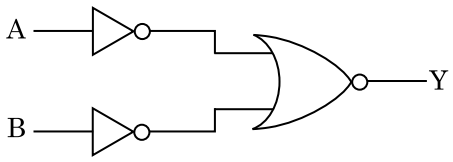
133. For the logic circuit shown, the truth table is :



(1)

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

(2)

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

(3)

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

(4)

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

134. The solids which have the negative temperature coefficient of resistance are :

(1) insulators only

(2) semiconductors only

(3) insulators and semiconductors

(4) metals

135. 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

136. 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) $8.314\ \text{J mol}^{-1}\text{K}^{-1} \times 300\ \text{K} \times \ln(2 \times 10^{13})$

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

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

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

137. 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]

138. 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.

139. The calculated spin only magnetic moment of Cr^{2+} ion is :

(1) 4.90 BM

(2) 5.92 BM

(3) 2.84 BM

(4) 3.87 BM

140. Which of the following is a natural polymer ?

(1) poly (Butadiene-styrene)

(2) polybutadiene

(3) poly (Butadiene-acrylonitrile)

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

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

(1) Alanine

(2) Tyrosine

(3) Lysine

(4) Serine

142. 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

143. Paper chromatography is an example of :

(1) Partition chromatography

(2) Thin layer chromatography

(3) Column chromatography

(4) Adsorption chromatography

144. For the reaction, $2Cl(g) \rightarrow Cl_2(g)$, the **correct** option is :

(1) $\Delta_r H > 0$ and $\Delta_r S < 0$

(2) $\Delta_r H < 0$ and $\Delta_r S > 0$

(3) $\Delta_r H < 0$ and $\Delta_r S < 0$

(4) $\Delta_r H > 0$ and $\Delta_r S > 0$

145. 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) $CuSO_4$

146. 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

147. An element has a body centered cubic (bcc) structure with a cell edge of 288 pm. The atomic radius is :

(1) $\frac{\sqrt{2}}{4} \times 288$ pm

(2) $\frac{4}{\sqrt{3}} \times 288$ pm

(3) $\frac{4}{\sqrt{2}} \times 288$ pm

(4) $\frac{\sqrt{3}}{4} \times 288$ pm

148. 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

149. 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

150. 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.

151. Which of the following is a cationic detergent ?

(1) Sodium stearate

(2) Cetyltrimethyl ammonium bromide

(3) Sodium dodecylbenzene sulphonate

(4) Sodium lauryl sulphate

152. 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

153. Which of the following is the **correct** order of increasing field strength of ligands to form coordination compounds ?

(1) $SCN^- < F^- < CN^- < C_2O_4^{2-}$
(2) $F^- < SCN^- < C_2O_4^{2-} < CN^-$
(3) $CN^- < C_2O_4^{2-} < SCN^- < F^-$
(4) $SCN^- < F^- < C_2O_4^{2-} < CN^-$

154. 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.

155. 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

156. 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)

157. 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

158. The number of Faradays(F) required to produce 20 g of calcium from molten $CaCl_2$ (Atomic mass of Ca = 40 g mol^{-1}) is :

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

159. Elimination reaction of 2-Bromo-pentane to form pent-2-ene is :

(a) β-Elimination reaction
(b) Follows Zaitsev rule
(c) Dehydrohalogenation reaction
(d) Dehydration reaction
(1) (a), (c), (d)
(2) (b), (c), (d)
(3) (a), (b), (d)
(4) (a), (b), (c)

160. 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

161. 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)

