

133. A  $40 \mu\text{F}$  capacitor is connected to a 200 V, 50 Hz ac supply. The rms value of the current in the circuit is, nearly :
- (1) 2.05 A
  - (2) 2.5 A
  - (3) 25.1 A
  - (4) 1.7 A
134. For transistor action, which of the following statements is **correct** ?
- (1) Base, emitter and collector regions should have same size.
  - (2) Both emitter junction as well as the collector junction are forward biased.
  - (3) The base region must be very thin and lightly doped.
  - (4) Base, emitter and collector regions should have same doping concentrations.
135. A body weighs 72 N on the surface of the earth. What is the gravitational force on it, at a height equal to half the radius of the earth ?
- (1) 32 N
  - (2) 30 N
  - (3) 24 N
  - (4) 48 N
136. On electrolysis of dil. sulphuric acid using Platinum (Pt) electrode, the product obtained at anode will be :
- (1) Oxygen gas
  - (2)  $\text{H}_2\text{S}$  gas
  - (3)  $\text{SO}_2$  gas
  - (4) Hydrogen gas
137. The number of Faradays (F) required to produce 20 g of calcium from molten  $\text{CaCl}_2$  (Atomic mass of Ca =  $40 \text{ g mol}^{-1}$ ) is :
- (1) 2
  - (2) 3
  - (3) 4
  - (4) 1
138. Elimination reaction of 2-Bromo-pentane to form pent-2-ene is :
- (a)  $\beta$ -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)
139. The rate constant for a first order reaction is  $4.606 \times 10^{-3} \text{ s}^{-1}$ . 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
140. 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
141. The mixture which shows positive deviation from Raoult's law is :
- (1) Benzene + Toluene
  - (2) Acetone + Chloroform
  - (3) Chloroethane + Bromoethane
  - (4) Ethanol + Acetone
142. Sucrose on hydrolysis gives :
- (1)  $\alpha$ -D-Glucose +  $\beta$ -D-Glucose
  - (2)  $\alpha$ -D-Glucose +  $\beta$ -D-Fructose
  - (3)  $\alpha$ -D-Fructose +  $\beta$ -D-Fructose
  - (4)  $\beta$ -D-Glucose +  $\alpha$ -D-Fructose
143. Which of the following is a basic amino acid ?
- (1) Alanine
  - (2) Tyrosine
  - (3) Lysine
  - (4) Serine

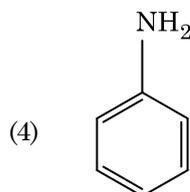
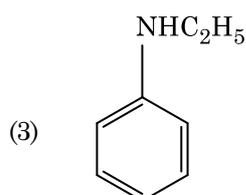
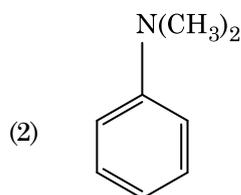
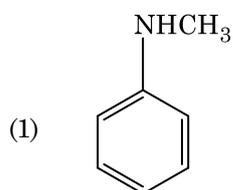
144. Which of the following alkane cannot be made in good yield by Wurtz reaction ?

- (1) 2,3-Dimethylbutane
- (2) n-Heptane
- (3) n-Butane
- (4) n-Hexane

145. Which of the following is a cationic detergent ?

- (1) Sodium stearate
- (2) Cetyltrimethyl ammonium bromide
- (3) Sodium dodecylbenzene sulphonate
- (4) Sodium lauryl sulphate

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



147. Paper chromatography is an example of :

- (1) Partition chromatography
- (2) Thin layer chromatography
- (3) Column chromatography
- (4) Adsorption chromatography

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

- (1)  $2 \times 10^{-8}$  M
- (2)  $1 \times 10^{-13}$  M
- (3)  $1 \times 10^8$  M
- (4)  $2 \times 10^{-13}$  M

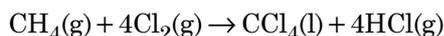
149. Which one of the followings has maximum number of atoms ?

