AIEEE

76. Which of the following sets of quantum numbers is correct for an electron in 4f orbital?

(1) n = 4, l =3, m = +4, s = $+\frac{1}{2}$ (2) n = 3, l = 2, m = -2, S = $+\frac{1}{2}$

(3) n =4, l = 3, m = +1, s = $+\frac{1}{2}$ (4) n =4, l = 4, m -4, s = $-\frac{1}{2}$

Ans. n =4, l = 3, m = +1, s = $+\frac{1}{2}$

77. Consider the ground state of Cr atom (Z = 24). The number of electrons with the azimuthal quantum numbers l =1 and 2 are respectively

(1) 12 and 4 (2) 16 and 5

(3) 16 and 4 (4) 12 and 5

Ans. 12 and 5

78. Which one the following ions has the highest value of ionic radius?

(1) Li^+ (2) F^-

(3) O^{2-} (4) B^{3+}

Ans. O^{2-}

79. The wavelength of the radiation emitted, when in hydrogen atom electron falls from infinity to stationary state 1, would be (Rydberg constant = $1.097 \times 10^7\ m^{-1}$)

(1) 91 nm (2) 9.1×10^{-8} nm

(3) 406 nm (4) 192 nm

Ans. 91 nm

80. The correct order of bond angles (smallest first) in H_2S, NH_3, BF_3 and SiH_4 is

(1) $H_2S < SiH_4 < NH_3 < BF_3$ (2) $H_2S < NH_3 < BF_3 < SiH_4$

(3) $H_2S < NH_3 < SiH_4 < BF_3$ (4) $NH_3 < H_2S < SiH_4 < BF_3$

Ans. $H_2S < NH_3 < SiH_4 < BF_3$

81. Which one the following sets of ions represents the collection of isoelectronic species?

(1) K^+, Ca^{2+}, Sc^{3+}, Cl^- (2) Na^+, Mg^{2+}, Al^{3+}, Cl^-

(3) K^+, Cl^-, Mg^{2+}, Sc^{3+} (4) Na^+, Ca^{2+}, Sc^{3+}, F^-

Ans. K^+, Ca^{2+}, Sc^{3+}, Cl^-

82. Among Al_2O_3, SiO_2, P_2O_3 and SO_2 the correct order of acid strength is

(1) $SO_2 < P_2O_3 < SiO_2 < Al_2O_3$ (2) $Al_2O_3 < SiO_2 < P_2O_3 < SO_2$

(3) $Al_2O_3 < SiO_2 < SO_2 < P_2O_3$ (4) $SiO_2 < SO_2 < Al_2O_3 < P_2O_3$

Ans. $Al_2O_3 < SiO_2 < P_2O_3 < SO_2$

83. The bond order in NO is 2.5 while that in NO^+ is 3. Which of the following statements is true for these two species?

(1) Bond length in NO^+ is greater than in NO
(2) Bond length is unpredictable
(3) Bond length in NO^+ in equal to that in NO
(4) Bond length in NO is greater than in NO^+

Ans. Bond length in NO is greater than in NO^+

84. The formation of the oxide ion $O^{2-}(g)$ requires first an exothermic and then an endothermic step as shown below

$O(g) + e^- O^-(g) \Delta H^\circ = -142\,kJmol^{-1}$

$O^-(g) + e^- O^{2-}(g) \Delta H^\circ = 844\,kJmol^{-1}$

(1) Oxygen is more electronegative
(2) O^- ion has comparatively larger size than oxygen atom
(3) O^- ion will tend to resist the addition of another electron
(4) Oxygen has high electron affinity

Ans. O^- ion will tend to resist the addition of another electron

85. The states of hybridization of boron and oxygen atoms in boric acid (H_3BO_3) are respectively
(1) sp^2 and sp^2
(2) sp^3 and sp^3
(3) sp^3 and sp^2
(4) sp^2 and sp^3

Ans. sp^2 and sp^3

86. Which one of the following has the regular tetrahedral structure?
(1) XeF_4
(2) $[Ni(CN)_4]^{2-}$
(3) BF_4^-
(4) SF_4

Ans. BF_4^-

87. Of the following outer electronic configurations of atoms, the highest oxidation state is achieved by which one of them?
(1) $(n-1)d^8ns^2$
(2) $(n-1)d^5ns^2$
(3) $(n-1)d^3ns^2$
(4) $(n-1)d^5ns^{-1}$

