

**1. ATOMIC STRUCTURE - II (Q.NO:31)**

1. What is bond order?
2. State Heisenberg's Uncertainty principle.
3. Distinguish between a particle and a wave.
4. He<sub>2</sub> molecule does not form why?
5. What is the significance of negative electronic energy?
6. What is the essential condition for effective hydrogen bonding?
7. What is hybridization?
8. What is the importance of hydrogen bonding?
9. Define – Orbital.
10. What are molecular orbital?

**2. PERIODIC CLASSIFICATION - II (Q.NO:32)**

1. Define electron affinity.
2. Ionisation energy of **Neon** is greater than that **Fluorine** Give the reason
3. Why is electron affinity of **Fluorine** less than that of **Chlorine**?
4. Why is the first ionization energy of **Be** is greater than that of **Li**?
5. Explain why the first ionization energy of **Be** is greater than that of **B**.
6. Compare the ionization energy of **nitrogen** with that of **oxygen**.
7. If the d(C-Cl) is 1.76 Å and r(Cl) is 0.99 Å, Find the radius of carbon atom.
8. Mention the disadvantage of Pauling's and Mullikan's electro negativity scale.
9. Why is ionization energy of **fluorine** greater than that of **oxygen**?
10. The electron affinities of **beryllium** and **nitrogen** are almost zero. Why?
11. Larger the size of the atom, lesser is the ionization energy. Explain.
12. K<sup>+</sup> and Cl<sup>-</sup> are isoelectronic but they have different ionic radii. Why?

**3. p – BLOCK ELEMENTS – II (Q.NO:33, 34)**

1. What is inert pair effect?
2. What is plumbo solvency?
3. H<sub>3</sub>PO<sub>4</sub> is triprotic. Prove.
4. H<sub>3</sub>PO<sub>3</sub> is diprotic. Why?
5. Explain the powerful dehydrating property of P<sub>2</sub>O<sub>5</sub>?
6. Explain the reducing property of H<sub>3</sub>PO<sub>3</sub>?
7. Why HF cannot be stored in glass bottles?
8. Write note on Holmes's signal.
9. Explain the laboratory preparation of orthophosphoric acid?
10. How is potash alum prepared?
11. Draw the electronic structure of (i) H<sub>3</sub>PO<sub>3</sub> (ii) H<sub>3</sub>PO<sub>4</sub> and (iii) PCl<sub>5</sub>
12. Give the uses of Helium?
13. Give the uses of Neon
14. What are inter halogen compounds? Give the preparation of any one
15. What happens when phosphorus acid is heated?
16. Explain the oxidizing power of fluorine?
17. Write note on etching of glass.
18. How is XeF<sub>6</sub> prepared?
19. Give the uses of Argon and Radon?

**4. d – BLOCK ELEMENTS (Q.NO:35, 36)**

1. Explain why  $Mn^{2+}$  is more stable than  $Mn^{3+}$ .
2. Write a note on chromyl chloride test.
3. What is spitting of silver? How it is prevented?
4. Why do d-block elements exhibit variable oxidation state?
5. Why transition metal ions are colored?
6. Why do d block elements form more complexes?
7. What is the action of heat on copper sulphate?
8. What is aqua regia? Give the reaction of gold with aqua regia?
9. What is chrome plating?
10.  $K_2Cr_2O_7$  is powerful oxidizing agent explains. Give two examples
11. Explain the electrolytic refining of copper?
12. What is the reaction of copper sulphate with KCN?
13. What is the reaction of Zinc on hot solution of NaOH?
14. Why do  $Zn^{2+}$  salts colorless while  $Ni^{2+}$  salts are colored?
15. What happens when KI solution is added to an aqueous solution of copper sulphate?
16. A substance is found to have a magnetic moment of 3.9 BM. How many unpaired electrons does it contain?
17. How is purple of cassius prepared?

**7. NUCLEAR CHEMISTRY (Q.NO:37)**

1. Define radioactivity
2. Define Half life period
3. State radioactive disintegration theory
4. What is binding energy of nucleus?
5. Give any three differences between nuclear reaction and chemical reaction
6. What is Q-value for a nuclear reaction?
7. What is radio carbon dating?
8. Explain the principle behind in Hydrogen bomb?
9. What is the significance of radio carbon dating?
10. State two uses of Radio carbon dating.