- (1) 1 g of Mg(s) [Atomic mass of Mg = 24]
- (2) 1 g of  $\text{O}_2$ (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]

150. For the reaction,  $2\text{Cl}(\text{g}) \rightarrow \text{Cl}_2(\text{g})$ , 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  $\Delta_r S > 0$

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



- (1) 0 to +4
- (2) -4 to +4
- (3) 0 to -4
- (4) +4 to +4

152. Which of the following is a natural polymer ?

- (1) poly (Butadiene-styrene)
- (2) polybutadiene
- (3) poly (Butadiene-acrylonitrile)
- (4) *cis*-1,4-polyisoprene

153. The calculated spin only magnetic moment of  $\text{Cr}^{2+}$  ion is :

- (1) 4.90 BM
- (2) 5.92 BM
- (3) 2.84 BM
- (4) 3.87 BM

- 154.** Urea reacts with water to form **A** which will decompose to form **B**. **B** when passed through  $\text{Cu}^{2+}$  (aq), deep blue colour solution **C** is formed. What is the formula of **C** from the following ?
- (1)  $[\text{Cu}(\text{NH}_3)_4]^{2+}$
  - (2)  $\text{Cu}(\text{OH})_2$
  - (3)  $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$
  - (4)  $\text{CuSO}_4$
- 155.** 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
- 156.** Hydrolysis of sucrose is given by the following reaction.
- $$\text{Sucrose} + \text{H}_2\text{O} \rightleftharpoons \text{Glucose} + \text{Fructose}$$
- If the equilibrium constant ( $K_c$ ) is  $2 \times 10^{13}$  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)  $-8.314 \text{ J mol}^{-1} \text{ K}^{-1} \times 300 \text{ K} \times \ln(2 \times 10^{13})$
- 157.** 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
- 158.** 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
- 159.** 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
- 160.** HCl was passed through a solution of  $\text{CaCl}_2$ ,  $\text{MgCl}_2$  and NaCl. Which of the following compound(s) crystallise(s) ?
- (1) Only NaCl
  - (2) Only  $\text{MgCl}_2$
  - (3) NaCl,  $\text{MgCl}_2$  and  $\text{CaCl}_2$
  - (4) Both  $\text{MgCl}_2$  and  $\text{CaCl}_2$
- 161.** The number of protons, neutrons and electrons in  ${}_{71}^{175}\text{Lu}$ , respectively, are :
- (1) 104, 71 and 71
  - (2) 71, 71 and 104
  - (3) 175, 104 and 71
  - (4) 71, 104 and 71
- 162.** Match the following :
- | Oxide                       | Nature          |
|-----------------------------|-----------------|
| (a) CO                      | (i) Basic       |
| (b) BaO                     | (ii) Neutral    |
| (c) $\text{Al}_2\text{O}_3$ | (iii) Acidic    |
| (d) $\text{Cl}_2\text{O}_7$ | (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)  |

163. 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

164. 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]

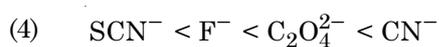
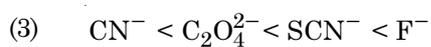
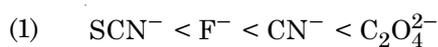
(1) 12 bar

(2) 15 bar

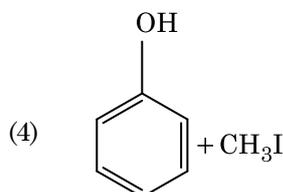
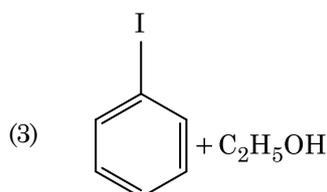
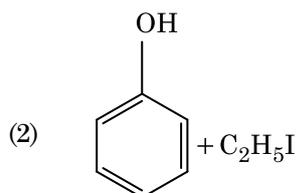
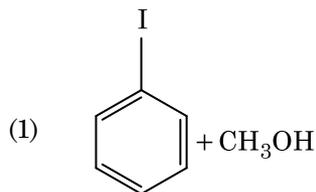
(3) 18 bar

(4) 9 bar

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



166. Anisole on cleavage with HI gives :



167. 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  $w = 0$

168. 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.