Ans. $(n-1)d^5ns^2$

88. As the temperature is raised from 20°C to 40°C, the average kinetic energy of neon atoms changes by a factor of which of the following?
(1) ½
(2) 2
(3) $\frac{313}{293}$
(4) $\sqrt{\frac{313}{293}}$

Ans. $\frac{313}{293}$

89. The maximum number of 90° angles between bond pair of electrons is observed in
(1) dsp^3 hybridization
(2) sp^3d^2 hybridization
(3) dsp^2 hybridization
(4) sp^3d hybridization

Ans. sp^3d^2 hybridization

90. Which one of the following aqueous solutions will exhibit highest boiling point?
(1) 0.01 M Na_2SO_4
(2) 0.015 M glucose
(3) 0.015 M urea
(4) 0.01 M KNO_3

Ans. 0.01 M Na_2SO_4

91. Which among the following factors is the most important in making fluorine the strongest oxidizing halogen?

(1) Electron affinity
(2) Bond dissociation energy
(3) Hydration enthalpy
(4) Ionization enthalpy

Ans. Bond dissociation energy

92. In Vander Waals equation of state of the gas law, the constant ‘b’ is a measure of
(1) intermolecular repulsions
(2) intermolecular collisions per unit volume
(3) Volume occupied by the molecules
(4) intermolecular attraction

Ans. Volume occupied by the molecules

93. The conjugate base of $H_2PO_4^-$ is
(1) PO_4^{3-}
(2) HPO_4^{2-}
(3) H_3PO_4
(4) P_2O_5

Ans. HPO_4^{2-}

94. 6.02×10^{20} molecules of urea are present in 100 ml of its solution. The concentration of urea solution is
(1) 0.001 M
(2) 0.1 M
(3) 0.02 M
(4) 0.01 M

Ans. 0.01 M

95. To neutralize completely 20 mL of 0.1 M aqueous solution of phosphorous acid (H_3PO_3), the volume of 0.1 M aqueous KOH solution required is
(1) 10 mL
(2) 60 mL
(3) 40 mL
(4) 20 mL

Ans. 40 mL

96. For which of the following parameters the structural isomers C_2H_5OH and CH_3OCH_3 would be expected to have the same values?
(Assume ideal behaviour)
(1) Heat of vaporization
(2) Gaseous densities at the same temperature and pressure
(3) Boiling points
(4) Vapour pressure at the same temperature

Ans. Gaseous densities at the same temperature and pressure

97. Which of the following liquid pairs shows a positive deviation from Raoult’s law?
(1) Water – hydrochloric acid
(2) Acetone – chloroform
(3) Water – nitric acid
(4) Benzene – methanol

Ans. Benzene – methanol

98. Which one of the following statements is false?
(1) Raoult’s law states that the vapour pressure of a components over a solution is proportional to its mole fraction
(2) Two sucrose solutions of same molality prepared in different solvents will have the same freezing point depression
(3) The correct order of osmotic pressure for 0.01 M aqueous solution of each compound is $BaCl_2 > KCl > CH_3COOH >$ sucrose
(4) The osmotic pressure (π) = MRT, where M is the molarity of the solution

Ans. Two sucrose solutions of same molality prepared in different solvents will have the same freezing point depression

99. What type of crystal defect is indicated in the diagram below?

Na^+ Cl^- Na^+Cl^- Na^+Cl^-
Cl^- □ Cl^- □ Na^+□ Na^+
Na^+ Cl^- □ Cl^- Na^+ Cl^-
Cl^- Na^+Cl^- Na^+ □ Na^+

(1) Frenkel defect
(2) Frenkel and Schottky defects
(3) Interstitial defect
(4) Schottky defect

Ans. Schottky defect

100. An ideal gas expands in volume from 1×10^{-3} m^3 to 1×10^{-2} m^3 at 300 K against a constant pressure of 1×10^5 Nm^{-2}. The work done is

(1) -900 J
(2) 900 kJ
(3) 2780 kJ
(4) -900 kJ

Ans. -900 J

101. In hydrogen – oxygen fuel cell, combustion of hydrogen occurs to

(1) generate heat
(2) remove adsorbed oxygen from electrode surfaces
(3) produce high purity water
(4) create potential difference between the two electrodes

