FINAL NEET(UG)–2020 EXAMINATION

(Held On Sunday 13th SEPTEMBER, 2020)

CHEMISTRY

TEST PAPER WITH ANSWER & SOLUTION

136. 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)	(i)	(iii)	(ii)	(iv)
(2)	(iii)	(i)	(ii)	(iv)
(3)	(iii)	(ii)	(i)	(iv)
(4)	(iii)	(iv)	(ii)	(i)

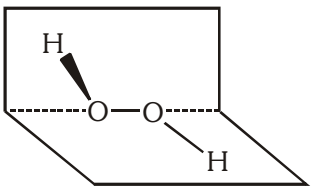
Ans. (2)

Sol. (a) $CO + H_2$ ... (iii) synthesis gas

(b) Temporary Hardness ... (i) $Mg(HCO_3)_2 + Ca(HCO_3)_2$

(c) B_2H_6 ... (ii) Electron deficient ($6e^-$)

(d) H_2O_2 ... (iv) Non-planar structure



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

(1) Hyperconjugation

(2) –I effect of $-CH_3$ groups

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

(4) –R effect of $-CH_3$ groups

Ans. (1)

Sol. $CH_3-\overset{\oplus}{C}(CH_3)_2$ (9α H) > $CH_3-\overset{\oplus}{C}H-CH_2-CH_3$ (5α H)

Tert. Butyl Carbocation ↓ More stable due to Hyperconjugation effect.

Sec. Butyl carbocation

138. 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

Ans. (4)

Sol. $CH_{4(g)} + 4Cl_{2(g)} \rightarrow CCl_{4(\ell)} + 4HCl_{(g)}$

$\underline{C}H_4(-4)$

$\underline{C}Cl_4(+4)$

–4 to + 4

139. Sucrose on hydrolysis gives :

(1) α-D-Fructose + β-D-Fructose

(2) β-D-Glucose + α-D-Fructose

(3) α-D-Glucose + β-D-Glucose

(4) α-D-Glucose + β-D-Fructose

Ans. (4)

Sol. Sucrose $\xrightarrow[\text{(Hydrolysis)}]{H_3O^+}$ α-D-Glucose + β-D-Fructose

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

(1) 2.84 BM (2) 3.87 BM

(3) 4.90 BM (4) 5.92 BM

Ans. (3)

Sol. $Cr^{+2} = 3d^4$ | 1 | 1 | 1 | 1 | | n=4

$\mu = \sqrt{n(n+2)}$ B.M. $= \sqrt{4(6)} = = \sqrt{24}$ B.M.

$= 4.90$ B.M.

141. Identify a molecule which does not exist.

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

Ans. (2)

Sol. He_2 = Total electron = 4

$= \sigma_{1s}^2\ \sigma_{1s}^{*2} \Rightarrow$ B.O. $= \frac{1}{2}[Nb - Na] = \frac{1}{2}[2-2] = 0$

Bond order = 0, so He_2 does not exist.

142. Which of the following oxoacid of sulphur has –O–O– linkage ?

(1) $H_2S_2O_7$, pyrosulphuric acid

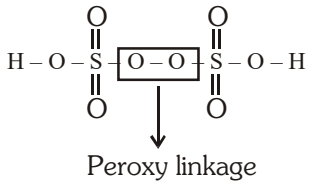
(2) H_2SO_3, sulphurous acid

(3) H_2SO_4, sulphuric acid

(4) $H_2S_2O_8$, peroxodisulphuric acid

Ans. (4)

Sol.



Peroxy linkage

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

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

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

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

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

Ans. (2)

Sol. According to spectrochemical series.

