

**ANSWER THE FOLLOWING QUESTIONS:**

1. What is inert pair effect?
2. What is auto oxidation?
3. What is Calcination?
4. What is Inter halogen compounds?
5. What is Holmes signal?
6. What is Interstitial compounds?
7. What is Linkage Isomers?
8. What is Ionisation Isomers?
9. What is Hydrated Isomers?
10. What is Co-ordination isomers?
11. What is Crystal field splitting energy?
12. What is Co-ordination number? What is the co-ordination number of atoms in BCC?
13. What is Impurity defect?
14. What is radius ratio and its uses?
15. What is Packing efficiency?
16. What is Molecular solids and it's types?
17. What is Activation energy?
18. What is Pseudo first order reaction?
19. What is Common ion effect?
20. What is Buffer capacity?
21. What is Corrosion?
22. What is Molar conductivity?
23. What is Equivalent conductance?
24. What is Colloids and examples?
25. What is Promoters and catalyst poison?
26. What is Active centres?
27. What is Tyndall effect?
28. What is Brownian motion?
29. What is Tanning of leather?
30. What is Ultrafiltration?
31. What is Crystal Field Stabilization Energy - CFSE?
32. What is Cathodic Protection?
33. What is Electrophoresis?
34. What is Electro osmosis?
35. What is Cogulation (or) Precipitation and types?
36. What is Freundlich adsorption isotherm?
37. What is Saponification?
38. What is Anomers?
39. What is Mutarotation?
40. What is Epimers and example?
41. What is Invert sugar?
42. What is Peptide bond?
43. What is Zwitter ion?
44. What is Denaturation of proteins?
45. What is vulcanization of rubber?
46. What is Analgesics and examples?
47. What is Opioids and examples?
48. What is Anaesthetics and example?
49. What is Antacids and examples?
50. What is Anti histamines and examples?
51. What is Antiseptic and examples?
52. What is Antimicrobials and examples?

53. What is Disinfectants and example?
54. What is Preservatives and example?
55. What is Antifertility drugs and examples?
56. What is Antioxidants and example?
57. What is Sugar Substituents and example?
58. What is Artificial sweetening agents?
59. What is Total Fatty Matters Value?
60. What is Differtiate the 1° Primary, 2° Secondary, 3° Tertiary amines?
61. What is Solubility product?
62. What is ionization of water at room temperature value?
63. What is PH scale?
64. What is Conjugate acid - base pair?
65. What is Arrhenius concept of acid - base?
66. What is Arrhenius equation?
67. What is Bragg's equation?
68. What is Debye - Huckel and onsagar equation?
69. What is Hormones?
70. What is the classification of hormones based on the site of action?

#### APPLICATION/USES

71. Applications of Aluminium.
72. Applications of Zinc.
73. Applications of Gold.
74. Applications of Iron.
75. Applications of Copper.
76. Uses of Aluminium.
77. Uses of Helium.
78. Uses of Neon.
79. Uses of Argon.
80. Uses of Chlorin.
81. Uses of  $K_2Cr_2O_7$  and  $KMnO_4$ .
82. Uses of Silicones.
83. Uses of Glycerol.
84. Uses of Ethanol.
85. Uses of Di-ethyl ether.
86. Uses of 40% Formaldehyde (Formalin).
87. Uses of Formic acid.
88. Uses of Nitro Alkanes.
89. Medicinal uses of colloids.
90. Medicinal uses of co-ordination compounds.
91. Applications of adsorptions.
92. Uses of Kohlraush's law.
93. Uses of Phenol.
94. Uses of Diboranes.

#### DIFFERENTIATE/DISTINCTION

95. Differentiate between minerals and ores.
96. Differentiate between lanthanoids and actinoids.
97. Differentiate between double salts and co-ordination compounds.
98. Differentiate between crystalline and amorphous solids.
99. Differentiate between tetrahedral voids and octahedral voids.
100. Differentiate between rate of the reaction and rate constant of the reaction.
101. Distinction the order of the reaction and molecularity of a reaction.
102. Differences between Lewis acids and Lewis bases.

103. Differences between Physical and Chemical adsorption.
104. Differences between Homogeneous catalysis and heterogeneous catalysis.
105. Differences between DNA and RNA.
106. Differences between Hormones and Vitamines.
107. Differences between Disinfectants and Antiseptics.
108. Differences between Glucose and Fructose.

### PRINCIPLE/THEORY

109. Define the Postulates of Werners theory.
110. Define the Valence Bond theory.
111. Define the Crystal Field theory.
112. Define Collision theory.
113. Define the Acid - Base theories.
114. Define the Intermediate compound formation theory.
115. Define Adsorption theory.