Ans. create potential difference between the two electrodes

102. In first order reaction, the concentration of the reactant decreases from 0.8 M to 0.4 M in 15 minutes. The time taken for the concentration to change from 0.1 M to 0.025 M is

(1) 30 minutes
(2) 60 minutes
(3) 7.5 minutes
(4) 15 minutes

Ans. 30 minutes

103. What is the equilibrium expression for the reaction $P_{4(s)} + 5O_{2(g)} \rightleftharpoons P_4O_{10(s)}$?

(1) $Kc = [P_4O_{10}] / P_4] [O_2]^5$
(2) $Kc = 1/[O_2]^5$
(3) $Kc = [O_2]^5$
(4) $Kc = [P_4O_{10}] / 5[P_4][O_2]$

Ans. $Kc = 1/[O_2]^5$

104. For the reaction, $CO(g) + Cl_2(g) \rightleftharpoons COCl_2(g)$ the $\frac{K_p}{K_c}$ is equal to

(1) $\frac{1}{RT}$
(2) 1.0
(3) $\sqrt{RT}$
(4) RT

Ans. $\frac{1}{RT}$

105. The equilibrium constant for the reaction $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$ at temperature T is 4×10^{-4}. The value of Kc for the reaction $NO(g) \rightleftharpoons \frac{1}{2}N_2(g) + \frac{1}{2}O_2(g)$ at the same temperature is

(1) 2.5×10^{2}
(2) 0.02
(3) 4×10^{-4}
(4) 50

Ans. 50

106. The rate equation for the reaction $2A + B \longrightarrow C$ is found to be: rate k[A][B]. The correct statement in relation to this reaction is that the
(1) unit of K must be s^{-1}
(2) values of k is independent of the initial concentration of A and B
(3) rate of formation of C is twice the rate of disappearance of A
(4) $t_{1/2}$ is a constant

Ans. values of k is independent of the initial concentration of A and B

107. Consider the following E° values
$E^{\circ}_{Fe^{3+}/Fe^{2+}} = 0.77$ V
$E^{\circ}_{Sn^{2+}/Sn} = -0.14$V
Under standard conditions the potential for the reaction
$Sn(s) + 2Fe^{3+}(aq) \longrightarrow 2Fe^{2+}(aq) + Sn^{2+}(aq)$ is
(1) 1.68 V
(2) 0.63 V
(3) 0.91 V
(4) 1.40 V

Ans. 0.91 V

108. The molar solubility product is K_{sp}. 's' is given in terms of K_{sp} by the relation
(1) $s = \left(\frac{K_{sp}}{128}\right)^{1/4}$
(2) $s = \left(\frac{K_{sp}}{256}\right)^{1/5}$
(3) $s = \left(256K_{sp}\right)^{1/5}$
(4) $s = (128K_{sp})^{1/4}$

Ans. $s = \left(\frac{K_{sp}}{256}\right)^{1/5}$

109. The standard e.m.f of a cell, involving one electron change is found to be 0.591 V at 25°C. The equilibrium constant of the reaction is (F = 96,500 C mol^{-1}: R = 8.314 JK^{-1} mol^{-1})
(1) 1.0×10^{1}
(2) 1.0×10^{30}
(3) 1.0×10^{10}
(4) 1.0×10^{5}

Ans. 1.0×10^{10}

110. The enthalpies of combustion of carbon and carbon monoxide are -393.5 and -283 kJ mol^{-1} respectively. The enthalpy of formation of carbon monoxide per mole is
(1) 110.5 kJ
(2) -110.5 kJ
(3) -676.5 kJ
(4) 676.5 kJ

Ans. -110.5 kJ

111. The limiting molar conductivities $\Lambda°$ for NaCl, KBr and KCl are 126, 152 and 150 S cm^{2} mol^{-1} respectively. The $\Lambda°$ for NaBr is
(1) 128 S cm^{2} mol^{-1}
(2) 302 S cm^{2} mol^{-1}
(3) 278 S cm^{2} mol^{-1}
(4) 176 S cm^{2} mol^{-1}

Ans. 128 S cm^2 mol^{-1}

112. In a cell that utilises the reaction $Zn(s) + 2H^+(aq) \longrightarrow Zn^{2+}(aq) + H_2(g)$ addition of H_2SO_4 to cathode compartment, will
(1) lower the E and shift equilibrium to the left
(2) increases the E and shift equilibrium to the left
(3) increase the E and shift equilibrium to the right
(4) Lower the E and shift equilibrium to the right

