \longrightarrow$ amphoteric

77. Which one of the following species is diamagnetic in nature?
(1) He_2^+ (2) H_2
(3) H_2^+ (4) H_2^-

77. (2)
$H_2\ \sigma 1s^2\ \sigma^* 1s^0$, no unpaired so diamagnetic

78. If α is the degree of dissociation of Na_2SO_4, the vant Hoff's factor (i) used for calculating the molecular mass is
(1) $1 + \alpha$ (2) $1 - \alpha$
(3) $1 + 2\alpha$ (4) $1 - 2\alpha$

78. (3)
$Na_2SO_4 \rightleftharpoons 2Na^+ + SO_4^{-2}$
$1 - \alpha \qquad 2\alpha \qquad \alpha$
Total moles = $1+2\alpha$

79. The oxidation state of Cr in $[Cr(NH_3)_4Cl_2]^+$ is
(1) +3 (2) +2
(3) +1 (4) 0

79. (1)
$(Cr(NH_3)_4Cl_2)^+$
$X + 4\times0 + 2\times-1 = 1$
$X = +3$

80. Hydrogen bomb is based on the principle of
(1) Nuclear fission (2) Natural radioactivity
(3) Nuclear fusion (4) Artificial radioactivity

80. (3)

81. An ionic compound has a unit cell consisting of A ions at the corners of a cube and B ions on the centres of the faces of the cube. The empirical formula for this compound would be
(1) AB (2) A_2B
(3) AB_3 (4) A_3B

81. (3)
$A = \frac{1}{8}\times 8 = 1$
(Corner)

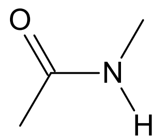
$B = \frac{1}{2} \times 6 = 3$
(Face centre)
$\therefore AB_3$

82. For a spontaneous reaction the ΔG, equilibrium constant (K) and E^o_{cell} will be respectively
(1) -ve, >1, +ve
(2) +ve, >1, -ve
(3) -ve, <1, -ve
(4) -ve, >1, -ve

82. (1)

83. Which of the following is a polyamide?
(1) Teflon
(3) Nylon – 66
(3) Terylene
(4) Bakelite

83 (2)



Amide $\longrightarrow$ Nylon 66

84. Which one of the following types of drugs reduces fever?
(1) Analgesic
(2) Antipyretic
(3) Antibiotic
(4) Tranquiliser

84. (2)

85. Due to the presence of an unpaired electron, free radicals are:
(1) Chemically reactive
(2) Chemically inactive
(3) Anions
(4) Cations

85. (1)

86. Lattice energy of an ionic compounds depends upon
(1) Charge on the ion only
(2) Size of the ion only
(3) Packing of ions only
(4) Charge on the ion and size of the ion

86. (4)

87. The highest electrical conductivity of the following aqueous solutions is of
(1) 0.1 M acetic acid
(2) 0.1 M chloroacetic acid
(3) 0.1 M fluoroacetic acid
(4) 0.1 M difluoroacetic acid

87. (4)

88. Aluminium oxide may be electrolysed at $1000°C$ to furnish aluminium metal (Atomic mass = 27 amu; 1 Faraday = 96,500 Coulombs). The cathode reaction is
$Al^{3+} + 3e^- \longrightarrow Al^o$
To prepare 5.12 kg of aluminium metal by this method would require
(1) 5.49×10^7 C of electricity
(2) 1.83×10^7 C of electricity
(3) 5.49×10^4 C of electricity
(4) 5.49×10^1 C of electricity

88. (1)

$Q = \frac{mFZ}{M} = \frac{5.12 \times 10^5 \times 96500 \times 3}{27}$
$= 5.49 \times 10^7$ C

89. Consider an endothermic reaction, $X \longrightarrow Y$ with the activation energies E_b and E_f for the backward and forward reactions, respectively. In general
(1) $E_b < E_f$
(2) $E_b > E_f$
(3) $E_b = E_f$
(4) There is no definite relation between E_b and E_f