144. 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) 4 (2) 1 (3) 2 (4) 3

Ans. (2)

Sol. $Ca^{+2} + 2e^- \rightarrow Ca_{(s)}$

v.f. = 2

As per faraday's 1st law

Charge passed in faraday = g.eq of product

$$= \frac{20}{40} \times 2 = 1F$$

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

(1) Isobutyl alcohol

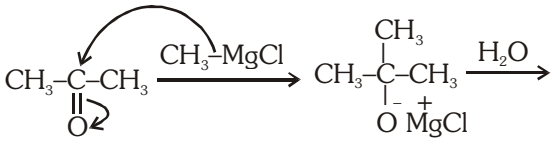
(2) Isopropyl alcohol

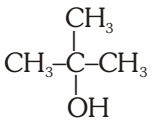
(3) Sec. butyl alcohol

(4) Tert. butyl alcohol

Ans. (4)

Sol.





(Tert. butyl alcohol)

146. Which of the following is a cationic detergent ?

(1) Sodium dodecylbenzene sulphonate

(2) Sodium lauryl sulphate

(3) Sodium stearate

(4) Cetyltrimethyl ammonium bromide

Ans. (4)

Sol. $C_{19}H_{42}N^+Br^-$ (cationic detergent)

12th NCERT (16.5.2)

Synthetic detergents

147. Identify the incorrect statement.

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

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

(3) 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.

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

Ans. (1)

Sol. Chromate (CrO_4^{-2}) $\Rightarrow$ oxidation state = + 6

dichromate ($Cr_2O_7^{-2}$) $\Rightarrow$ oxidation state = + 6

oxidation state are same.

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

(1) n-Butane

(2) n-Hexane

(3) 2,3-Dimethylbutane

(4) n-Heptane

Ans. (4)

Sol. n-Heptane can not be made in good yield using Wurtz reaction since it is unsymmetrical alkane.

149. 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) $CuCO_3 \cdot Cu(OH)_2$ (2) $CuSO_4$

(3) $[Cu(NH_3)_4]^{2+}$ (4) $Cu(OH)_2$

Ans. (3)

Sol. $NH_2CONH_2 + H_2O \rightarrow \underset{(A)}{NH_4OH} + CO_2$

$$NH_4OH \xrightarrow{\Delta} \underset{(B)}{NH_3 + H_2O}$$

$$Cu^{+2}(aq) + 4NH_3 \rightarrow \underset{(C)}{[Cu(NH_3)_4]^{+2}} \text{ (deep blue)}$$

150. 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) 0.60 K (2) 0.20 K (3) 0.80 K (4) 0.40 K

Ans. (4)

Sol. $\Delta T_f = K_f \times m$

$= 5.12 \times 0.078$

$\Delta T_f = 0.40$ K

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

(1) 175, 104 and 71 (2) 71, 104 and 71

(3) 104, 71 and 71 (4) 71, 71 and 104

Ans. (2)

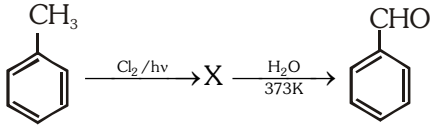
Sol. $^{175}_{71}Lu$

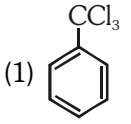
$p^+ = 71$

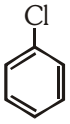
$n^0 = 175 - 71 = 104$

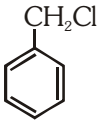
$e^- = 71$

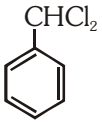
152. Identify compound X in the following sequence of reactions :



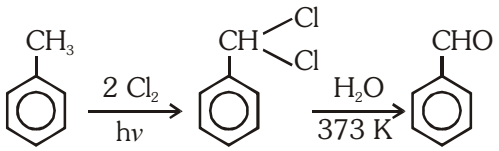
(1) 

(2) 

(3) 

(4) 

Ans. (4)

Sol. 

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

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

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

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

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

Ans. (1)

Sol. Pig iron contains impurities (C, S, Si, P etc) having malleable nature that's why can be moulded.

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

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

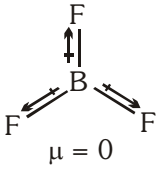
(2) Ammonia, beryllium difluoride, water, 1,4-dichlorobenzene

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

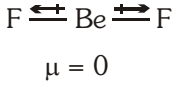
(4) Nitrogen trifluoride, beryllium difluoride, water, 1,3-dichlorobenzene

Ans. (1)

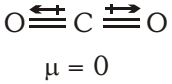
Sol. BF_3, BeF_2, CO_2 & 1, 4 - dichloro benzene all are symmetrical structure.