Ans. increase the E and shift equilibrium to the right

113. Which one the following statement regarding helium is incorrect?
(1) It is used to fill gas balloons instead of hydrogen because it is lighter and non – inflammable
(2) It is used in gas – cooled nuclear reactors
(3) It is used to produce and sustain powerful superconducting reagents
(4) It is used as cryogenic agent for carrying out experiments at low temperatures

Ans. It is used to fill gas balloons instead of hydrogen because it is lighter and non – inflammable

114. Identify the correct statements regarding enzymes
(1) Enzymes are specific biological catalysts that can normally function at very high temperature (T ~ 1000 K)
(2) Enzymes are specific biological catalysts that the posses well – defined active sites
(3) Enzymes are specific biological catalysts that can not be poisoned
(4) Enzymes are normally heterogeneous catalysts that are very specific in their action

Ans. Enzymes are specific biological catalysts that the posses well – defined active sites

115. One mole of magnesium nitride on the reaction with an excess of water gives
(1) one mole of ammonia (2) two moles of nitric acid
(3) two moles of ammonia (4) one mole of nitric acid

Ans. two moles of ammonia

116. Which one of the following ores is best concentrated by froth – floatation method?
(1) Magnetite (2) Malachite
(3) Galena (4) Cassiterite

Ans. Galena

117. Beryllium and aluminium exhibit many properties which are similar. But the two elements differ in
(1) exhibiting maximum covalency in compound
(2) exhibiting amphoteric nature in their oxides
(3) forming covalent halides
(4) forming polymeric hydrides

Ans. exhibiting maximum covalency in compound

118. Aluminium chloride exists as dimer, Al_2Cl_6 in solid state as well as in solution of non-polar solvents such as benzene. When dissolved in water, it gives
(1) $Al^{3+} + 3Cl^-$ (2) $Al_2O_3 + 6HCl$
(3) $[Al(OH)_6]^{3-}$ (D) $[Al(H_2O)_6]^{3+} + 3Cl^-$

Ans. $[Al(H_2O)_6]^{3+} + 3Cl^-$

119. The soldiers of Napolean army while at Alps during freezing winter suffered a serious problem as regards to the tin buttons of their uniforms. White metallic tin buttons got converted to grey powder. This transformation is related to
(1) an interaction with nitrogen of the air at very low temperatures
(2) an interaction with water vapour contained in the humid air
(3) a change in the partial pressure of oxygen in the air
(4) a change in the crystalline structure of tin

Ans. a change in the crystalline structure of tin

120. The $E^{\circ}_{M^{+3}/M^{2+}}$ values for Cr, Mn, Fe and Co are – 0.41, +1.57, + 0.77 and +1.97 V respectively. For which one of these metals the change in oxidation state form +2 to +3 is easiest?
(1) Cr (2) Co
(3) Fe (4) Mn

Ans. Cr

121. Excess of KI reacts with $CuSO_4$ solution and then $Na_2S_2O_3$ solution is added to it. Which of the statements is incorrect for this reaction?
(1) Cu_2I_2 is reduced (2) Evolved I_2 is reduced
(3) $Na_2S_2O_3$ is oxidized (4) CuI_2 is formed

Ans. CuI_2 is formed

122. Among the properties (a) reducing (b) oxidising (c) complexing, the set of properties shown by CN^- ion towards metal species is
(1) a, b (2) a, b, c
(3) c, a (4) b, c

Ans. c, a

123. The coordination number of central metal atom in a complex is determined by
(1) the number of ligands around a metal ion bonded by sigma bonds
(2) the number of only anionic ligands bonded to the metal ion
(3) the number of ligands around a metal ion bonded by sigma and pi- bonds both
(4) the number of ligands around a metal ion bonded by pi-bonds

Ans. the number of ligands around a metal ion bonded by sigma

124. Which one of the following complexes in an outer orbital complex?
(1) $[Fe(CN)_6]^{4-}$ (2) $[Ni(NH_3)_6]^{2+}$
(3) $[Co(NH_3)_6]^{3+}$ (4) $[Mn(CN)_6]^{4-}$