89. (1)
$\Delta H = E_f - E_b$
For ΔH = Positive, $E_b < E_f$

90. Consider the reaction: $N_2 + 3H_2 \longrightarrow 2NH_3$ carried out at constant temperature and pressure. If ΔH and ΔU are the enthalpy and internal energy changes for the reaction, which of the following expressions is true?
(1) $\Delta H = 0$ (2) $\Delta H = \Delta U$
(3) $\Delta H < \Delta U$ (4) $\Delta H > \Delta U$

90. (3)
$\Delta H = \Delta U + \Delta nRT$
$\Delta n = -2$
$\Delta H = \Delta U - 2RT$
$\Delta H < \Delta U$

91. Which one of the following statements is NOT true about the effect of an increase in temperature on the distribution of molecular speeds in a gas?
(1) The most probable speed increases
(2) The fraction of the molecules with the most probable speed increases
(3) The distribution becomes broader
(4) The area under the distribution curve remains the same as under the lower temperature

91. (2)
Most probable velocity increase and fraction of molecule possessing most probable velocity decreases.

92. The volume of a colloidal particle, V_C as compared to the volume of a solute particle in a true solution V_S, could be
(1) $\frac{V_C}{V_S} \simeq 1$ (2) $\frac{V_C}{V_S} \simeq 10^{23}$
(3) $\frac{V_C}{V_S} \simeq 10^{-3}$ (4) $\frac{V_C}{V_S} \simeq 10^{3}$

92. (4)

93. The solubility product of a salt having general formula MX_2, in water is: 4×10^{-12}. The concentration of M^{2+} ions in the aqueous solution of the salt is
(1) 2.0×10^{-6} M (2) 1.0×10^{-4} M
(3) 1.6×10^{-4} M (4) 4.0×10^{-10} M

93. (2)
$$MX_2 \rightleftharpoons \underset{S}{M^{+2}} + \underset{2S}{2X^-}$$
$K_{sp} = 4s^3$, $S = \sqrt[3]{\frac{K_{sp}}{4}} = 1 \times 10^{-4}$

94. Benzene and toluene form nearly ideal solutions. At $20^{\circ}C$, the vapour pressure of benzene is 75 torr and that of toluene is 22 torr. The partial vapour pressure of benzene at $20^{\circ}C$ for a solution containing 78 g of benzene and 46 g of toluene in torr is

(1) 50 (2) 25
(3) 37.5 (4) 53.5

94. (1)

$P_B = P_B^{\circ} \times B = 75 \times \frac{1}{1.5} = 50$ torr

95. The exothermic formation of ClF_3 is represented by the equation:

$Cl_{2(g)} + 3F_{2(g)} \rightleftharpoons 2ClF_{3(g)}; \quad \Delta rH = -329$ kJ

Which of the following will increase the quantity of ClF_3 in an equilibrium mixture of Cl_2, F_2 and ClF_3?

(1) Increasing the temperature (2) Removing Cl_2
(3) Increasing the volume of the container (4) Adding F_2

95. (4)

$M_3V_3 = M_1V_2 + M_2V_2$

$M = \frac{480(1.5) + 520(1.2)}{1000} = 1.344M$

96. Two solutions of a substance (non electrolyte) are mixed in the following manner. 480 ml of 1.5 M first solution + 520 mL of 1.2 M second solution. What is the molarity of the final mixture?

(1) 1.20 M (2) 1.50 M
(3) 1.344 M (4) 2.70 M

96. (3)

97. For the reaction

$2NO_{2(g)} \rightleftharpoons 2NO_{(g)} + O_{2(g)}$,

$(K_c = 1.8 \times 10^{-6}$ at $184^{\circ}C)$

(R = 0.0831 kJ / (mol.K)

When K_p and K_c are compared at $184^{\circ}C$, it is found that

(1) K_p is greater than K_c
(2) K_p is less than K_c
(3) $K_p = K_c$
(4) Whether K_p is greater than, less than or equal to K_c depends upon the total gas pressure

97. (1)

$Kp = Kc\ RT^{\Delta n}$, $\Delta n = 1$

$Kp > Kc$

98. Hydrogen ion concentration in mol / L in a solution of pH = 5.4 will be

(1) 3.98×10^{8} (2) 3.88×10^{6}
(3) 3.68×10^{-6} (4) 3.98×10^{-6}

98. (4)