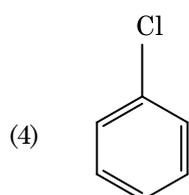
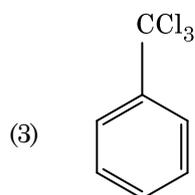
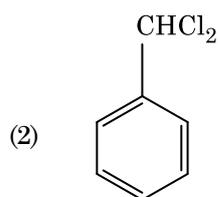
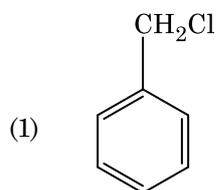
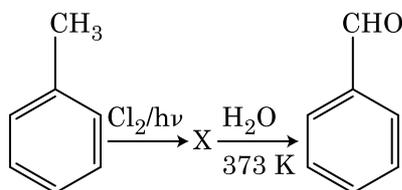
(3) Pig iron can be moulded into a variety of shapes.

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

169. 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  $\text{CrO}_4^{2-}$  and  $\text{Cr}_2\text{O}_7^{2-}$  are not the same.
- (4)  $\text{Cr}^{2+}(\text{d}^4)$  is a stronger reducing agent than  $\text{Fe}^{2+}(\text{d}^6)$  in water.

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



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

- |     |  |       |   |
|-----|--|-------|---|
| (a) | $\text{CO}(\text{g}) + \text{H}_2(\text{g})$ | (i)   | $\text{Mg}(\text{HCO}_3)_2 + \text{Ca}(\text{HCO}_3)_2$ |
| (b) | Temporary hardness of water                  | (ii)  | An electron deficient hydride                           |
| (c) | $\text{B}_2\text{H}_6$                       | (iii) | Synthesis gas   |
| (d) | $\text{H}_2\text{O}_2$                       | (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) |

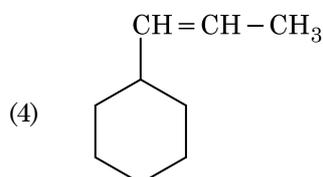
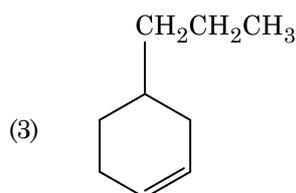
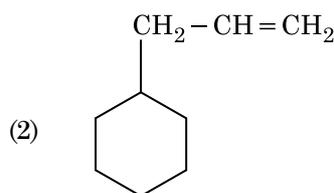
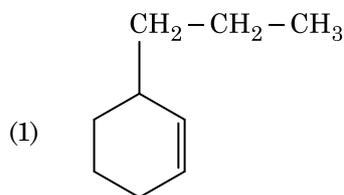
172. The freezing point depression constant ( $K_f$ ) of benzene is  $5.12 \text{ K kg mol}^{-1}$ . The freezing point depression for the solution of molality  $0.078 \text{ m}$  containing a non-electrolyte solute in benzene is (rounded off upto two decimal places) :

- (1) 0.80 K
- (2) 0.40 K
- (3) 0.60 K
- (4) 0.20 K

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

- (1) + R effect of  $-\text{CH}_3$  groups
- (2) - R effect of  $-\text{CH}_3$  groups
- (3) Hyperconjugation
- (4) - I effect of  $-\text{CH}_3$  groups

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



175. 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.

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

- (1)  $\text{Li}_2$
- (2)  $\text{C}_2$
- (3)  $\text{O}_2$
- (4)  $\text{He}_2$

177. Which of the following oxoacid of sulphur has  $-\text{O}-\text{O}-$  linkage ?

- (1)  $\text{H}_2\text{SO}_4$ , sulphuric acid
- (2)  $\text{H}_2\text{S}_2\text{O}_8$ , peroxodisulphuric acid
- (3)  $\text{H}_2\text{S}_2\text{O}_7$ , pyrosulphuric acid
- (4)  $\text{H}_2\text{SO}_3$ , sulphurous acid

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

- (a)  $\text{CO}_2(\text{g})$  is used as refrigerant for ice-cream and frozen food.
  - (b) The structure of  $\text{C}_{60}$  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

179. 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

180. Identify the **incorrect** match.

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

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