Ans. $[Ni(NH_3)_6]^{2+}$

125. Coordination compound have great importance in biological systems. In this context which of the following statements is incorrect?
(1) Chlorophylls are green pigments in plants and contains calcium
(2) Carboxypeptidase – A is an enzyme and contains zinc
(3) Cyanocobalamin is B_{12} and contains cobalt
(4) Haemoglobin is the red pigment of blood and contains iron

Ans. Chlorophylls are green pigments in plants and contains calcium

126. Cerium (Z = 58) is an important member of the lanthanoids. Which of the following statements about cerium is incorrect?
(1) The common oxidation states of cerium are +3 and +4
(2) Cerium (IV) acts as an oxidizing agent
(3) The +4 oxidation state of cerium is not known in solutions
(4) The +3 oxidation state of cerium is more stable than the +4 oxidation state

Ans. The +4 oxidation state of cerium is not known in solutions

127. Which one the following has largest number of isomers?
(1) $[Ru(NH_3)_4Cl_2^+]$ (2) $[Co(en)_2Cl_2]^+$
(3) $[Ir(PR_3)_2\ H(CO)]^{2+}$ (4) $[Co(NH_3)_5Cl]^{2+}$
(R -= alkyl group, en = ethylenediamine)

Ans. $[Co(en)_2Cl_2]^+$

128. The correct order of magnetic moments (spin only values in B.M.) among is
(1) $[MnCl_4]^{2-} > [CoCl_4]^{-2} > [Fe(CN)_6]^{-4}$ (2) $[Fe(CN)_6]^{-4} > [CoCl_4]^{2-} > [MnCl_4]^{2-}$
(3) $[Fe(CN)_6]^{4-} > [MnCl_4]^{2-} > [CoCl_4]^{2-}$ (4) $[MnCl_4]^{2-} > [Fe(CN)_6]^{4-} > [CoCl_4]^{2-}$
(Atomic numbers: Mn = 25; Fe = 26, Co =27)

Ans. $[MnCl_4]^{2-} > [CoCl_4]^{-2} > [Fe(CN)_6]^{-4}$

129. Consider the following nuclear reactions
$^{238}_{92}M \rightarrow ^{x}_{y}N + ^{4}_{2}He$
$^{x}_{y}N \rightarrow ^{A}_{B}L + 2\beta^{+}$
The number of neutrons in the element L is
(1) 142 (2) 146
(3) 140 (4) 144

Ans. 144

130. The half – life of a radioisotope is four hours. If the initial mass of the isotope was 200 g, the mass remaining after 24 hours undecayed is
(1) 1.042 g (2) 4.167 g
(3) 3.125 g (4) 2.084 g

Ans. 3.125 g

131. The compound formed in the positive test for nitrogen with the Lassaigne solution of an organic compound is
(1) $Fe_4[Fe(CN)_6]_3$ (2) $Na_4[Fe(CN)_5NOS]$
(3) $Fe(CN)_3$ (4) $Na_3[Fe(CN)_6]$

Ans. $Fe_4[Fe(CN)_6]_3$

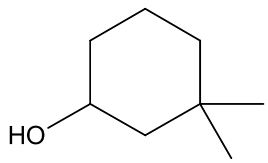
132. The ammonia evolved from the treatment of 0.30 g of an organic compound for the estimation of nitrogen was passed in 100 mL of 0.1 M sulphuric acid. The excess of acid required 20 mL of 0.5 M sodium hydroxide solution hydroxide solutio for complete neutralization. The organic compound is
(1) acetamide (2) thiourea
(3) urea (4) benzamide

Ans. urea

133. Which one of the following has the minimum boiling point?
(1) n-butane (2) isobutane
(3) 1- butene (4) 1- butyne

Ans. isobutane

134. The IUPAC name of the compound



(1) 3, 3- dimethyl -1- hydroxy cyclohexane (2) 1,1 – dimethyl -3- cyclohexanol
(3) 3,3- dimethyl -1- cyclohexanol (4) 1,1 – dimethyl -3- hydroxy cyclohexane

Ans. 3,3- dimethyl -1- cyclohexanol

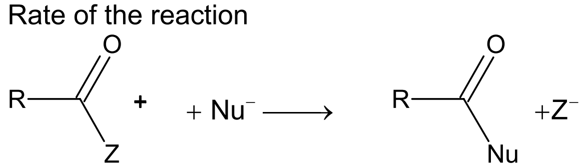
135. Which one the following does not have sp^2 hybridized carbon?
(1) Acetone (2) Acetamide
(3) Acetonitrile (4) Acetic acid