### EXPLAIN

116. Explain Mond's process for refining nickel.
117. Explain Zone - Refining.
118. Explain Electrochemical extraction of aluminium.
119. Explain the structure of Di - Borane.
120. Explain the types of silicones and structure.
121. Explain the types of silicates and structure.
122. Explain Electrolytic refining.
123. Explain the structure of Graphite and Diamond.
124. Explain the structure of zeolites.
125. Explain Schottky, Frenkel, Metal Excess, Metal Deficiency defects.
126. Explain the types of molecular solids.
127. Explain the factors affecting the reaction rate.
128. Explain Daniel cell.
129. Explain Leclanche cell
130. Explain the lead storage battery.
131. Explain consequences of Lanthanoid contraction.
132. Explain the Mercury button cell.
133. Explain the Lithium - Ion battery.
134. Explain the Fuel cell ( $H_2 - O_2$ ).
135. Explain the Protection of metals from corrosion.
136. Explain Factors affecting electrolytic conductance.
137. Explain Factors affecting adsorption.
138. Explain Saytzeff's Rule with example.
139. Explain the Crossed - aldol condensation with mechanism.
140. Explain the Mechanism of cannizaro reaction.
141. Explain the Esterification reaction with mechanism.
142. Explain the Cleansing action of soap.
143. Explain the structure of Glucose.
144. Explain the structure of Fructose.
146. Explain the Peptide Bond formation with example.
147. Explain the reduction reactions of nitro benzene.

### EQUATIONS/DERIVATIONS

148. Equations of Integrated Rate law for zero order reaction and calculate the Half life period.
149. Equations of Integrated Rate law of First order reaction and Calculate the Half life period.
150. Equations of Ostwald's Dilution law.

151. Equations of Henderson – Hasselbelch.
152. Explain the Nernst equation
153. Relation between  $P^H$  and  $P^{OH}$ .
154. Relation between  $\Delta G$ , E and K equilibrium.

#### PROPERTIES/CHARACTERISTIC

155. Properties of silicones.
156. Properties of Inter Halogen Compounds.
157. Characteristic of Ionic crystals.
158. Characteristic of Catalyst.
159. Ostwald dilution law.

#### LAWS AND CONCEPTS

160. Faraday's First law.
161. Faraday's Second law.
162. Kohlraush's law.
163. Saytzeff's rule.
164. Popoff's rule.

#### LIMITATIONS/DISADVANTAGES

165. Limitations of Ellingham diagram.
166. Limitations of VB theory.
167. Limitations of Arrhenius concept.
168. Limitations of Freundlich adsorption (concept) isotherm.

#### ORGANIC CHEMISTRY - NAMING REACTIONS

169. Swern – oxidation.
170. Dow's process.
171. Schotten – Baumann reaction
172. Williamson Ether synthesis.
173. Kolbe's reaction.
174. Riemer – Tiemann reaction
175. Coupling reaction.
176. Rosenmund Reduction.
177. Stephen's Reaction.
178. Gattermann – Koch reaction.
179. Etard reaction.
180. Friedel – Crafts Acylation.
181. Friedel – Crafts Benzylation.
182. Clemmensen reduction
183. Wolf – Kishner reduction.
184. Haloform reaction.
185. Claisen – Schmidt condensation.
186. Benzoin condensation.
187. Perkin's reaction.
188. Knoevenagal reaction.
189. HVZ – reaction
190. Hoff mann's degradation reaction
191. Gabriel Phthalimide synthesis.
192. Scotten – Baumann reaction in Aniline.
193. Carbylamine reaction.
194. Mustard oil reaction.
195. Sandmeyer reaction.

196. Gattermann reaction.
197. Crossed aldol condensation reaction.
198. Crossed cannizaro reaction.
199. McAfee process.

### PREPARATION REACTIONS

200. Preparation of hydroboration.
201. Preparation of Phosphine ( $\text{PH}_3$ ) in laboratory method.
202. Preparation of Phosphoric acid
203. Preparation of  $\text{H}_2\text{SO}_4$  in contact process
204. Preparation of  $\text{K}_2\text{Cr}_2\text{O}_7$ .
205. Preparation of  $\text{KMnO}_4$ .
206. Preparation of Colloids by chemical method.
207. Mechanical Dispersion.
208. Esterification reaction.
209. Preparation of Urotropine .
210. Trans Esterification reaction.
211. Preparation of Nylon - 66 and uses.
212. Preparation of Nylon - 6 and uses.
213. Preparation of Nylon - 2, Nylon - 6.
214. Preparation of Terylene (Decron).
215. Preparation of BUNA - S.
216. Preparation of BUNA - N.
217. Preparation of PHBV.
218. Preparation of HDPE and LDPE, uses.
219. Preparation of Bakelite.
220. Preparation of Melamine.
221. Preparation of Teflon.

### TESTS/ESTIMATIONS

222. How will you identify Borate Radical.
223. Test for Sulphate and Sulphuric acid.
224. Chromyl Chloride Test.
225. Test for Colloids.
226. Give one test to differentiate  $[\text{CO}(\text{NH}_3)_5\text{Cl}]\text{SO}_4$  and  $[\text{CO}(\text{NH}_3)_5\text{SO}_4]$ .
227. Test for Carboxylic acid.
228. Lucas Test.
229. Victor - Meyer Test.
230.  $\text{Ni}^{2+}$  is identified using alcoholic solution of dimethyl glyoxime.
231. Give the test to differentiate Phenols and Alcohols.
232. Test for Aldehyde.
233. Test for Primary Amines.

