NEET–II (2016) TEST PAPER WITH ANSWER & SOLUTIONS (HELD ON SUNDAY 24th JULY, 2016)

136. Hot concentrated sulphuric acid is a moderately strong oxidizing agent. Which of the following reactions does not show oxidizing behaviour ?

(1) $C + 2H_2SO_4 \rightarrow CO_2 + 2SO_2 + 2H_2O$

(2) $CaF_2 + H_2SO_4 \rightarrow CaSO_4 + 2HF$

(3) $Cu + 2H_2SO_4 \rightarrow CuSO_4 + SO_2 + 2H_2O$

(4) $3S + 2H_2SO_4 \rightarrow 3SO_2 + 2H_2O$

Ans. (2)

Sol. $CaF_2 + H_2SO_4 \rightarrow CaSO_4 + 2HF$

In this reaction, oxidation number of none of the atom is not changed. Hence H_2SO_4 is not acting as oxidising agent.

137. Which of the following pairs of d-orbitals will have electron density along the axes ?

(1) $d_{z^2}, d_{x^2-y^2}$ (2) $d_{xy}, d_{x^2-y^2}$

(3) d_{z^2}, d_{xz} (4) d_{xz}, d_{yz}

Ans. (1)

Sol. dz^2 and $dx^2–y^2$ has electron density concentrated on the axis.

138. The correct geometry and hybridization for XeF_4 are :

(1) Planar triangle, sp^3d^3

(2) square planar, sp^3d^2

(3) octahedral, sp^3d^2

(4) trigonal bipyramidal, sp^3d

Ans. (3)

Sol. XeF_4, $AB_4L_2 \rightarrow sp^3d^2$

$\rightarrow$ geometry $\rightarrow$ octahedral

$\rightarrow$ shape $\rightarrow$ square planar

139. Among the following which one is a wrong statement?

(1) SeF_4 and CH_4 have same shape

(2) I_3^+ has bent geometry

(3) PH_5 and $BiCl_5$ do not exist

(4) $p\pi$-$d\pi$ bonds are present in SO_2

Ans. (1)

Sol. (1) SeF_4 –sp^3d, lp = 1, shape = see-saw

CH_4 –sp^3, lp = 0, shape =tetrahedral

(2) I_3^+ –sp^3, lp =2, shape = bent/angular

(3) PH_5 = d-orbital contraction absent

$BiCl_5$ = due to inert pair effect

(Bi^{+5} act as OA, Cl^- act as RA)

(4) SO_2 : O=S=O

Pπ-dπ, Pπ–Pπ both type bonds are present

140. The correct increasing order of trans-effect of the following species is :

(1) $Br^- > CN^- > NH_3 > C_6H_5^-$

(2) $CN^- > Br^- > C_6H_5^- > NH_3$

(3) $NH_3 > CN^- > Br– > C_6H_5^-$

(4) $CN^- > C_6H_5^- > Br^- > NH_3$

Ans. (4)

Sol. Trans effect order – $C\bar{N} > C_6H_5^- > Br^- > NH_3$

141. Which one of the followng statements related to lanthanons is **incorrect** ?

(1) All the lanthanons are much more reactive than aluminium

(2) Ce(+4) solutions are widely used as oxidizing agent in volumetric analysis

(3) Europium shows +2 oxidation state.

(4) The basicity decreases as the ionic radius decreases from Pr to Lu.

Ans. (1)

Sol. (1) Lanthanon's are less reactive than aluminium due to high IP (Lanthenoid contraction)

(2) Ce^{+4} is good oxidising agent and easily converted into Ce^{+3}

(3) Eu(63) = $4f^7\ 5d^0\ 6s^2$, $Eu^{+2} = 4f^7$

(4) In lanthenoids series 'Ce' to Lu ionic radius regular decreases and covalent character increase, basic character of hydroxide decrease

142. Jahn-Teller effect **not** observed in high spin complexes of :-

(1) d^4 (2) d^9 (3) d^7 (4) d^8

Ans. (4)

Sol. John Teller effect explain axial distortion in perfect octahedral geometry. It is present in d^4 high spin, d^7 low spin and d^9 configuations which have odd number of electrons in eg set.