Ans. Acetonitrile

136. Which of the following will have meso-isomer also?
(1) 2- chlorobutane (2) 2- hydroxyopanoic acid
(3) 2,3 – dichloropentane (4) 2-3- dichlorobutane

Ans. 2-3- dichlorobutane

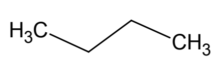
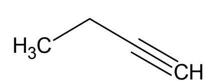
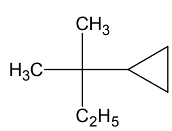
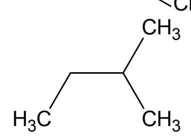
137. Rate of the reaction

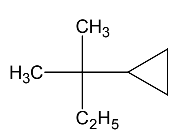


is fastest when Z is
(1) Cl (2) $OCOCH_3$
(3) OC_2H_5 (4) NH_2

Ans. Cl

138. Amongst the following compound, the optically active alkane having lowest molecular mass is

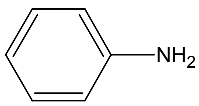
(1) 
(2) 
(3) 
(4) 

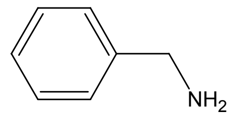
Ans. 

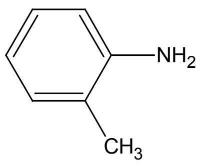
139. Consider the acidity of the carboxylic acids:
(1) PhCOOH
(2) o – $NO_2C_6H_4COOH$
(3) p – $NO_2C_6H_4COOH$
(4) m – $NO_2C_6H_4COOH$

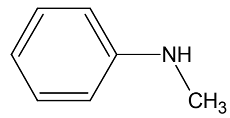
Ans. o – $NO_2C_6H_4COOH$

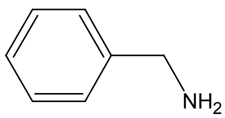
140. Which of the following is the strongest base?

(1) 

(2) 

(3) 

(4) 

Ans. 

141. Which base is present in RNA but not in DNA?
(1) Uracil
(2) Thymine
(3) Guanine
(4) Cytosine

Ans. Uracil

142. The compound formed on heating chlorobenzene with chloral in the presence concentrated sulphuric acid is
(1) gammexene
(2) hexachloroethane
(3) Freon
(4) DDT

Ans. DDT

143. On mixing ethyl acetate with aqueous sodium chloride, the composition of the resultant solution is
(1) $CH_3COOC_2H_5 + NaCl$
(2) $CH_3Cl + C_2H_5COONa$
(3) $CH_3COCl + C_2H_5OH + NaOH$
(4) $CH_3COONa + C_2H_5OH$

Ans. $CH_3COOC_2H_5 + NaCl$

144. Acetyl bromide reacts with excess of CH_3MgI followed by treatment with a saturated solution of NH_4Cl given
(1) acetone
(2) acetyl iodide
(3) 2- methyl -2- propanol
(4) acetamide

Ans. 2- methyl -2- propanol

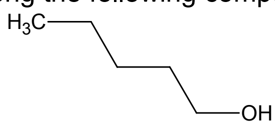
145. Which one of the following reduced with zinc and hydrochloric acid to give the corresponding hydrocarbon?
(1) Ethyl acetate
(2) Butan -2-one
(3) Acetamide
(4) Acetic acid

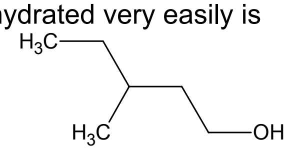
Ans. Butan -2-one

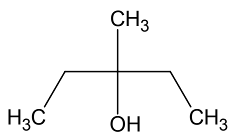
146. Which of the following undergoes reaction with 50% sodium hydroxide solution to give the corresponding alcohol and acid?
(1) Phenol
(2) Benzoic acid
(3) Butanal
(4) Benzaldehyde

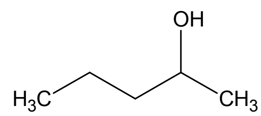
Ans. Benzaldehyde

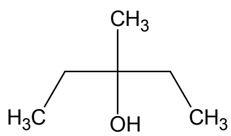
147. Among the following compound which can be dehydrated very easily is

(1) 

(2) 

(3) 

(D) 

Ans. 