**8. SOLID STATE-II (Q.NO:38)**

1. State Bragg's Law?
2. What are super conductors?
3. What is super conducting transition temperature?
4. Give the uses of super conductors?
5. How glasses are formed?
6. What is vitreous state?
7. Calculate the number of CsCl unit in crystal
8. Write a note on molecular crystal
9. Write a note on Frenkel defect
10. Sketch the following lattices:  
a) Simple cubic      b) Face – centered cubic      c) Body centered cubic.
11. Define Unit cell.

**9. THERMODYNAMICS (Q.NO:39)**

1. What is entropy? What is its unit?
2. State the Kelvin-Planck's statement of second law of thermodynamics?
3. State Clausius state of second law of thermodynamics
4. State Trouton's law
5. What is Gibbs free energy?
6. What types of liquids or substances deviate from Trouton's rule?
7. Mention the entropy state of second law of thermodynamics and mention the unit of entropy also.
8. What are the conditions for the spontaneity of a reaction?

**10. CHEMICAL EQUILIBRIUM-II (Q.NO:40)**

1. State Lechatelier's principle
2. Define-Degree of dissociation
3. Define reaction Quotient
4. What is equilibrium constant?
5. Why do chemical equilibrium is referred to as dynamic equilibrium?
6. Dissociation of  $\text{PCl}_5$  decreases in the presence of increase in  $\text{Cl}_2$  why?
7. What happens when  $\Delta n_g=0, \Delta n_g=+ve, \Delta n_g=-ve$  in a gaseous reaction?
8. What is the relationship between equilibrium constant and dissociations constant? Give one example
9. Define reaction quotient. How is related to equilibrium constant?

**11. CHEMICAL KINETICS – II (Q.NO:41, 42)**

1. Define order of a reaction
2. What is half-life period?
3. What is Pseudo first order reaction? Give example
4. What is activation energy?
5. What are simple and complex reactions?
6. What is Consecutive reaction? Give example
7. What is parallel reaction? Give example
8. What is opposing reaction? Give example
9. What are complex reactions? Give an example.
10. Write the Arrhenius equation and explain the terms.

**12. SURFACE CHEMISTRY (Q.NO:43)**

1. What is Brownian movement? Give reason
2. What is Tyndall's effect?
3. What is electrophoresis?
4. What is electro osmosis?
5. What are promoters? Give example
6. What is peptisation? Give an example
7. What is tanning?
8. What is heterogeneous catalysis? Give example
9. Give three differences between physical adsorption and chemical adsorption
10. What is emulsion? What are emulsifying agents?
11. Gas in gas colloidal solution is not formed why?
12. What is catalysis? Give example
13. What are characteristics of catalyst?

14. What is catalytic poison? Give example
15. Explain the following with examples
  - i) Positive catalysis
  - ii) negative catalysis
  - iii) Autocatalysis
  - iv) induced catalysis
  - v) Active centre's

**13. ELECTRO CHEMISTRY – I (Q.NO:44)**

1. State Faraday's law of electrolysis
2. Define-electro chemical equivalent. What is its unit?
3. State Ostwald dilution law
4. What is common ion effect? Give example
5. What are Buffer solutions? Give examples
6. What is equivalent conductance? Give its unit
7. What is molar conductance? Give its unit
8. State Kohlraush's law
9. What do mean ionic product of water?
10. What is cell constant? Give its unit
11. Define pH of a solution.
12. What are indicators?

**15. ISOMERISM IN ORGANIC CHEMISTRY (Q.NO:45)**

1. Distinguish between enantiomers and diastereomers
2. Distinguish between racemic form and meso form.
3. What is asymmetric carbon? Or What is a chiral carbon atom?
4. What are the conditions for optical activity?
5. Meso tartaric acid is optically inactive-justify your answer
6. *Trans*-isomer is more stable than *cis*-isomer .Why?
7. What is a racemic mixture? Explain with a suitable example.