$p^H = -\log(H^+)$

99. A reaction involving two different reactants can never be

(1) Unimolecular reaction (2) First order reaction
(3) second order reaction (4) Bimolecular reaction

99. (1)

100. If we consider that $\frac{1}{6}$, in place of $\frac{1}{12}$; mass of carbon atom is taken to be the relative atomic mass unit, the mass of one mole of a substance will
(1) Decrease twice
(2) Increase two fold
(3) Remain unchanged
(4) Be a function of the molecular mass of the substance

100. (3)

101. In a multi – electron atom, which of the following orbitals described by the three quantum numbers will have the same energy in the absence of magnetic acid and electric fields?
(a) n = 1, l = 0, m = 0
(b) n = 2, l = 0, m = 0
(c) n = 2, l = 1, m = 1
(d) n = 3, l = 2, m = 1
(e) n = 3, l = 2, m = 0
(1) (a) and (b)
(2) (b) and (c)
(3) (c) and (d)
(4) (d) and (e)

101. (4)
n = same

102. During the process of electrolytic refining of copper, some metals present as impurity settle as 'anode mud' These are
(1) Sn and Ag
(2) Pb and Zn
(3) Ag and Au
(4) Fe and Ni

102. (3)

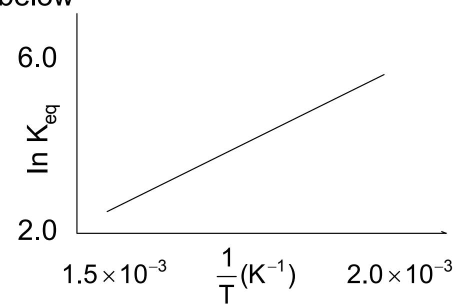
103.

Electrolyte	KCl	KNO_3	HCl	NaOAc	NaCl
$\wedge^{\infty}$(S cm^{2}mol^{-1})	149.9	145.0	426.2	91.0	126.5

Calculate $\wedge^{\infty}_{HOAc}$ Using appropriate molar conductances of the electrolytes listed above at infinite dilution in H_2O at 25°C
(1) 517.2
(2) 552.7
(3) 390.7
(4) 217.5

103. (3)
$\wedge^{\infty}_{AcOH} = \wedge^{\infty}_{HCl} + \wedge^{\infty}_{AcONa} - \wedge^{\infty}_{NaCl}$
= 390.7

104. A schematic plot of ln K_{eq} versus inverse of temperature for a reaction is shown below



The reaction must be

(1) exothermic
(2) endothermic
(3) one with negligible enthalpy change
(4) highly spontaneous at ordinary temperature

104. **(1)**

$K_{eq} = A\ e^{-\frac{\Delta H}{RT}}$

105. The disperse phase in colloidal iron (III) hydroxide and colloidal gold is positively and negatively charged, respectively, which of the following statements is NOT correct?

(1) magnesium chloride solution coagulates, the gold sol more readily than the iron (III) hydroxide sol.
(2) sodium sulphate solution causes coagulation in both sols
(3) mixing the sols has no effect
(4) coagulation in both sols can be brought about by electrophoresis

105. **(3)**

106. Based on lattice energy and other considerations which one of the following alkali metal chlorides is expected to have the highest melting point.
(1) LiCl
(2) NaCl
(3) KCl
(4) RbCl

106. **(2)**
Although lattice energy of LiCl higher than NaCl but LiCl is covalent in nature and NaCl ionic there after , the melting point decreases as we move NaCl because the lattice energy decreases as a size of alkali metal atom increases (lattice energy $\propto$ to melting point of alkali metal halide)

107. Heating mixture of Cu_2O and Cu_2S will give
(1) $Cu + SO_2$
(2) $Cu + SO_3$
(3) $CuO + CuS$
(4) Cu_2SO_3

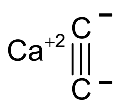
107. **(1)**
$2Cu_2O + Cu_2S \longrightarrow 6Cu + SO_2$