148. Which of the following compound is not chiral?
(1) 1- chloropentane
(2) 3-chloro-2- methyl pentane
(3) 1-chloro -2- methyl pentane
(4) 2- chloropentane

Ans. 1- chloropentane

149. Insulin production and its action in human body are responsible for the level of diabetes. This compound belongs to which of the following categories?
(1) A co- enzyme
(2) An antibiotic
(3) An enzyme
(4) A hormone

Ans. A hormone

150. The smog is essentially caused by the presence of
(1) O_2 and O_3
(2) O_3 and N_2
(3) Oxides of sulphur and nitrogen
(4) O_2 and N_2

Ans. Oxides of sulphur and nitrogen

SOLUTIONS (AIEEE)

76.	**(3)**	77.	**(4)**	78.	**(3)**	79.	**(1)**
80.	**(3)**	81.	**(1)**	82.	**(2)**	83.	**(4)**
84.	**(3)**	85.	**(4)**	86.	**(3)**	87.	**(2)**
88.	**(3)**	89.	**(2)**	90.	**(1)**	91.	**(2)**
92.	**(3)**	93.	**(2)**	94.	**(4)**	95.	**(3)**
96.	**(2)**	97.	**(4)**	98.	**(2)**	99.	**(4)**
100.	**(1)**	101.	**(4)**	102.	**(1)**	103.	**(2)**
104.	**(1)**	105.	**(4)**	106.	**(2)**	107.	**(3)**
108.	**(2)**	109.	**(3)**	110.	**(2)**	111.	**(1)**
112.	**(3)**	113.	**(1)**	114.	**(2)**	115.	**(3)**
116.	**(3)**	117.	**(1)**	118.	**(4)**	119.	**(4)**
120.	**(1)**	121.	**(4)**	122.	**(3)**	123.	**(1)**
124.	**(2)**	125.	**(1)**	126.	**(3)**	127.	**(2)**
128.	**(1)**	129.	**(4)**	130.	**(3)**	131.	**(1)**
132.	**(3)**	133.	**(2)**	134.	**(2)**	135.	**(3)**
136.	**(4)**	137.	**(1)**	138.	**(3)**	139.	**(2)**
140.	**(2)**	141.	**(1)**	142.	**(4)**	143.	**(1)**
144.	**(3)**	145.	**(2)**	146.	**(4)**	147.	**(3)**
148.	**(1)**	149.	**(4)**	150.	**(3)**		

SOLUTION

76. $4f \longrightarrow n = 4$
$l = 3$
$m = -l \text{ to } +l$
$-3 \text{ to } +3$

77. $24 \longrightarrow 1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^5$
$l = 1 \rightarrow p \longrightarrow 12$
$l = 2 \rightarrow d \longrightarrow 5$

78. Li^{+} F^{-} O^{-2} B^{+3}

e	2	10	10	2
p	3	9	8	5

79. $\frac{1}{\lambda} = R\left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right]$

$= 1.097 \times 10^7 \left(\frac{1}{1}\right)$

$\lambda = \frac{1}{1.097} \times 10^{-7} m$

80. $H_2S \longrightarrow sp^3$
$NH_3 \longrightarrow sp^3$
$BF_3 \longrightarrow sp^2$
$SiH_4 \longrightarrow sp^3$

82. Al, Si, P, S acidity of oxides increases

83. Bond order of NO = 2.5
Bond order of NO^+ = 3
Higher the bond order shorter is the bond length

84. $O^{-1}(g) + e \longrightarrow O^{-2}(g)$
Due to the electronic repulsion, amount of the energy is needed to add electron

86. Total no of valence electrons
$= 3+7\times4+1 = 32$
Total No of hybrid orbital = 4
$\because$ Hybridisation = sp^3

88. $\frac{E_1}{E_2} = \frac{T_1}{T_2}$

$\frac{E_1}{E_2} = \frac{293}{313}$

$\because$ factor = $\frac{313}{293}$

89. sp^3d^2 hybridisation confirms to octahedral or square bipyramidal configuration
$\therefore$ all the bond angles are 90° in the structure

90. Von't Hoffs factor (i) for Na_2SO_4 is maximum i.e. 3(maximum no of particles)
$Na_2SO_4 \longrightarrow 2Na^+ + SO_4^{--}$

92. In Vander Waals equation 'b' is the excluded volume i.e. the volume occupied by the molecules

93. $\because$ $6.02\times10^{+20}$ molecules of urea is present in = $\frac{0.0001\times1000}{100} = 0.01M$

95. No. of gm equivalents of phosphorous acid
= No. of gm equivalents of KOH
$20\times0.1\times2$ (n = factor) = $0.1 \times V$
$= 0.1 \times V$

$V = \frac{4}{0.1} = 40\,ml$

96. $\because$ the molecular weight of C_2H_5OH & CH_3OCH_3 are same so in its vapour phase at same temperature & pressure the densities will be same

97. Benzene in methanol breaks the H – bonding of the alcohol making its boiling point decrease & there by its vapour pressure increases leading two +ve deviation.

