100. Which of the following set of molecules will have zero dipole moment ?

(1) Boron trifluoride, hydrogen fluoride, carbon dioxide, 1,3-dichlorobenzene

(2) Nitrogen trifluoride, beryllium difluoride, water, 1,3-dichlorobenzene

(3) Boron trifluoride, beryllium difluoride, carbon dioxide, 1,4-dichlorobenzene

(4) Ammonia, beryllium difluoride, water, 1,4-dichlorobenzene

101. The following metal ion activates many enzymes, participates in the oxidation of glucose to produce ATP and with Na, is responsible for the transmission of nerve signals.

(1) Copper

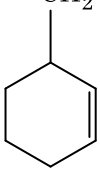
(2) Calcium

(3) Potassium

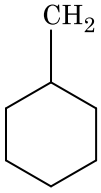
(4) Iron

102. An alkene on ozonolysis gives methanal as one of the product. Its structure is :

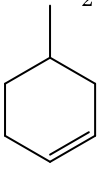
(1) $CH_2-CH_2-CH_3$



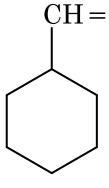
(2) $CH_2-CH=CH_2$



(3) $CH_2CH_2CH_3$



(4) $CH=CH-CH_3$



103. The rate constant for a first order reaction is $4.606 \times 10^{-3}\ s^{-1}$. The time required to reduce 2.0 g of the reactant to 0.2 g is :

(1) 200 s

(2) 500 s

(3) 1000 s

(4) 100 s

104. Reaction between acetone and methylmagnesium chloride followed by hydrolysis will give :

(1) Sec. butyl alcohol

(2) Tert. butyl alcohol

(3) Isobutyl alcohol

(4) Isopropyl alcohol

105. Which of the following is a natural polymer ?

(1) poly (Butadiene-styrene)

(2) polybutadiene

(3) poly (Butadiene-acrylonitrile)

(4) *cis*-1,4-polyisoprene

106. Identify the **correct** statements from the following :

(a) $CO_2(g)$ is used as refrigerant for ice-cream and frozen food.

(b) The structure of C_{60} contains twelve six carbon rings and twenty five carbon rings.

(c) ZSM-5, a type of zeolite, is used to convert alcohols into gasoline.

(d) CO is colorless and odourless gas.

(1) (a) and (c) only

(2) (b) and (c) only

(3) (c) and (d) only

(4) (a), (b) and (c) only

107. The correct option for free expansion of an ideal gas under adiabatic condition is :

(1) $q = 0, \Delta T < 0$ and $w > 0$

(2) $q < 0, \Delta T = 0$ and $w = 0$

(3) $q > 0, \Delta T > 0$ and $w > 0$

(4) $q = 0, \Delta T = 0$ and $w = 0$

108. Which of the following oxoacid of sulphur has $-O-O-$ linkage ?

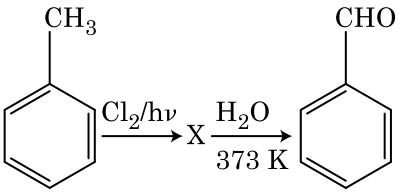
(1) H_2SO_4, sulphuric acid

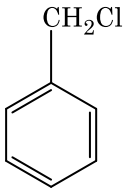
(2) $H_2S_2O_8$, peroxodisulphuric acid

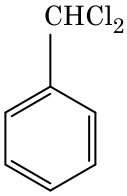
(3) $H_2S_2O_7$, pyrosulphuric acid

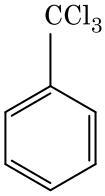
(4) H_2SO_3, sulphurous acid

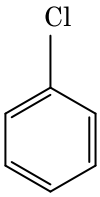
109. Identify compound X in the following sequence of reactions :



(1) 

(2) 

(3) 

(4) 

110. The number of protons, neutrons and electrons in $^{175}_{71}Lu$, respectively, are :

(1) 104, 71 and 71

(2) 71, 71 and 104

(3) 175, 104 and 71

(4) 71, 104 and 71

111. Identify the **incorrect** statement.

(1) The transition metals and their compounds are known for their catalytic activity due to their ability to adopt multiple oxidation states and to form complexes.

(2) Interstitial compounds are those that are formed when small atoms like H, C or N are trapped inside the crystal lattices of metals.

(3) The oxidation states of chromium in CrO_4^{2-} and $Cr_2O_7^{2-}$ are not the same.

(4) $Cr^{2+}(d^4)$ is a stronger reducing agent than $Fe^{2+}(d^6)$ in water.