108. The molecular shapes of SF_4, CF_4 and XeF_4 are
(1) the same with 2,0 and 1 lone pairs of electrons on the central atom, respectively
(2) the same with 1, 1 and 1 lone pair of electrons on the central atoms, respectively
(3) different with 0, 1 and 2 lone pair of electrons on the central atoms, respectively
(4) different with 1, 0 and 2 lone pairs of electron on the central atoms respectively

108 **(4)**

109. The number and type of bonds between two carbon atoms in calcium carbide are
(1) One sigma, one pi
(2) One sigma, two pi
(3) Two sigma, one pi
(4) Two sigma, two pi

109. **(2)**

CaC_2 

One σ

Two π

110. The oxidation state of chromium in the final product formed by the reaction between KI and acidified potassium dichromate solution is
(1) +4
(2) +6
(3) +2
(4) +3

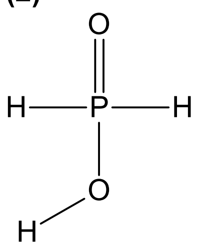
110. **(4)**

$$Cr_2O_7^{-2} + 14H^+ + 6I^- \longrightarrow 2Cr^{+3} + 7H_2O + 3I_2$$

+6 +3

111. The number of hydrogen atom(s) attached to phosphorus atom in hypophosphorous acid is
(1) zero (2) two
(3) one (4) three

111. **(2)**



112. What is the conjugate base of OH^-?
(1) O_2 (2) H_2O
(3) O^- (4) O^{-2}

112. **(4)**
$OH^- \longrightarrow O^{-2} + H^+$

113. The correct order of the thermal stability of hydrogen halides (H – X) is
(1) HI > HBr > HCl > HF (2) HF > HCl > HBr > HI
(3) HCl < HF > HBr < HI (4) HI > HCl < HF < HBr

113. **(2)**

114. Heating an aqueous solution of aluminium chloride to dryness will give
(1) $AlCl_3$ (2) Al_2Cl_6
(3) Al_2O_3 (4) $Al(OH)Cl_2$

114. **(3)**
$Al_2Cl_6\ 6H_2O \longrightarrow Al_2O_3 + + 6HCl + 3H_2O\uparrow$

115. Calomel (Hg_2Cl_2) on reaction with ammonium hydroxide gives
(1) $HgNH_2Cl$ (2) $NH_2 – Hg – Hg – Cl$
(3) Hg_2O (4) HgO

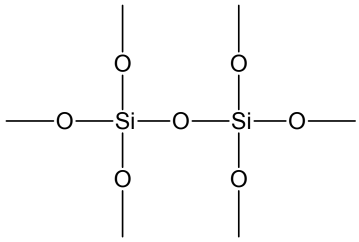
115. **(1)**
$Hg_2Cl_2 + 2NH_4OH \longrightarrow Hg + Hg(NH_2)Cl + NH_4Cl + 2H_2O$

116. In which of the following arrangements the order is NOT according to the property indicated against it?
(1) $Al^{3+} < Mg^{2+} < Na^+ < F^-$
Increasing ionic size
(2) B < C < N < O
Increasing first ionization enthalpy
(3) I < Br < F < Cl
Increasing electron gain enthalpy (with negative sign)
(4) Li < Na < K < Rb
Increasing metallic radius

116. **(2)**
B < C < O < N

117. In silicon dioxide
(1) Each silicon atom is surrounded by four oxygen atoms and each oxygen atom is bonded to two silicon atoms
(2) Each silicon atom is surrounded by two oxygen atoms and each oxygen atom is bonded to two silicon atoms
(3) Silicon atoms is bonded to two oxygen atoms
(4) there are double bonds between silicon and oxygen atoms

117. (1)



118. Of the following sets which one does NOT contain isoelectronic species?
(1) $PO_4^{-3}, SO_4^{-2}, ClO_4^-$ (2) CN^-, N_2, C_2^{-2}
(3) $SO_3^{-2}, CO_3^{-2}, NO_3^-$ (4) $BO_3^{-3}, CO_3^{-2}, NO_3^-$

118. (3)

119. The lanthanide contraction is responsible for the fact that
(1) Zr and Y have about the same radius (2) Zr and Nb have similar oxidation state
(3) Zr and Hf have about the same radius (4) Zr and Zn have the same oxidation

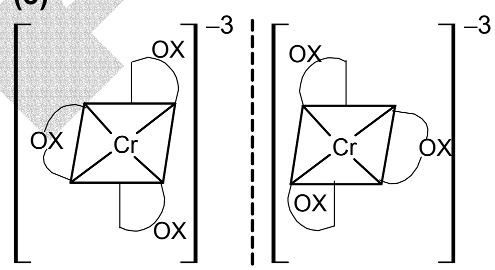
119. (3)
Due to Lanthanide contraction.