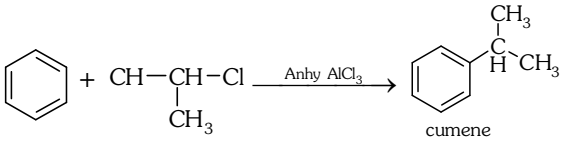
A weak John Teller effect in also present in d^7 high spin complex which has odd number of electrons in the set.

143. Which of the following can be used as the halide component for Friedel-Crafts reaction ?

(1) Chloroethene (2) Isopropyl chloride

(3) Chlorobenzene (4) Bromobenzene

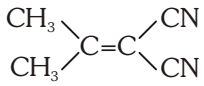
Ans. (2)

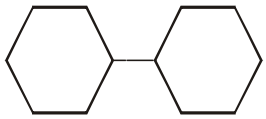
Sol. 

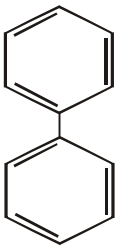
cumene

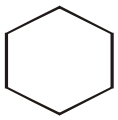
But in chlorobenzene, Bromobenzene, chloroethene lone pair of halogen are delocalised with π bonds, so attain double bond character.

144. In which of the following molecules, all atoms are coplanar ?

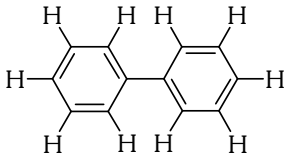
(1) 

(2) 

(3) 

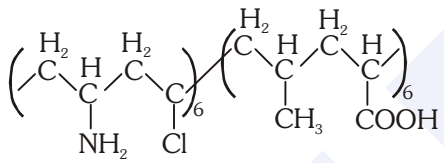
(4) 

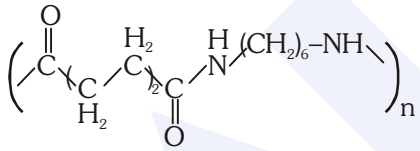
Ans. (3)

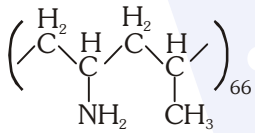
Sol. 

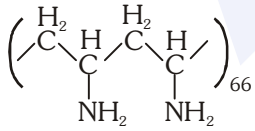
All carbons are sp^2 hybridised

145. Which one of the following structures represents nylon 6,6 polymer ?

(1) 

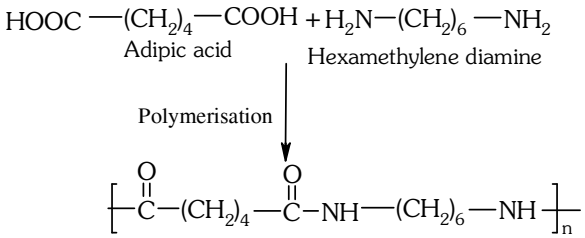
(2) 

(3) 

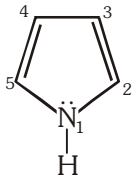
(4) 

Ans. (2)

Sol.



146. In pyrrole

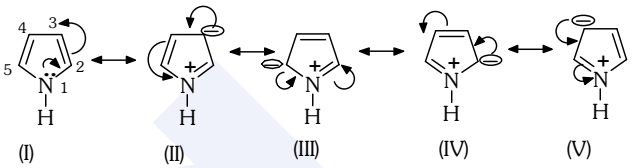


The electron density is maximum on :-

(1) 2 and 4 (2) 2 and 5

(3) 2 and 3 (4) 3 and 4

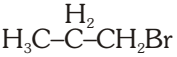
Ans. (2)

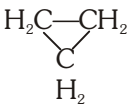


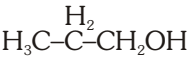
Maximum electron density at (2) and (5) as resonating structures III & IV are more stable than (II) & (V) so are major contributor.

147. Which of the following compounds shall not produced propene by reaction with HBr followed by elimination of direct only elimination reaction ?