**16. HYDROXY DERIVATIVES (Q.NO:46, 47)**

1. How can the consumption of alcohol by a person be detected?
2. Give the uses of methanol
3. Give the uses of ethanol
4. How will you differentiate primary, secondary and tertiary alcohol by Lucas test?
5. How is Dacron prepared? (Terylene or Terene)
6. How will you convert ethylene glycol into ethylene?
7. How ethylene glycol is converted into dioxan?
8. How will you convert ethylene glycol into formic acid?
9. What is Saponification reaction?
10. What happens when glycerol react  $\text{KHSO}_4$ ? (acrolein)
11. How allyl alcohol is prepared from glycerol
12. What is glycerose? How it is prepared?
13. Give the uses of benzyl alcohol
14. Explain the acidic nature of phenol
15. How is phenol identified?
16. Explain Dow's process?
17. How phenolphthalein is prepared?
18. Why glycol is more viscous than ethanol?
19. Phenol is insoluble in  $\text{NaHCO}_3$  but acetic acid is soluble-Give the reason

19. How will you convert  $C_2H_5-OH$  to  $C_2H_5-O-C_2H_5$ ? (Ethyl alcohol to diethyl ether)
20. Alcohols cannot be used as a solvent for Grignard reagents. Why?
21. Give a chemical test to distinguish between ethanol and methanol
22. How will you convert 2-methyl 2-propanol into 2-methyl propene?
23. Phenol is soluble in alcohol why?
24. How phenol is identified by dye test? Give equation (**Coupling Rxn**)
25. How is glycerol prepared by synthesis?
26. How is nitroglycerine prepared from glycerol?
27. Starting from phenol how would you obtain picric acid?
28. Write a note on Kolbe's reaction.
29. What happens when ethylene reacts with cold dilute alkaline  $KMnO_4$ ?
30. Write short notes on Riemeier-Tiemann reaction.

**18. CARBONYL COMPOUNDS (Q.NO:48)**

1. What is Rosenmund's reduction? What is the purpose of adding  $BaSO_4$  in it?
2. What is Urotrophine? Give its use or How does formaldehyde react with ammonia?
3. Explain the haloform reaction?
4. Explain the reaction of ammonia with benzaldehyde
5. How will you acetone into propane?
6. Give the tests for aldehydes
7. Give the polymerization reactions of formaldehyde and acetaldehyde
8. Write briefly on Clemmenson's reduction.
9. Give the reaction of benzaldehyde with Chlorine in the presence of catalyst
10. Give the uses of benzaldehyde
11. What is formalin? Write its use.
12. How is acetophenone prepared by Friedel-Craft's reaction?
13. Give the uses of acetaldehyde
14. Give the uses of formaldehyde
15. Write note on cannizzaro reaction.
16. Difference between formaldehyde and acetaldehyde.
17. Give the IUPAC names for the following:  
(i) Crotonaldehyde (ii) Methyl n-propyl ketone (iii) Phenyl acetaldehyde

**19. CARBOXYLIC ACIDS (Q.NO:49)**

1. What is trans-esterification?
2. What is meant by esterification reaction? Write the equation.
3. Write a note on HVZ reaction.
4. Mention the uses of Oxalic acid.
5. How is aspirin prepared from salicylic acid?
6. How is methyl salicylate prepared?
7. Formic acid reduces Tollen's reagent. But acetic acid does not. Give reason.
8. Give the tests for Salicylic acid.
9. What is the action of lactic acid with dil.  $H_2SO_4$ ?
10. Account for the reducing nature of formic acid with suitable illustration?
11. Write two tests to identify carboxylic acids.
12. Mention the uses of benzoic acid.
13. How will you convert lactic acid into lactyl chloride.
14. Give the source and trivial name of (i)  $HCOOH$  (ii)  $C_3H_7COOH$  (iii)  $C_{11}H_{23}COOH$

**20. ORGANIC NITROGEN COMPOUNDS (Q.NO:50)**

1. What is Gabriel's Phthalimide synthesis?
2. Write a note on Sand meyer reaction.
3. How will you convert acetamide to methyl amine? Give equation.
4. How is Schiff's base formed from methylamine?
5. Write about Gomberg-Bachmann reaction.
6. Give short notes on diazotisation reaction.

**22. CHEMISTRY IN ACTION (Q.NO:51)**

1. What are analgesics? Give examples.
2. Write a brief note on Antiseptic.
3. What are chromophores? Give two examples.
4. What are anaesthetics? Give examples.
5. What are antacids? Give an example.
6. What are food preservatives? Give an example.
7. What are artificial sweetening agents? Give two examples.
8. Give a note on antibiotics.
9. Write note on characteristics of dyes.
10. What are the functions of anti Oxidants?
11. What are antipyretics ? Give an example.