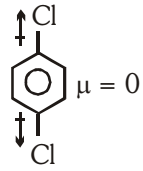
$\mu = 0$



$\mu = 0$



$\mu = 0$



$\mu = 0$

155. Paper chromatography is an example of:

(1) Column chromatography

(2) Adsorption chromatography

(3) Partition chromatography

(4) Thin layer chromatography

Ans. (3)

Sol. 11th NCERT (12.8.5) chromatography

156. Identify the **incorrect** match :

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

(1) (d), (iv) (2) (a), (i)

(3) (b), (ii) (4) (c), (iii)

Ans. (1)

Sol. Ununnunium (Z = 111) it is Rontgentum (Rg) not darmstadtium.

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

(1) 1×10^{8} M

(2) 2×10^{-13} M

(3) 2×10^{-8} M

(4) 1×10^{-13} M

Ans. (2)

Sol. α = 1 for NaOH

$$NaOH_{(aq)} \longrightarrow \underset{0.1M}{Na^{+}}(aq) + \underset{0.1M}{OH^{-}}(aq)$$

$$Ni(OH)_2(s) \rightleftharpoons \underset{S'}{Ni^{+2}}(aq) + \underset{0.1+2S'}{2OH^{-}}(aq)$$

Ionic product = (S') $(0.1 + 2S')^2$

$2 \times 10^{-15} = S'(0.1)^2$

$S' = 2 \times 10^{-13}$ M

158. Which of the following is a natural polymer ?

(1) poly (Butadiene-acrylonitrile)

(2) cis-1,4-polyisoprene

(3) poly (Butadiene-styrene)

(4) polybutadiene

Ans. (2)

Sol. 12th NCERT (15.2.4)

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

(1) Cross Aldol condensation

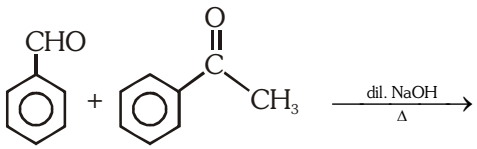
(2) Aldol condensation

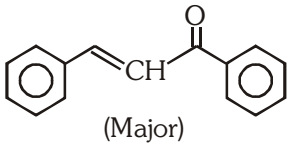
(3) Cannizzaro's reaction

(4) Cross Cannizzaro's reaction

Ans. (1)

Sol.





(Major)
Cross-Aldol product

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

(1) Chloroethane + Bromoethane

(2) Ethanol + Acetone

(3) Benzene + Toluene

(4) Acetone + Chloroform

Ans. (2)

Sol. Hydrogen bond of ethanol gets weakened by addition of acetone.

161. 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) 1000 s (2) 100 s

(3) 200 s (4) 500 s

Ans. (4)

Sol. $k = 4.606 \times 10^{-3} s^{-1}$

$$kt = 2.303 \log_{10} \frac{2}{0.2}$$

$$4.606 \times 10^{-3} \times t = 2.303 \times \log 10$$

$$t = \frac{1000}{2} = 500\,s$$

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

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

(2) Both $MgCl_2$ and $CaCl_2$

(3) Only NaCl

(4) Only $MgCl_2$

Ans. (3)

Sol. When HCl is passed thorugh the mixture Cl^- ion concentration increases. Hence ionic product $[Na^+]\ [Cl^-]$ becomes more than solubility product.

So NaCl will precipitate out.