(1) $H_2C=C=O$

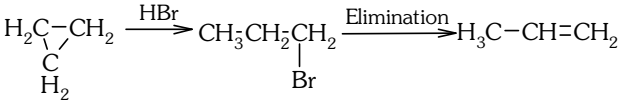
(2) 

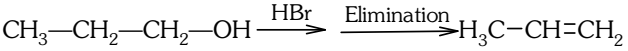
(3) 

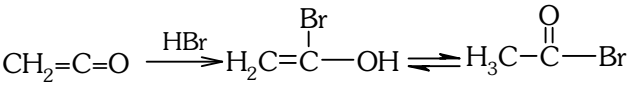
(4) 

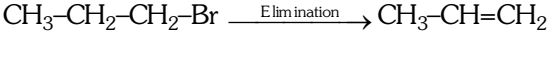
Ans. (1)

Sol.

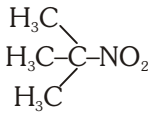


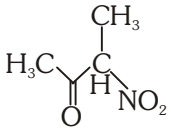


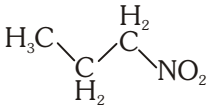


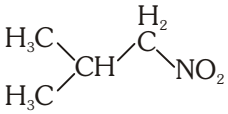


148. Which one of the following nitro-compounds does not react with nitrous acid ?

(1) 

(2) 

(3) 

(4) 

Ans. (1)

Sol. 3°-Nitro compound does not react with HNO_2 because of absence of α–H

149. The central dogma of molecular genetics states that the genetic information flows from :-

(1) DNA → RNA → Proteins

(2) DNA → RNA → Carbohydrates

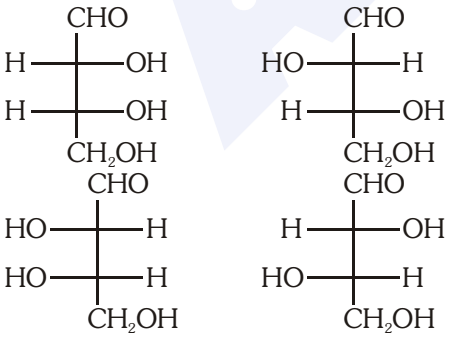
(3) Amino acids → Proteins → DNA

(4) DNA → Carbohydrates → Proteins

Ans. (1)

Sol. DNA $\xrightarrow{\text{Transcription}}$ RNA $\xrightarrow{\text{Translation}}$ Protein

150. The **correct** corresponding order names of four aldoses with configuration given below



respectively, is :-

(1) L-erythrose, L-threose, D-erythrose, D-threose

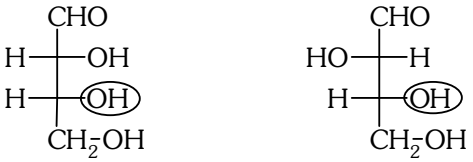
(2) D-erythrose, D-threose, L-erythrose, L-threose

(3) L-erythrose, L-threose, L-erythrose, D-threose

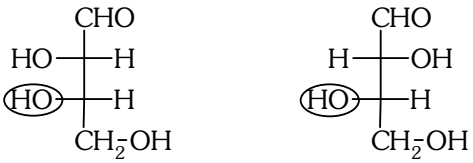
(4) D-threose, D-erythrose, L-threose, L-erythrose

Ans. (2)

Sol.

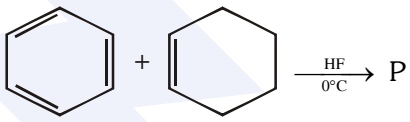


D-Erythrose D-Threose

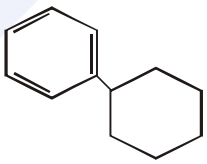


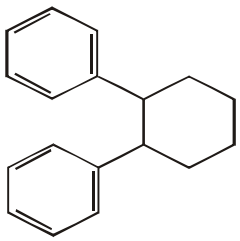
L-Erythrose L-Threose

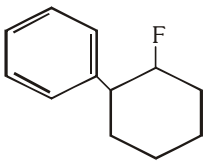
151. In the given reaction

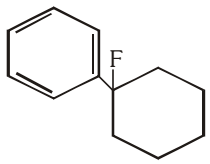


the product P is :-

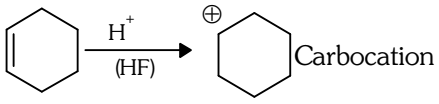
(1) 

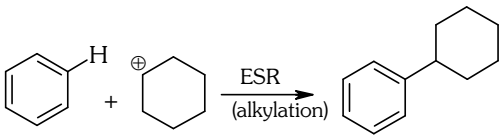
(2) 

(3) 

(4) 

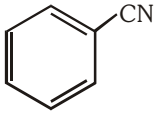
Ans. (1)

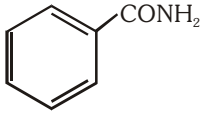
Sol. 