**1. ATOMIC STRUCTURE - II (Q.NO:52)**

1. Explain the formation of oxygen molecule by Mo theory.
2. Drive de Broglie's equation and significance.
3. Discuss Davisson and Germer's Experiment.
4. Give the postulates of molecular orbital theory.
5. Explain the formation of Nitrogen molecule by Mo theory.

**4. d – BLOCK ELEMENTS (Q.NO:53)**

1. Briefly explain the extraction of Zinc blende.
2. How is silver extracted from its ore?
3. How is gold extracted from its ore?
4. How is potassium dichromate prepared from chrome iron ore?
5. How is Cr<sub>2</sub>O<sub>3</sub> reduced to chromium by aluminothermic process?

**5. f – BLOCK ELEMENTS (Q.NO:54)**

1. List the similarities and difference between Lanthanides and Actinides.
2. What is lanthanide contraction? Discuss its causes and any two consequences.
3. Describe the extraction of Lanthanides from monazite sand.
4. Write note on the uses of lanthanides and actinides.

**6. COORDINATION COMPOUNDS AND BIO-COORDINATION COMPOUNDS (Q.NO:55 & 65(B))**

1. Explain coordination and ionization isomerism with suitable example.
2. [Ni(CN)<sub>4</sub>]<sup>2-</sup> is diamagnetic whereas [Ni(NH<sub>3</sub>)<sub>4</sub>]<sup>2+</sup> is paramagnetic. Explain.
3. Write the postulates of Werner's theory on co-ordination compound.
4. For the complex K<sub>4</sub>[Fe(CN)<sub>6</sub>], [Cu(NH<sub>3</sub>)<sub>4</sub>] SO<sub>4</sub>, [Co(NH<sub>3</sub>)<sub>6</sub>] Cl<sub>3</sub>, [Cr(en)<sub>3</sub>]Cl<sub>3</sub> mention
  - a) IUPAC Name
  - b) Central metal ion
  - c) Ligand
  - d) Co-ordination number
  - e) Geometry or Structure
  - f) Charge in Co-ordination sphere
5. How is chlorophyll important in environmental chemistry? Mention its function.

6. In what way does  $[\text{FeF}_6]^{4-}$  differ from  $[\text{Fe}(\text{CN})_6]^{4-}$ ?
7. Mention the function of hemoglobin in natural process.
8. Apply V.B. theory for  $[\text{Ni}(\text{CN})_4]^{2-}$  and  $[\text{FeF}_6]^{4-}$  and explain the shape and magnetic properties.

**9. THERMODYNAMICS (Q.NO:56)**

1. State the various statement of second law of thermodynamics.
2. Write the characteristics of free energy (G)?
3. What are the characteristics of entropy (S)?

**10. CHEMICAL EQUILIBRIUM-II (Q.NO:57)**

1. Derive the relation between equilibrium constant  $K_p$  and  $K_c$ .
2. Apply Le chatelier's principle for the manufacture of ammonia by Haber's process.
3. Derive the expression for  $K_p$  and  $K_c$  for the decomposition of  $\text{PCl}_5$ .
4. Apply Le chatelier's principle for the manufacture of  $\text{SO}_3$  by contact process.
5. Derive the expression for  $K_p$  and  $K_c$  for the formation of HI.

**11. CHEMICAL KINETICS – II (Q.NO:58)**

1. Write the characteristics of order of reaction.
2. State the difference between simple and complex reactions.
3. Write notes on (i) consecutive reaction, (ii) parallel reactions and (iii) opposing reactions.
4. Explain the experimental determination of rate constant for decomposition of  $\text{H}_2\text{O}_2$  in aqueous solution.
5. Discuss the characteristics of a first order reaction.
6. Explain the experimental determination of rate constant of acid hydrolysis of methyl acetate.
7. Explain various types of complex reaction and give one example for each.
8. Derive an equation for the rate constant of a first order reaction.

**14. Electro Chemistry –II (Q.No:59)**

1. Derive Nernst equation.
2. Write an account on cell terminology.
3. How is a standard Hydrogen Electrode (SHE) constructed? Explain its function.