Filtrate $\xrightarrow{\text{HCl gas passed}}$ pure NaCl precipitation (common ion effect)

163. 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 $w = 0$

Ans. (2)

Sol. free expansion of ideal gas

$P_{ext} = 0$

$W_{pv} = 0$

$q = 0$ (adiabatic process)

$\Delta E = q + w$

$\Delta E = 0$

$\Delta E = nC_{vm}\ \Delta T = 0$

$q = 0,\ \Delta T = 0,\ w = 0$

164. 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) (c) and (d) only

(2) (a) and (b) and (c) only

(3) (a) and (c) only

(4) (b) and (c) only

Ans. (1)

Sol. Correct statement are (c) and (d)

(c) use of zeolite (3d-silicate)

(d) CO-neutral, colourless & odourless gas.

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

Sucrose + $H_2O \rightleftharpoons$ Glucose + Fructose

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

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

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

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

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

Ans. (2)

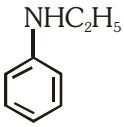
Sol. $K_c = 2 \times 10^{13}$

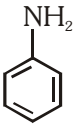
$T = 300K$

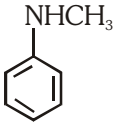
$\Delta G^\circ = -RT\ \ln k_{eq}$

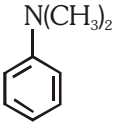
$\Delta G^\circ = -8.314\ JK^{-1}\ mol^{-1} \times 300\ K \times \ln(2 \times 10^{13})$

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

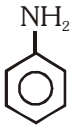
(1) 

(2) 

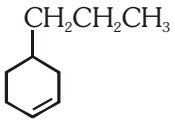
(3) 

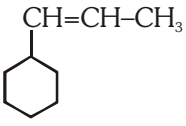
(4) 

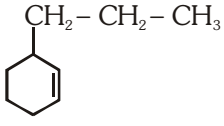
Ans. (2)

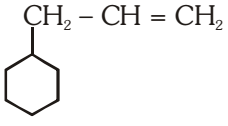
Sol. Since  is primary amine it gives carbylamine test (isocyanide test)

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

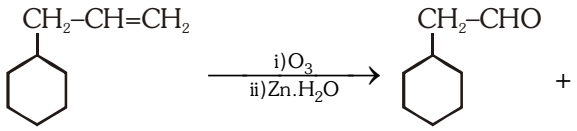
(1) 

(2) 

(3) 

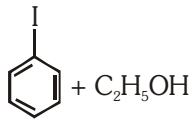
(4) 

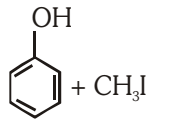
Ans. (4)

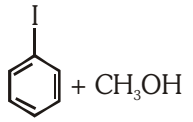
Sol. 

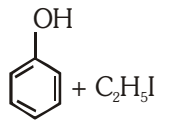
Methanal

168. Anisole on cleavage with HI gives:

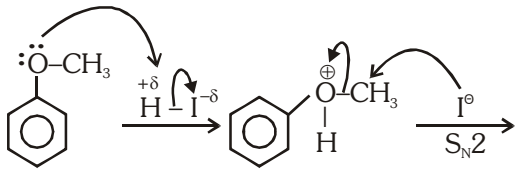
(1) 

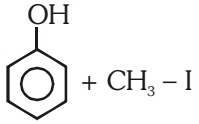
(2) 

(3) 

(4) 

Ans. (2)

Sol. 



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

(a) β-Elimination reaction

(b) Follow Zaitsev rule

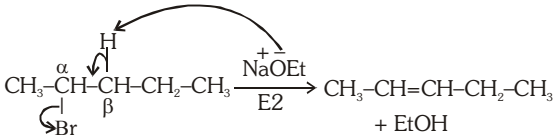
(c) Dehydrohalogenation reaction

(d) Dehydration reaction

(1) (a), (b), (d) (2) (a), (b), (c)

(3) (a), (c), (d) (4) (b), (c), (d)

Ans. (2)

Sol. 

sec. alkyl halide

* This reaction is an example of β-elimination.
* Hydrogen is removed from β-carbon and halgoen from α-carbon, hence, dehydrohalgoenation reaction.
* Generally in E2 reaction Zaitsev alkene is formed as major product (more stable alkene).

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

(1) collision frequency

(2) activation energy

(3) heat of reaction

(4) threshold energy

Ans. (1)

Sol. Collision frequency

Z_{12} ∝ number of reactant molecules per unit volume.