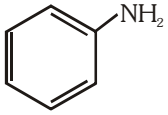


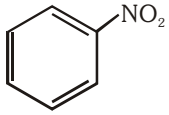
[Friedel Craft reaction]

152. A given nitrogen-containing aromatic compound A reacts with Sn/HCl, followed by HNO_2 to give an unstable compound B. B, on treatment with phenol, forms a beatiful coloured compound C with the molecular formula $C_{12}H_{10}N_2O$. The structure of compound A is :-

(1) 

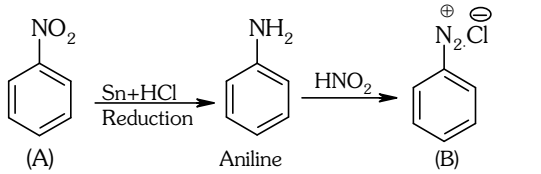
(2) 

(3) 

(4) 

Ans. (4)

Sol.



153. Consider the reaction

$CH_3CH_2CH_2Br + NaCN \rightarrow CH_3CH_2CH_2CN + NaBr$

This reaction will be the fastest in

(1) N,N'-dimethylformamide (DMF)

(2) water

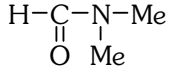
(3) ethanol

(4) methanol

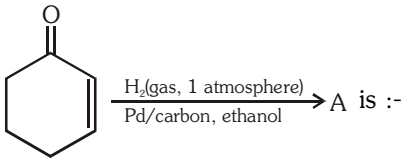
Ans. (1)

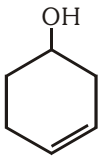
Sol. $CH_3–CH_2–CH_2Br + NaCN \rightarrow CH_3CH_2CH_2CN + NaBr$

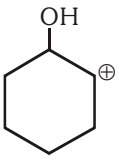
This reaction follows by S_N2 path, which is favoured by polar aprotic solvents like DMF, DMSO, etc.

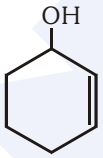
DMF (Dimethyl formamide) 

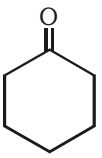
154. The **correct** structure of the product A formed in the reaction



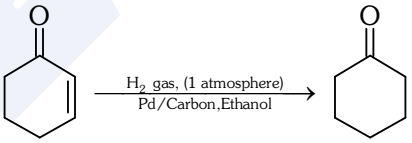
(1) 

(2) 

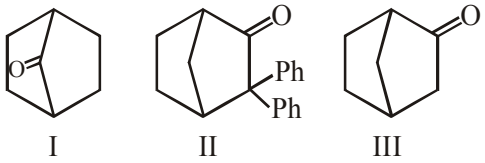
(3) 

(4) 

Ans. (4)

Sol. 

155. Which among the given molecules can exhibit tautomerism ?



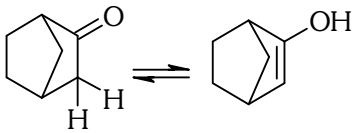
(1) Both I and II

(2) Both II and III

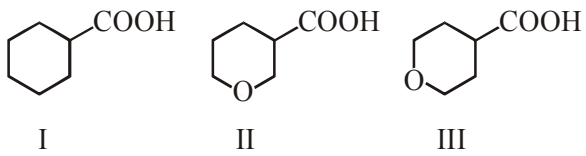
(3) III only

(4) Both I and III

Ans. (3)

Sol. 