120. The IUPAC name of the coordination compound $K_3[Fe(CN)_6]$ is
(1) Potassium hexacyanoferrate (II) (2) Potassium hexacyanoferrate (III)
(3) Potassium hexacyanoiron (II) (4) tripotassium hexcyanoiron (II)

120. (2)

121. Which of the following compounds shows optical isomerism?
(1) $[Cu(NH_3)_4]^{+2}$ (2) $[ZnCl_4]^{-2}$
(3) $[Cr(C_2O_4)_3]^{-3}$ (4) $[Co(CN)_6]^{-3}$

121. (3)

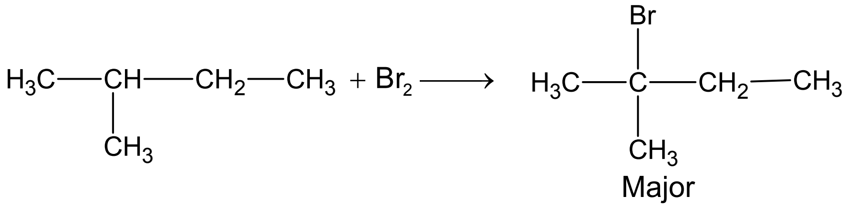


122. Which one of the following cyano complexes would exhibit the lowest value of paramagnetic behaviour?
(1) $[Cr(CN)_6]^{-3}$ (2) $[Mn(CN)_6]^{-3}$
(3) $[Fe(CN)_6]^{-3}$ (4) $[Co(CN)_6]^{-3}$
(At. No. Cr = 24, Mn = 25, Fe = 26, Co = 27)

122. (4)

123. 2 methylbutane on reacting with bromine in the presence of sunlight gives mainly
(1) 1 – bromo -2 - methylbutane (2) 2 – bromo -2 - methylbutane
(3) 2 – bromo -3 - methylbutane (4) 1 – bromo -3 – methylbutane

123. (2)



124. The photon of hard gamma radiation knocks a proton out of ${}^{24}_{12}Mg$ nucleus to form
(1) the isotope of parent nucleus (2) the isobar of parent nucleus
(3) the nuclide ${}^{23}_{11}Na$ (4) the isobar of ${}^{23}_{11}Na$

124. (3)

125. The best reagent to convert pent -3- en-2-ol into pent -3-en-2-one is
(1) Acidic permanganate (2) Acidic dichromate
(3) Chromic anhydride in glacial acetic acid (4) Pyridinium chloro – chromate

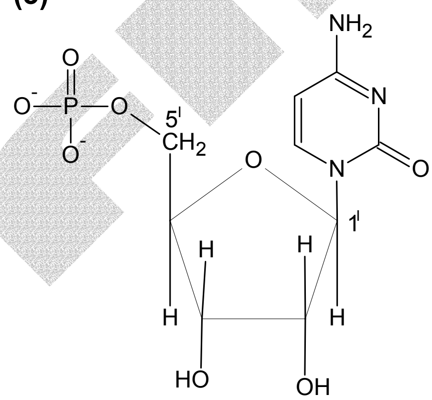
125. (3)

126. Tertiary alkyl halides are practically inert to substitution by $S_N{}^2$ mechanism because of
(1) insolubility (2) instability
(3) inductive effect (4) steric hindrance

126. (4)

127. In both DNA and RNA, heterocyclic base and phosphate ester linkages are at-
(1) C'_5 and C'_2 respectively of the sugar molecule
(2) C'_2 and C'_5 respectively of the sugar molecule
(3) C'_1 and C'_5 respectively of the sugar molecule
(4) C'_5 and C'_1 respectively of the sugar molecule