### REASONING QUESTIONS

234. Write a note on anomalous properties of the first elements of P - block.
235. Give the reason to support that  $\text{H}_2\text{SO}_4$  is a dehydrating agent.
236. Bleaching action of  $\text{SO}_2$ . Explain.
237.  $\text{Gd}^{3+}$  is colourless, why?
238.  $\text{Fe}^{3+}$  is more stable than  $\text{Fe}^{2+}$ , why?
239.  $\text{Mn}^{2+}$  is more stable than  $\text{Mn}^{3+}$ . why?
240.  $\text{Cu}^{2+}$  coloured,  $\text{Zn}^{2+}$  colourless, why?
241. Why we add  $\text{NaCN}$  in Froth Flotation method.
242. Explain why  $\text{Cr}^{2+}$  is strong reducing while  $\text{Mn}^{3+}$  is strongly oxidizing.

243. Transitional Elements exhibit variable oxidation states. Why?
244. Why Transitional elements are formed interstitial compounds?
245. Out of  $\text{Lu}(\text{OH})_3$  and  $\text{La}(\text{OH})_3$  which is more basic and why?
246.  $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$  is coloured, while  $[\text{Sc}(\text{H}_2\text{O})_6]^{3+}$  is colourless explain?
247.  $[\text{Ni}(\text{CN})_4]^{2-}$  is diamagnetic, while  $[\text{NiCl}_4]^{2-}$  is paramagnetic explain using crystal field theory.
248. A solution of  $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$  is green, whereas a solution of  $[\text{Ni}(\text{CN})_4]^{2-}$  is colourless explain.
249. Why the ionic crystals are hard and brittle?
250. Molar conductance of a solution increases with increases in dilution why?
251. Why AC current used instead of DC in measuring the electrolytic conductance.
252. Amines are more basicity than amide why?
253. Aniline does not under go Fridel - Crafts reaction. why?
254. In case of chemisorptions, why adsorption first increase and then decreases with temperature.

### How will you convert the following

255. Ethylene  $\rightarrow$  Ethylene glycol.
256. Glycerol  $\rightarrow$  Acrolein.
257. Glycerol  $\rightarrow$  1,2,3 - Trl Nitro Glycerin (TNG).
258. Cumene  $\rightarrow$  Phenol.
259. Phenol  $\rightarrow$  Picric Acid.
260. Phenol  $\rightarrow$  Phenolphthalein.
261. Benzaldehyde  $\rightarrow$  Malachite green dye.
262. Methyl Acetate  $\rightarrow$  Ethyl Acetate.
263. Acetone  $\rightarrow$  Pinacol.
264. Acetaldehyde  $\rightarrow$  Lactic Acid.

265. Structures  $\text{HNO}_3$ .
266. Structures  $\text{H}_3\text{PO}_4$ .
267. Structures  $\text{PCl}_5$ .
268. Structures  $\text{IF}_7$ .
269. Structures  $\text{BrF}_5$ .
270. Structures  $\text{CO}_2$  and  $\text{CO}$  give the resonance structure.
271. The electronic configuration of 4f and 5f elements.
272. Cyclic structure of Glucose.
273. Cyclic structure of Fructose.
274. Structure of Sucrose.
275. Structure of Lactose.
276. Structure of Maltose.
277. Importance of Carbohydrates, Proteins and Lipids.

### STRUCTURES

### CALCULATIONS

278. Packing efficiency of BCC?
279. Packing efficiency of Simple Cubic.
280. Packing efficiency of FCC?
281. Write the expression for the solubility product of  $\text{Ca}_3(\text{PO}_4)_2$ .
282. Write the expression for the solubility product of  $\text{Hg}_2\text{Cl}_2$ .
283. Calculate the  $\text{P}^{\text{H}}$  of 0.1M  $\text{CH}_3\text{COOH}$  solution. Dissociation constant of Acetic acid ( $K_a$ ) is  $1.8 \times 10^{-5}$ .
284. Calculate the  $\text{P}^{\text{H}}$  of 0.001 M  $\text{HCl}$  solution.
285. Show that in case of first order, reaction. The time required for 99.9% completion is nearly 10 times the time required for half completion of the reaction.
286. Find the number of atoms present in a FCC unit cell.
287. Calculate the standard emf of the cell  $\text{Cd} | \text{Cd}^{2+} || \text{Cu}^{2+} | \text{Cu}$  and determine the cell reaction. The standard reduction potential of  $\text{Cu}^{2+} | \text{Cu}$  and  $\text{Cd}^{2+} | \text{Cd}$  are 0.34V and - 0.40 volts respectively. Predict the feasibility of the cell reaction.