156. The **correct** order of strengths of the carboxylic acids



I II III

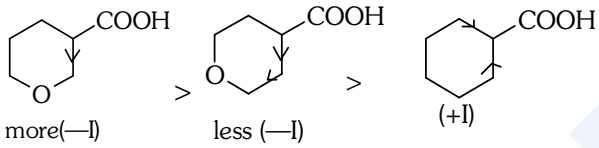
is

(1) III > II > I (2) II > I > III

(3) I > II > III (4) II > III > I

Ans. (4)

Sol. Acidic Strength



more(—I) less (—I) (+I)

157. The compound that will react most readily with gaseous bromine has the formula

(1) C_4H_{10} (2) C_2H_4

(3) C_3H_6 (4) C_2H_2

Ans. (3)

Sol. Gaseous Bromine reacts with alkene to give allylic substituted product by free radical mechanism

$$CH_3-CH=CH_2 \xrightarrow{Br_2(gas)} \underset{Br}{H_2C-\overset{H}{C}=CH_2}$$

158. Which one of the following compounds shows the presence of intramolecular hydrogen bond ?

(1) Cellulose

(2) Concentrated acetic acid

(3) H_2O_2

(4) HCN

Ans. (1)

Sol. In acetic acid, H_2O_2 and HCN inter molecular hydrogen bond present but in cellulose intramolecular hydrogen bond present.

159. The molar conductivity of a 0.5 mol/dm^3 solution of $AgNO_3$ with electrolytic conductivity of 5.76×10^{-3} S cm^{-1} at 298 K is

(1) 0.086 S cm^2/mol

(2) 28.8 S cm^2/mol

(3) 2.88 S cm^2/mol

(4) 11.52 S cm^2/mol

Ans. (4)

Sol. C = 0.5 mol / dm^3

$\kappa = 5.76 \times 10^{-3}$ S cm^{-1}

T = 298 K

$$\lambda_m = \frac{\kappa \times 1000}{M} = \frac{5.76 \times 10^{-3}}{0.5} = 11.52 \text{ Scm}^2\text{/mol}$$

160. The decomposition of phosphine (PH_3) on tungsten at low pressure is a first-order reaction. It is because the

(1) rate is independent of the surface coverage

(2) rate of decomposition is very slow

(3) rate is proportional to the surface coverage

(4) rate is inversely proportional to the surface coverage

Ans. (3)

Sol. The decomposition of PH_3 on tungsten at low pressure is a first order reaction because rate is proportional to the surface coverage.

161. The coagulation values in millimoles per litre of the electrolytes used for the coagulation of As_2S_3 are given below :

I. (NaCl) = 52, II. ($BaCl_2$) = 0.69,

III. ($MgSO_4$) = 0.22

The **correct** order of their coagulating power is

(1) III > II > I (2) III > I > II

(3) I > II > III (4) II > I > III

Ans. (1)

Sol. Coagulation power $\propto \frac{1}{\text{coagulation value}}$

So, the order is III > II > I

162. During the electrolysis of molten sodium chloride, the time required to produce 0.10 mol of chlorine gas using a current of 3 amperes is

(1) 220 minutes (2) 330 minutes

(3) 55 minutes (4) 110 minutes

Ans. (4)

Sol. $2Cl^- \rightarrow Cl_2(g) + 2e^-$

$$W = \frac{E}{96500} \times it$$

$$0.1 \times 71 = \frac{35.5}{96500} \times 3 \times t(sec)$$

t (s) = 6433.33 sec

t(min) = 107.22 min $\approx$ 110 min.

163. How many electrons can fit in the orbital for which n = 3 and l = 1 ?

(1) 10 (2) 14 (3) 2 (4) 6

Ans. (3)

Sol. n=3, l =1 $\Rightarrow$3p

Total 2 electron can fit in the orbital of 3p

164. For a sample of perfect gas when its pressure is changed isothermally from p_i to p_f, the entropy change is given by

(1) $\Delta S = nRT \ln\left(\frac{p_f}{p_i}\right)$ (2) $\Delta S = RT \ln\left(\frac{p_i}{p_f}\right)$

(3) $\Delta S = nR \ln\left(\frac{p_f}{p_i}\right)$ (4) $\Delta S = nR \ln\left(\frac{p_i}{p_f}\right)$

Ans. (4)