100. Work done = $-P(\Delta V)$
$= -1\times10^5\,[10^{-2} - 10^{-3}] = -900$ J

102. $t_{1/2}$ = 15 minutes
$\therefore$ No. of half lives s =2
($\therefore$ for change of 0.1 to 0.025)
is 30 minutes

103. Applying law of mass action

104. $Kp = Kc\,(RT)^{\Delta n}$

105. As per property of equilibria reverse the equation & divide it by 2

107. $E_{cell} = E^\circ_{RHS} - E^\circ_{LHS}$
= (0.77) – (-0.14)
= 0.91 V

108. $Ksp = 108s^5$
$1\times4^4\times s^{1+4} = 256\,s^5 = Ksp$

109. $\therefore \log K_{eq} = \frac{nE^\circ}{0.0591} = \frac{1\times0.591}{0.0591}$
$\Rightarrow K_{eq} = 10^{10}$

110. $C + O_2 \longrightarrow CO_2$ $\quad \Delta H = -393.5$ kJ
$2CO + \frac{1}{2}O_2 \longrightarrow 2CO_2$ $\quad \Delta H = -283$ kJ
$2C + O_2 \longrightarrow 2CO$ $\quad \Delta H = -110$ kJ

111. $\Lambda^\circ_{NaCl} = \lambda^\circ_{Na} + \lambda^\circ_{Cl} = 126$ … (1)
$\Lambda^\circ_{KBr} = \lambda^\circ_{K^+} + \lambda^\circ_{Br^-} = 152$ … (2)
$\Lambda^\circ_{KCl} = \lambda^\circ_{K^+} + \lambda^\circ_{Cl^-} = 150$ … (3)
$\Lambda^\circ_{NaBr} = \lambda^\circ_{Na} + \lambda^\circ_{Br^-}$
$\Lambda^\circ_{NaBr} = 126 + 152 - 150 = 128$

115. $Mg_3N_2 + 6H_2O \longrightarrow 3Mg(OH)_2 + 2NH_3$

117. $\because$ Be & Al have diagonal relationship & so possess similar properties but Be cannot form polymeric hydrides

120. $\because$ oxidation of potential of Cr is least & so it changes easily from +2 to +3 state

121. $2\,CuSO_4 + 4KI\ (excess) \longrightarrow 2K_2SO_4 + Cu_2\,I_2 + I_2\uparrow$

$Na_2S_2O_3 + I_2 \longrightarrow Na_2S_4O_6 + 2NaI$

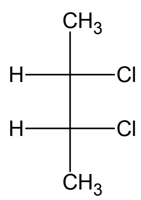
124. sp^3d^2 $\therefore$ outer orbital octahedral complex

125. Chlorophyll contains magnesium instead of calcium

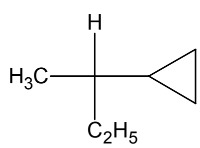
126. Oxidation potential of Ce(IV) in aqueous solution is supposed to be –ve i.e. -0.784 V at 25°C

130. $2^6 = \dfrac{200}{a-x}$
$(a - x) = 3.125$ gm

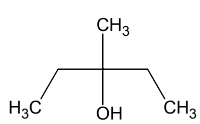
135. It is having only sp^3 & sp hybridized carbon atom

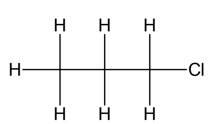
136.

plane symmetry

137. Rate of reaction will be fastest when Z is Cl because it is a weakest base

138.


146. Benzaldehyde does not contain α - hydrogen. Hence goes for cannizarro's reaction forming alcohol and acid

147.

Tertiory alcohols will undergo more easily dehydration than secondary & primary

148.

No. chiral centre
Hence not chiral compound

149. Insulin