127. (3)

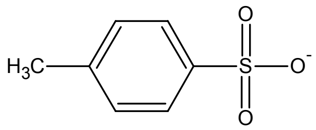


128. Reaction of one molecule of HBr with one molecule of 1,3-butadiene at 40^0C gives predominantly
(1) 3-bromobutene under kinetically controlled conditions
(2) 1-bromo-2-butene under thermodymically controlled conditions
(3) 3-bromobutene under thermodynamically controlled conditions
(4) 1-bromo-2-butene under kinetically controlled conditions

128. (2)

129. Among the following acids which has the lowest pK_a value?
(1) CH_3COOH
(2) $HCOOH$
(3) $(CH_3)_2COOH$
(4) CH_3CH_2COOH

129. (2)

130. The decreasing order of nucleophilicity among the nucleophiles
(a) $CH_3-\underset{\underset{O}{\|}}{C}-O^-$
(b) CH_3O^-
(c) CN^-
(d)


(1) (a), (b), (c), (d)
(2) (d), (c), (b), (a)
(3) (b), (c), (a), (d)
(4) (c), (b), (a), (d)

130. (4)

131. Which one of the following methods is neither meant for the synthesis nor for separation of amines?
(1) Hinsberg method
(2) Hofmann method
(3) Wurtz reaction
(4) Curtius reaction

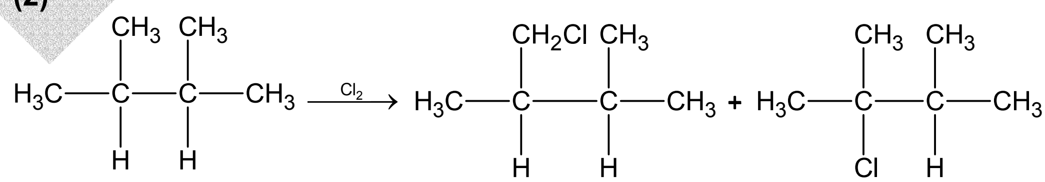
131. (3)

132. Which of the following is fully fluorinated polymer?
(1) Neoprene
(2) Teflon
(3) Thiokol
(4) PVC

132. (2)

133. Of the five isomeric hexanes, the isomer which can give two monochlorinated compounds is
(1) n-hexane
(2) 2, 3-dimethylbutane
(3) 2,2-dimethylbutane
(4) 2-methylpentane

133. (2)



134. Alkyl halides react with dialkyl copper reagents to give
(1) alkenes
(2) alkyl copper halides
(3) alkanes
(3) alkenyl halides

134. (3)

$R_2CuLi + R'X \longrightarrow R-R' + R-Cu + LiX$

135. Acid catalyzed hydration of alkenes except ethene leads to the formation of
(1) primary alcohol
(2) secondary or tertiary alcohol
(3) mixture of primary and secondary alcohols
(4) mixture of secondary and tertiary alcohols

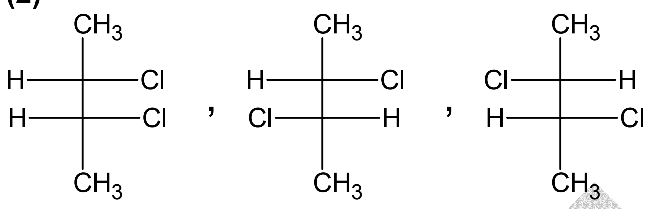
135. (4)

136. Amongst the following the most basic compound is
(1) benzylamine (2) aniline
(3) acetanilide (4) p-nitroaniline

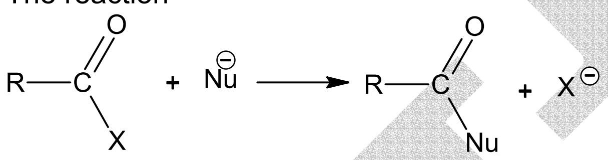
136. (1)
-NH_2 group is not linked with benzene ring.

137. Which types of isomerism is shown by 2,3-dichlorobutane?
(1) Diastereo (2) Optical
(3) Geometric (4) Structural

137. (2)



138. The reaction



is fastest when X is
(1) Cl (2) NH_2
(3) OC_2H_5 (4) OCOR

138. (1)
Conjugated acid of Cl^- is a stronger acid i.e. HCl.