Sol. $$\Delta S = nC_{pm} \ell n \frac{T_f}{T_i} + nR \ell n \frac{P_i}{P_f}$$

For isothermal $T_i = T_f$, ln1 = 0

$$\Delta S = nR \ell n \frac{P_i}{P_f}$$

165. The van't Hoff factor (i) for a dilute aqueous solution of the strong electrolyte barium hydroxide is

(1) 2 (2) 3

(3) 0 (4) 1

Ans. (2)

Sol. $Ba(OH)_2$ is strong electrolyte, so its 100% dissociation occurs in solution

$$Ba(OH)_2 \rightarrow Ba^{+2}(aq) + 2OH^-(aq)$$

Van't Hoff factor = total number of ions present in solution i =3

166. The percentage of pyridine (C_5H_5N) that forms pyridinium ion ($C_5H_5N^+H$) in a 0.10 M aqueous pyridine solution (K_b for $C_5H_5N = 1.7 \times 10^{-9}$) is

(1) 0.77% (2) 1.6%

(3) 0.0060% (4) 0.013%

Ans. (4)

Sol. Pyridine ($C_5H_5H_5N$) is a weak base

$K_b = C\alpha^2$

$$\alpha = \sqrt{\frac{1.7 \times 10^{-9}}{0.1}}$$

$$\alpha = 1.30 \times 10^{-4}$$

$$\%\alpha = 1.30 \times 10^{-4} \times 100$$

$$\%\alpha = 0.013\%$$

167. In calcium fluoride, having the fluorite structure, the coordination numbers for calcium ion (Ca^{2+}) and fluoride ion (F^-) are

(1) 8 and 4 (2) 4 and 8

(3) 4 and 2 (4) 6 and 6

Ans. (1)

Sol. In CaF_2, the coordination numbers for

$Ca^{+2} = 8$

$F^- = 4$

168. If the E°_{cell} for a given reaction has a negative value, which of the following gives the **correct** relationships for the values of ΔG° and K_{eq} ?

(1) $\Delta G^{\circ} < 0;\ K_{eq} > 1$

(2) $\Delta G^{\circ} < 0;\ K_{eq} < 1$

(3) $\Delta G^{\circ} > 0;\ K_{eq} < 1$

(4) $\Delta G^{\circ} > 0;\ K_{eq} > 1$

Ans. (3)

Sol. $\because E^{0}_{cell} = -ve$

$\therefore \Delta G^{0} = -nF\ E^{0}_{cell}$

$\Delta G^{0} = +ve \Rightarrow \Delta G > 0$

$\because \Delta G^{0} = -2.303RT\log K_{eq}$

$\therefore K_{eq} < 1$

169. Which one of the following is **incorrect** for ideal solution ?

(1) $\Delta P = Pobs - P_{calculated\ by\ Raoult's\ law} = 0$

(2) $\Delta G_{mix} = 0$

(3) $\Delta H_{mix} = 0$

(4) $\Delta U_{mix} = 0$

Ans. (2)

Sol. For an ideal solution $\Delta H_{mix} = 0$

$\Delta U_{mix} = 0$

$\Delta S_{mix} \neq 0$

According to $\Delta G_{mix} = \Delta H_{mix} - T\Delta S_{mix}$

$\Rightarrow \Delta G_{mix} \neq 0$

Incorrect answer, is $\Delta G_{mix} = 0$

170. The solubility of AgCl(s) with solubility product 1.6×10^{-10} in 0.1 M NaCl solution would be

(1) 1.6×10^{-11} M

(2) zero

(3) 1.26×10^{-5} M

(4) 1.6×10^{-9} M

Ans. (4)

Sol.

$NaCl(aq)$	$\rightarrow$	$Na^{+}(aq$	+	$Cl^{-}(aq)$
0.1M		0		0
0		0.1M		$0.1+S$

$AgCl(s)$	$\rightleftharpoons$	$Ag^{+}(aq)$	+	$Cl^{-}(aq)$
a		0		0
$a-S$		S		$S+0.1$

$K_{sp} = 1.6 \times 10^{-10} = [Ag^{+}]\ [Cl^{-}] = S\ (0.1+S)$

$\because K_{sp}$ is small, S is neglected with respect to 0.1 M

$1.6 \times 10^{-10} = S \times 0.1$

$S = 1.6 \times 10^{-9}$ M

171. Suppose the elements X and Y combine to form two compounds XY_2 and X_3Y_2. When 0.1 mole of XY_2 weighs 10 g and 0.05 mole of X_3Y_2 weighs 9 g, the atomic weights of X and Y are