**17. ETHERS (Q.NO:60)**

1. Distinguish aliphatic ether (diethyl ether) and aromatic ether(anisole).
2. How does diethyl ether react with the following reagents?  
(i)  $\text{O}_2$ /long contact (ii) dil.  $\text{H}_2\text{SO}_4$  (iii)  $\text{PCl}_5$  (iv) HI and (v) excess of HI
3. Give any three methods of preparing diethyl ether.
4. Give any two (or) three methods of preparation of anisole and explain the reaction of HI with anisole.
5. Write all possible isomers with the molecular formula  $\text{C}_4\text{H}_{10}\text{O}$  and name them.

**18. CARBONYL COMPOUNDS (Q.NO:61)**

1. Explain the mechanism of Cannizzaro reaction.
2. Explain the mechanism of crossed aldol condensation.
3. Explain the mechanism of aldol condensation of acetaldehyde.
4. Write the mechanism of Claisen Schmidt reaction.
5. Explain the mechanism of aldol condensation in acetone.
6. Write the difference between acetaldehyde and acetone.
7. Write the difference between aliphatic aldehyde and aromatic aldehyde.
8. Explain 'Popott's rule with an example.
9. Write notes on (i) Stephen's reaction, (ii) Perkin's reaction.

10. How is acetone converted to (i) mesityl oxide (ii) mesitylene.

### 19. CARBOXYLIC ACIDS (Q.NO:62 & 68B)

1. How is lactic acid manufactured in large scale? How can it be converted into cyclic diester?
2. Account for the reducing nature of formic acid.
3. How is benzoic acid obtained from (a) Ethyl benzene (b) Phenyl cyanide (c) Carbon dioxide?
4. Distinguish between formic acid and acetic acid.
5. How is Oxalic acid manufactured from sodium formate?
6. Write the mechanism of esterification reaction.
7. What happens when (i) Oxalic acid is treated with  $\text{NH}_3$  (ii) Benzoic acid is treated with  $\text{PCl}_5$ ?
8. Bring about the following conversions:
  - (i) Salicylic acid to Aspirin
  - (ii) Lactic acid to Lactide
  - (iii) Benzoic acid to Benzyl alcohol
  - (iv) Succinic acid to Succinimide
9. Explain the mechanism of Kolbe's reaction.
10. What happens when lactic acid is
  - (i) treated with dilute  $\text{H}_2\text{SO}_4$
  - (ii) treated with  $\text{PCl}_5$
  - (iii) Oxidised with acidified  $\text{KMnO}_4$ ?
11. Explain the reactions of  $\text{CH}_3\text{CONH}_2$  with (i)  $\text{P}_2\text{O}_5$  (ii)  $\text{Br}_2/\text{NaOH}$  and (iii) Hydrolysis by an acid
12. How is lactic acid synthesized from acetylene? How can it be converted into cyclic diester?
13. Give the equation for the action of heat on (a) Oxalic acid (b) Succinic acid (c) Formic acid
14. Write shorts on the following: (i) HVZ reaction (ii) Trans-esterification (iii) Kolbe's electrolytic reaction

### 22. CHEMISTRY IN ACTION (Q.NO:63)

1. Explain brief on characteristics of rocket propellants.
2. Write notes on anesthetics.
3. How are Buna-S Buna-N and Nylon – 66 prepared?
4. Explain briefly on colour and structure of dyes.

### 2. PERIODIC CLASSIFICATION - II (Q.NO:64A)

1. Explain Pauling's method to determine ionic radii.
2. Explain the various factors that affect electron affinity.
3. How do electronegativity values help to find out the nature of bonding between atoms?
4. Explain the Pauling's scale for the determination of electro negativity and disadvantage.
5. Define ionization energy. factors affecting the ionization energy.
6. Explain how electronegativity values help to find out the percentage of ionic character in polar covalent bond.