139. Elimination of bromine from 2-bromobutane results in the formation of-
(1) equimolar mixture of 1 and 2-butene (2) predominantly 2-butene
(3) predominantly 1-butene (4) predominantly 2-butyne

139. (2)
Saytzeffs product.

140. Equimolar solutions in the same solvent have
(1) Same boiling point but different freezing point
(2) Same freezing point but different boiling point
(3) Same boiling and same freezing points
(4) Different boiling and different freezing points

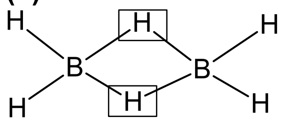
140. (3)

141. Which of the following statements in relation to the hydrogen atom is correct?
(1) 3s orbital is lower in energy than 3p orbital
(2) 3p orbital is lower in energy than 3d orbital
(3) 3s and 3p orbitals are of lower energy than 3d orbital
(4) 3s, 3p and 3d orbitals all have the same energy

141. (4)

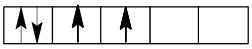
142. The structure of diborane (B_2H_6) contains
(1) four 2c-2e bonds and two 3c-2e bonds
(2) two 2c-2e bonds and four 3c-2e bonds
(3) two 2c-2e bonds and two 3c-3e bonds
(4) four 2c-2e bonds and four 3c-2e bonds

142. **(1)**



143. The value of the 'spin only' magnetic moment for one of the following configurations is 2.84 BM. The correct one is
(1) d^4 (in strong ligand filed)
(2) d^4 (in weak ligand field)
(3) d^3 (in weak as well as in strong fields)
(4) d^5 (in strong ligand field)

143. **(1)**



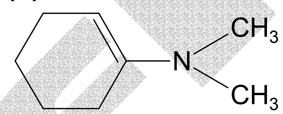
d^4 in strong field, so unpaired electrons = 2.

144. Which of the following factors may be regarded as the main cause of lanthanide contraction?
(1) Poor shielding of one of 4f electron by another in the subshell
(2) Effective shielding of one of 4f electrons by another in the subshell
(3) Poorer shielding of 5d electrons by 4f electrons
(4) Greater shielding of 5d electrons by 4f electrons

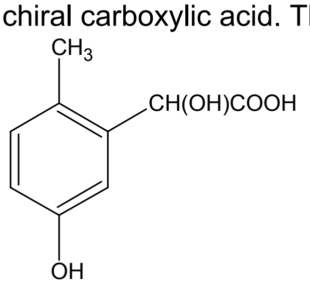
144. **(1)**

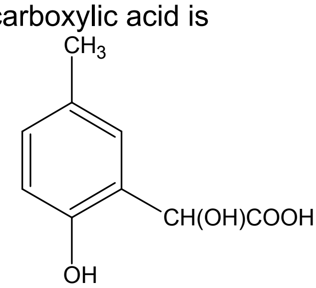
145. Reaction of cyclohexanone with dimethylamine in the presence of catalytic amount of an acid forms a compound if water during the reaction is continuously removed. The compound formed is generally known as
(1) a Schiff's base (2) an enamine
(3) an imine (4) an amine

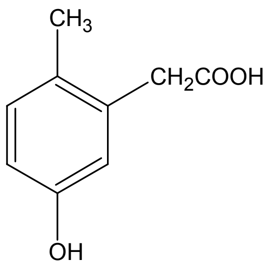
145. **(2)**

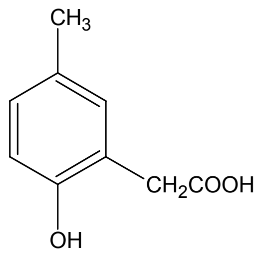


146. p-cresol reacts with chloroform in alkaline medium to give the compound A which adds hydrogen cyanide to form, the compound B. The latter on acidic hydrolysis gives chiral carboxylic acid. The structure of the carboxylic acid is