162. 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

163. 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

164. The rate constant for a first order reaction is 4.606×10^{-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

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

(1) Benzene + Toluene

(2) Acetone + Chloroform

(3) Chloroethane + Bromoethane

(4) Ethanol + Acetone

166. 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

167. 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

168. Sucrose on hydrolysis gives :

(1) α-D-Glucose + β-D-Glucose

(2) α-D-Glucose + β-D-Fructose

(3) α-D-Fructose + β-D-Fructose

(4) β-D-Glucose + α-D-Fructose

169. Find out the solubility of $Ni(OH)_2$ in 0.1 M NaOH. Given that the ionic product of $Ni(OH)_2$ is 2×10^{-15}.

(1) 2×10^{-8} M

(2) 1×10^{-13} M

(3) 1×10^{8} M

(4) 2×10^{-13} M

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

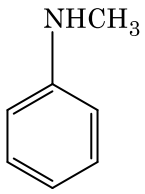
(1) $q = 0$, $\Delta T < 0$ and $w > 0$

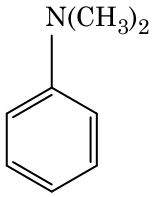
(2) $q < 0$, $\Delta T = 0$ and $w = 0$

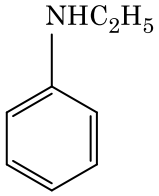
(3) $q > 0$, $\Delta T > 0$ and $w > 0$

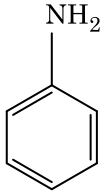
(4) $q = 0$, $\Delta T = 0$ and $w = 0$

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

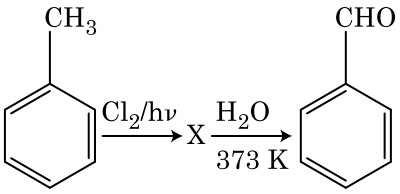
(1) 

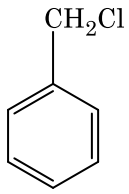
(2) 

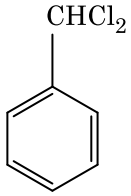
(3) 

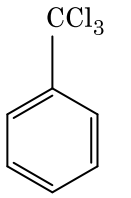
(4) 

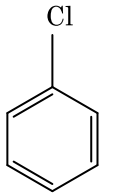
172. Identify compound X in the following sequence of reactions :



(1) 

(2) 

(3) 

(4) 

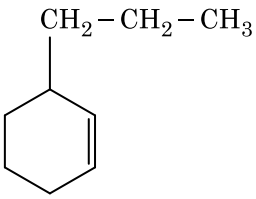
173. Reaction between benzaldehyde and acetophenone in presence of dilute NaOH is known as :

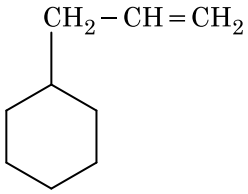
(1) Cannizzaro's reaction
(2) Cross Cannizzaro's reaction
(3) Cross Aldol condensation
(4) Aldol condensation

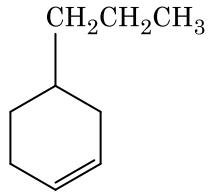
174. Identify a molecule which does **not** exist.

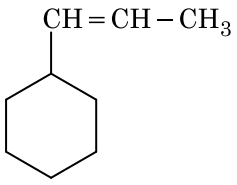
(1) Li_2
(2) C_2
(3) O_2
(4) He_2

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

(1) 

(2) 

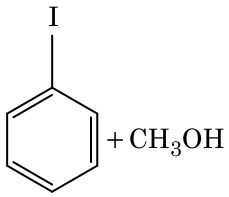
(3) 

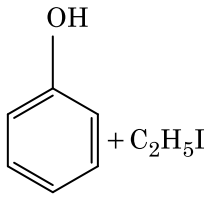
(4) 

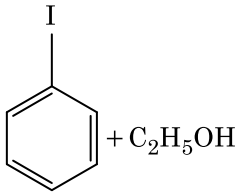
176. The following metal ion activates many enzymes, participates in the oxidation of glucose to produce ATP and with Na, is responsible for the transmission of nerve signals.

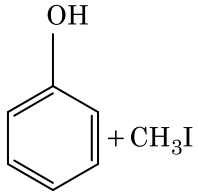
(1) Copper
(2) Calcium
(3) Potassium
(4) Iron

177. Anisole on cleavage with HI gives :

(1) 

(2) 

(3) 

(4) 

178. 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)

179. HCl was passed through a solution of $CaCl_2$, $MgCl_2$ and NaCl. Which of the following compound(s) crystallise(s) ?

(1) Only NaCl

(2) Only $MgCl_2$

(3) NaCl, $MgCl_2$ and $CaCl_2$

(4) Both $MgCl_2$ and $CaCl_2$

180. 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

- o 0 o -