112. Which of the following is a cationic detergent ?

(1) Sodium stearate

(2) Cetyltrimethyl ammonium bromide

(3) Sodium dodecylbenzene sulphonate

(4) Sodium lauryl sulphate

113. The freezing point depression constant (K_f) of benzene is 5.12 K kg mol^{-1}. The freezing point depression for the solution of molality 0.078 m containing a non-electrolyte solute in benzene is (rounded off upto two decimal places) :

(1) 0.80 K

(2) 0.40 K

(3) 0.60 K

(4) 0.20 K

114. Identify the **incorrect** match.

	Name		**IUPAC Official Name**
(a)	Unnilunium	(i)	Mendelevium
(b)	Unniltrium	(ii)	Lawrencium
(c)	Unnilhexium	(iii)	Seaborgium
(d)	Unununnium	(iv)	Darmstadtium

(1) (b), (ii)

(2) (c), (iii)

(3) (d), (iv)

(4) (a), (i)

115. The mixture which shows positive deviation from Raoult's law is :

(1) Benzene + Toluene

(2) Acetone + Chloroform

(3) Chloroethane + Bromoethane

(4) Ethanol + Acetone

116. Match the following :

	Oxide		**Nature**
(a)	CO	(i)	Basic
(b)	BaO	(ii)	Neutral
(c)	Al_2O_3	(iii)	Acidic
(d)	Cl_2O_7	(iv)	Amphoteric

Which of the following is **correct** option ?

	(a)	**(b)**	**(c)**	**(d)**
(1)	(ii)	(i)	(iv)	(iii)
(2)	(iii)	(iv)	(i)	(ii)
(3)	(iv)	(iii)	(ii)	(i)
(4)	(i)	(ii)	(iii)	(iv)

117. Which one of the followings has maximum number of atoms ?

(1) 1 g of Mg(s) [Atomic mass of Mg = 24]

(2) 1 g of O_2(g) [Atomic mass of O = 16]

(3) 1 g of Li(s) [Atomic mass of Li = 7]

(4) 1 g of Ag(s) [Atomic mass of Ag = 108]

118. Reaction between benzaldehyde and acetophenone in presence of dilute NaOH is known as :

(1) Cannizzaro's reaction

(2) Cross Cannizzaro's reaction

(3) Cross Aldol condensation

(4) Aldol condensation

119. A tertiary butyl carbocation is more stable than a secondary butyl carbocation because of which of the following ?

(1) + R effect of $-CH_3$ groups

(2) − R effect of $-CH_3$ groups

(3) Hyperconjugation

(4) − I effect of $-CH_3$ groups

120. Which of the following is **not** correct about carbon monoxide ?

(1) It reduces oxygen carrying ability of blood.

(2) The carboxyhaemoglobin (haemoglobin bound to CO) is less stable than oxyhaemoglobin.

(3) It is produced due to incomplete combustion.

(4) It forms carboxyhaemoglobin.

121. Which of the following is a basic amino acid ?

(1) Alanine

(2) Tyrosine

(3) Lysine

(4) Serine

122. Urea reacts with water to form **A** which will decompose to form **B**. **B** when passed through Cu^{2+} (aq), deep blue colour solution **C** is formed. What is the formula of **C** from the following ?

(1) $[Cu(NH_3)_4]^{2+}$

(2) $Cu(OH)_2$

(3) $CuCO_3 \cdot Cu(OH)_2$

(4) $CuSO_4$

123. A mixture of N_2 and Ar gases in a cylinder contains 7 g of N_2 and 8 g of Ar. If the total pressure of the mixture of the gases in the cylinder is 27 bar, the partial pressure of N_2 is :

[Use atomic masses (in g mol^{-1}) : N = 14, Ar = 40]

(1) 12 bar

(2) 15 bar

(3) 18 bar

(4) 9 bar

124. Identify the **correct** statement from the following :

(1) Blister copper has blistered appearance due to evolution of CO_2.

(2) Vapour phase refining is carried out for Nickel by Van Arkel method.

(3) Pig iron can be moulded into a variety of shapes.

(4) Wrought iron is impure iron with 4% carbon.