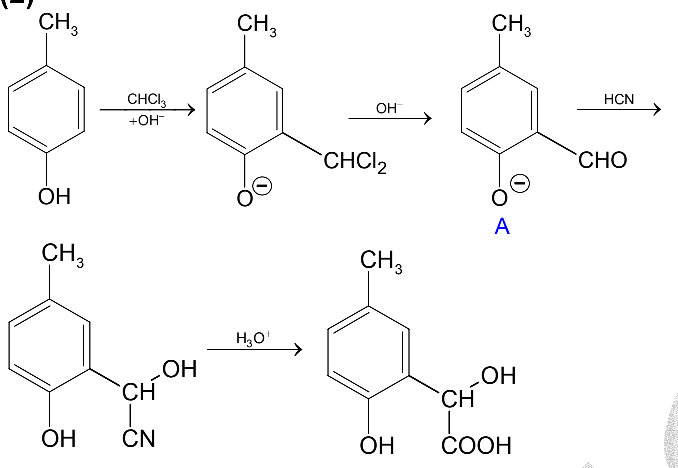
(1) 

(2) 

(3) 

(4) 

146. **(2)**



147. An organic compound having molecular mass 60 is found to contain C = 20%, H = 6.67% and N = 46.67% while rest is oxygen. On heating it gives NH_3 alongwith a solid residue. The solid residue give violet colour with alkaline copper sulphate solution. The compound is

(1) CH_3NCO
(2) CH_3CONH_2
(3) $(NH_2)_2CO$
(4) $CH_3CH_2CONH_2$

147. **(3)**

148. If the bond dissociation energies of XY, X_2 and Y_2 (all diatomic molecules) are in the ratio of 1:1:0.5 and $\Delta_f H$ for the formation of XY is -200 kJ mole^{-1}. The bond dissociation energy of X_2 will be

(1) 100 kJ mol^{-1}
(2) 200 kJ mol^{-1}
(3) 300 kJ mol^{-1}
(4) 400 kJ mol^{-1}

148. **-**

(None of the options is correct.)

$$XY \longrightarrow X_{(g)} + Y_{(g)}; \quad \Delta H = +a \text{ kJ/mole} \;............(i)$$

$$X_2 \longrightarrow 2X; \quad \Delta H = +a \text{ kJ/mole} \;...............(ii)$$

$$Y_2 \longrightarrow 2Y; \quad \Delta H = +0.5a \text{ kJ/mole} \;............(iii)$$

$$\frac{1}{2} \times (ii) + \frac{1}{2} \times (iii) - (i), \text{ Gives}$$

$$\frac{1}{2}X_2 + \frac{1}{2}Y_2 \longrightarrow XY; \quad \Delta H = \left(+\frac{a}{2} + \frac{0.5}{2}a - a\right) \text{ kJ / mole}$$

$$+\frac{a}{2} + \frac{0.5a}{2} - a = -200$$

a = 800.

149. $t_{1/4}$ can be taken as the time taken for the concentration of a reactant to drop to $\frac{3}{4}$ of its initial value. If the rate constant for a first order reaction is K, the $t_{1/4}$ can be written as

(1) 0.10 / K (2) 0.29 / K
(3) 0.69 / K (4) 0.75 / K

149. (2)

$$t_{1/4} = \frac{2.303}{K}\log\frac{1}{1-\frac{1}{4}} = \frac{0.29}{K}.$$

150. An amount of solid NH_4HS is placed in a flask already containing ammonia gas at a certain temperature and 0.50 atm. Pressure. Ammonium hydrogen sulphide decomposes to yield NH_3 and H_2S gases in the flask. When the decomposition reaction reaches equilibrium, the total pressure in the flask rises to 0.84 atm. The equilibrium constant for NH_4HS decomposition at this temperature is

(1) 0.30 (2) 0.18
(3) 0.17 (4) 0.11

150. (4)

$$NH_4HS \rightleftharpoons NH_{3(g)} + H_2S_{(g)}$$

$a \quad\quad 0.5\ \text{atm}$

$a - x \quad\quad 0.5 + x \quad\quad x$

Total pressure = 0.5 + 2x = 0.84

i.e., x = 0.17

$K_p = p_{NH_3} \cdot p_{H_2S}$

= (0.67). (0.17)

= 0.1139.