(1) 20, 30 (2) 30, 20

(3) 40, 30 (4) 60, 40

Ans. (3)

Sol. Let atomic weight of x is A_x and y is A_y

$$n_{xy_2} = 0.1 = \frac{10}{A_x + 2A_y}$$

$$A_x + 2A_y = 100 \ldots(1)$$

$$n_{x_3y_2} = 0.05 = \frac{9}{3A_x + 2A_y}$$

$3A_x + 2A_y = 180$ ...(2)

on solving eq. (1) and (2)

$A_x = 40,\ A_y = 30$

172. The number of electrons delivered at the cathode during electrolysis by a current of 1 ampere in 60 seconds is (charge on electron = 1.60×10^{-19} C)

(1) 3.75×10^{20} (2) 7.48×10^{23}

(3) 6×10^{23} (4) 6×10^{20}

Ans. (1)

Sol. $Q = ne$

$i.t = n.e$

$$n = \frac{1 \times 60}{1.6 \times 10^{-19}} = 3.75 \times 10^{20} \text{ electrons}$$

173. Boric acid is an acid because its molecule

(1) accepts OH^- from water releasing proton

(2) combines with proton from water molecule

(3) contains replaceable H^+ ion

(4) gives up a proton

Ans. (1)

Sol. $B(OH)_3 + H_2O \rightleftharpoons [B(OH)_4]^- + H^+$

174. AlF_3 is soluble in HF only in presence of KF. It is due to the formation of

(1) AlH_3 (2) $K[AlF_3H]$

(3) $K_3[AlF_3H_3]$ (4) $K_3[AlF_6]$

Ans. (4)

Sol. $AlF_3 + 3KF \rightarrow K_3[AlF_6]$

175. Zinc can be coated on iron to produce galvanized iron but the reverse is not possible. It is because

(1) zinc has lower negative electrode potential than iron

(2) zinc has higher negative electrode potential than iron

(3) zinc is lighter than iron

(4) zinc has lower melting point than iron

Ans. (2)

Sol. Zinc has higher negative electrode potential than iron, so iron cannot be coated on zinc.

176. The suspension of slaked lime in water is known as

(1) milk of lime

(2) aqueous solution of slaked lime

(3) limewater

(4) quicklime

Ans. (1)

Sol. Aqueous solution of slaked lime $\Rightarrow$ lime water

Suspension solution of slaked lime $\Rightarrow$ milk of lime

177. The hybridizations of atomic orbitals of nitrogen in NO_2^+, NO_3^- and NH_4^+ respectively are

(1) sp, sp^2 and sp^3

(2) sp^2, sp and sp^3

(3) sp, sp^3 and sp^2

(4) sp^2, sp^3 and sp

Ans. (1)

Sol. $NO_2^+ = sp$ Linear

$NO_3^- = sp^2$ Trigonal planar

$NH_4^+ = sp^3$ Tetrahedral

178. Which of the following fluoro-compounds is most likely to behave as a Lewis base ?

(1) CF_4 (2) SiF_4

(3) BF_3 (4) PF_3

Ans. (4)

Sol. PF_3 act as Lewis base due to present of lone pair on P atom.

179. Which of the following pairs of ions is isoelectronic and isostructural ?

(1) SO_3^{2-}, NO_3^- (2) ClO_3^-, SO_3^{2-}

(3) CO_3^{2-}, NO_3^- (4) ClO_3^-, CO_3^{2-}

Ans. (2 & 3)

Sol. (2) In SO_3^{2-}, ClO_3^-, No. of electrons = 42,

Shape : Pyramidal

(3) In CO_3^{-2}, NO_3^-, No. of electrons = 32

Shape : trigonal planar

180. In context with beryllium, which one of the following statements is **incorrect** ?

(1) Its salts rarely hydrolyze.

(2) Its hydride is electron-deficient and polymeric.

(3) It is rendered passive by nitric acid.

(4) it forms Be_2C.

Ans. (1)

Sol. Be salts are covalent nature, so easily hyrolysed.