125. Hydrolysis of sucrose is given by the following reaction.

$$\text{Sucrose} + H_2O \rightleftharpoons \text{Glucose} + \text{Fructose}$$

If the equilibrium constant (K_c) is 2×10^{13} at 300 K, the value of $\Delta_r G^{\ominus}$ at the same temperature will be :

(1) $8.314\ J\ mol^{-1}K^{-1} \times 300\ K \times \ln(2 \times 10^{13})$

(2) $8.314\ J\ mol^{-1}K^{-1} \times 300\ K \times \ln(3 \times 10^{13})$

(3) $-8.314\ J\ mol^{-1}K^{-1} \times 300\ K \times \ln(4 \times 10^{13})$

(4) $-8.314\ J\ mol^{-1}K^{-1} \times 300\ K \times \ln(2 \times 10^{13})$

126. Identify a molecule which does **not** exist.

(1) Li_2

(2) C_2

(3) O_2

(4) He_2

127. An increase in the concentration of the reactants of a reaction leads to change in :

(1) heat of reaction

(2) threshold energy

(3) collision frequency

(4) activation energy

128. Which of the following alkane cannot be made in good yield by Wurtz reaction ?

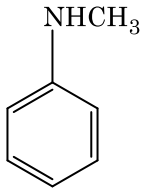
(1) 2,3-Dimethylbutane

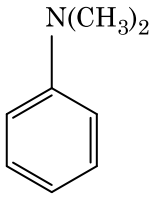
(2) n-Heptane

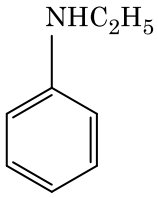
(3) n-Butane

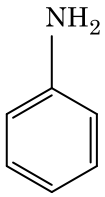
(4) n-Hexane

129. Which of the following amine will give the carbylamine test ?

(1) 

(2) 

(3) 

(4) 

130. On electrolysis of dil.sulphuric acid using Platinum (Pt) electrode, the product obtained at anode will be :

(1) Oxygen gas

(2) H_2S gas

(3) SO_2 gas

(4) Hydrogen gas

131. What is the change in oxidation number of carbon in the following reaction ?

$$CH_4(g) + 4Cl_2(g) \rightarrow CCl_4(l) + 4HCl(g)$$

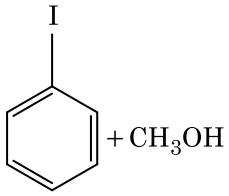
(1) 0 to +4

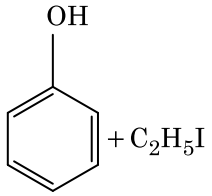
(2) −4 to +4

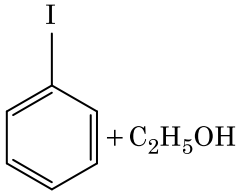
(3) 0 to −4

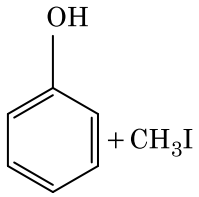
(4) +4 to +4

132. Anisole on cleavage with HI gives :

(1)  $+ CH_3OH$

(2)  $+ C_2H_5I$

(3)  $+ C_2H_5OH$

(4)  $+ CH_3I$

133. Measuring Zeta potential is useful in determining which property of colloidal solution ?

(1) Solubility

(2) Stability of the colloidal particles

(3) Size of the colloidal particles

(4) Viscosity

134. Paper chromatography is an example of :

(1) Partition chromatography

(2) Thin layer chromatography

(3) Column chromatography

(4) Adsorption chromatography

135. Match the following and identify the **correct** option.

(a)	$CO(g) + H_2(g)$	(i)	$Mg(HCO_3)_2 + Ca(HCO_3)_2$
(b)	Temporary hardness of water	(ii)	An electron deficient hydride
(c)	B_2H_6	(iii)	Synthesis gas
(d)	H_2O_2	(iv)	Non-planar structure

	(a)	**(b)**	**(c)**	**(d)**
(1)	(iii)	(ii)	(i)	(iv)
(2)	(iii)	(iv)	(ii)	(i)
(3)	(i)	(iii)	(ii)	(iv)
(4)	(iii)	(i)	(ii)	(iv)

136. A series LCR circuit is connected to an ac voltage source. When L is removed from the circuit, the phase difference between current and voltage is $\frac{\pi}{3}$. If instead C is removed from the circuit, the phase difference is again $\frac{\pi}{3}$ between current and voltage. The power factor of the circuit is :

(1) 0.5

(2) 1.0

(3) -1.0

(4) zero

137. A wire of length L, area of cross section A is hanging from a fixed support. The length of the wire changes to L_1 when mass M is suspended from its free end. The expression for Young's modulus is :

(1) $\frac{Mg(L_1 - L)}{AL}$

(2) $\frac{MgL}{AL_1}$

(3) $\frac{MgL}{A(L_1 - L)}$

(4) $\frac{MgL_1}{AL}$