171. Which of the following is a basic amino acid :

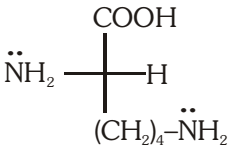
(1) Lysine

(2) Serine

(3) Alanine

(4) Tyrosine

Ans. (1)

Sol. 

Lysine

Since it contains more number of $-NH_2$ groups as compared to –COOH groups hence it is basic amino acid.

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

(1) Potassium

(2) Iron

(3) Copper

(4) Calcium

Ans. (1)

Sol. Biological importance of sodium & potassium.

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

(1) $\Delta_rH < 0$ and $\Delta_rS < 0$

(2) $\Delta_rH > 0$ and $\Delta_rS > 0$

(3) $\Delta_rH > 0$ and $\Delta_rS < 0$

(4) $\Delta_rH < 0$ and $\Delta_rS > 0$

Ans. (1)

Sol. $2Cl(g) \longrightarrow Cl_2(g)$

$\Delta_rS < 0$ and $\Delta_rH < 0$

174. 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)	(iv)	(iii)	(ii)	(i)
(2)	(i)	(ii)	(iii)	(iv)
(3)	(ii)	(i)	(iv)	(iii)
(4)	(iii)	(iv)	(i)	(ii)

Ans. (3)

Sol. (a) CO (ii) Neutral

(b) BaO (i) Basic

(c) Al_2O_3 (iv) Amphoteric

(d) Cl_2O_7 (iii) Acidic

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

(1) Size of the colloidal particles

(2) Viscosity

(3) Solubility

(4) Stability of the colloidal particles

Ans. (4)

Sol. Greater the Zeta potential more will be the stability of colloidal particles.

176. A mixture of N_2 and Ar gases in a cylinder contains 7g of N_2 and 8g of Ar. If the total pressure of the mixture of 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) 18 bar (2) 9 bar

(3) 12 bar (4) 15 bar

Ans. (4)

Sol. N_2 Ar

7 gram 8 gram

moles $\frac{7}{28}=\frac{1}{4}$ $\frac{8}{40}=\frac{1}{5}$

$(\text{Partial pressure})_{N_2} = P_T \times (\text{mole fraction})_{N_2}$

$$= 27\times\frac{1/4}{1/4+1/5}$$

$$= 27\times\frac{1/4}{9/20}$$

$$= 27\times\frac{20}{4\times9}$$

$$= 3\times5$$

$$= 15 \text{ bar}$$

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

(1) It is produced due to incomplete combustion

(2) It forms carboxyhaemoglobin

(3) It reduce oxygen carrying ability of blood

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

Ans. (4)

Sol. Not correct

Carboxyhaemoglobin (haemoglobin bound to CO) is more stable than oxyhaemoglobin.

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

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

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

Ans. (2)

Sol. $\sqrt{3}a = 4r$ (for bcc lattice)

$r = \frac{\sqrt{3}}{4} \times 288$ pm

179. Which one of the following has maximum number of atoms?

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

(2) 1g of Ag(s) [Atomic mass of Ag = 108]

(3) 1g of Mg(s) [Atomic mass of Mg = 24]

(4) 1g of O_2(g) [Atomic mass of O = 16]

Ans. (1)

Sol. Number of atoms

$$= \frac{w}{\text{molar mass}} \times N_A \times \text{atomicity}$$

(1) $\frac{1}{7} \times N_A \times 1$

(2) $\frac{1}{108} \times N_A \times 1$

(3) $\frac{1}{24} \times N_A \times 1$

(4) $\frac{1}{32} \times N_A \times 2$

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

(1) SO_2 gas

(2) Hydrogen gas

(3) Oxygen gas

(4) H_2S gas

Ans. (3)

Sol. H_2SO_4

At Anode : $2H_2O \rightarrow O_{2(g)} + 4H^+_{(aq)} + 4e^-$

Oxygen gas will liberate at anode