### 3. p – BLOCK ELEMENTS – II (Q.NO:64B)

1. How is fluorine isolated from their fluorides by Dennis method?
2. Describe in detail how noble gases are isolated from air by Ramsay – Rayleigh's method.
3. Describe in detail how noble gases are isolated by Dewar's process.
4. Mention the uses of silicones.
5. How is lead extracted from its ore?
6. How does Fluorine differ from other halogens?(Anamalous nature of fluorine)
7. Discuss the structure of interhalogen compound  $\text{AX}$ ,  $\text{AX}_3$ ,  $\text{AX}_5$  and  $\text{AX}_7$  type.(Any two type)

**6. COORDINATION COMPOUNDS AND BIO-COORDINATION COMPOUNDS (Q.NO:65A)**

1. Write the application of VB theory on the following complex.  
i)  $[\text{Fe}^{\text{II}}\text{F}_6]^{4-}$     ii)  $[\text{Fe}^{\text{II}}(\text{CN})_6]^{4-}$
2. Write the postulates of Werner's theory of coordination compounds.
3. Explain the following terms:  
i) Neutral ligand    ii) Chelates    iii) Co-ordination sphere
4. What are the postulates of valence bond theory?
5. Explain hydrate and linkage isomerism with suitable examples.

**7. NUCLEAR CHEMISTRY (Q.NO:65B)**

1. Explain briefly about Radiocarbon dating.
2. Explain the principle underlying the function of hydrogen bomb.
3. Difference between chemical reaction and nuclear reaction.
4. Distinguish between Nuclear Fusion reactions and Fission reactions.
5. Explain the nuclear reaction that take place in sun.
6. Explain nuclear fission reaction with an example.
7. List the medical uses of radioactive isotopes.
8. Mention the use of radioisotopes in the field of  
i) Study of hydrolysis of ester    ii) Mechanism of photosynthesis in plants

**8. SOLID STATE-II (Q.NO:66A)**

1. Explain Schottky and Frenkel defect.
2. Explain Bragg's spectrometer method.
3. Explain Bragg's equation. Give its significance.
4. Explain the nature of glass.
5. Write the properties of ionic crystals.
6. What are superconductors? Write their uses.

**12. SURFACE CHEMISTRY (Q.NO:66B)**

1. Write briefly the adsorption theory of catalysis?
2. Explain intermediate compound theory of catalysis.
3. Write briefly about the preparation of colloids by chemical methods.
4. Write the general characteristics of catalytic reactions.
5. How are colloids prepared by using  
(i) mechanical dispersion method,    (ii) electro dispersion method?
6. What is electro – osmosis? Explain the experiment.
- 7 Give any 5 main differences between physical adsorption and chemical adsorption.
8. Write notes on a (i) Auto catalyst, (ii) Promoters.
9. How can colloidal solution be purified by dialysis?

**13. ELECTRO CHEMISTRY – I (Q.NO:67A)**

1. Derive Oswald's dilution law.    2. Explain Oswald's theory of indicators.
3. Derive Henderson equation.    4. Write note on Quinonoid theory of indicators.
5. Explain the postulates of Arrhenius theory of electrolytic dissociation.
6. Explain the buffer action of acidic buffer with an example.
7. What are the evidences in favour of Arrhenius theory of electrolytic dissociation?
8. Differentiate between electronic conduction and electrolytic conduction.

**14. Electro Chemistry –II (Q.NO:67B)**

1. Write the IUPAC convention for writing cell diagram with example.
2. Derive Nernst equation.
3. Write a brief account on the relation between EMF and free energy.
4. Describe Daniel cell.
5. How is e. m. f of a half cell determined?
6. Explain any five terms used in cell terminology.

**15. ISOMERISM IN ORGANIC CHEMISTRY (Q.NO:68A)**

1. Distinguish between enantiomers and diastereomers.
2. Discuss the optical activity in Tartaric acid.
3. Distinguish racemic form from Meso form with suitable example.
4. Describe the conformations of cyclohexanol and comment on their stability.
5. Explain internal and external compensation with suitable examples.
6. Explain geometrical (cis-trans) isomerism with example.

**19. CARBOXYLIC ACIDS (Q.NO: 68B)**

1. Give the mechanism involved in the esterification of carboxylic acid with alcohol.
2. Give the mechanism involved in bromination of salicylic acid.
3. Discuss the isomerism exhibited by carboxylic acid.
4. How do you distinguish formic acid from acetic acid?
5. How can salicylic acid be converted to (i) Aspirin (ii) 2,4,6 tribromophenol (iii) Methyl salicylate?
6. What happens when lactic acid is  
(i) treated with dil.  $H_2SO_4$  (ii) heated alone (iii) Oxidised with alkaline  $KMnO_4$ ?
7. How are the following conversion take place?  
(i) Salicylic acid to Methyl salicylate (ii) Lactic acid to Pyruvic acid (iii) Methyl cyanide to Acetamide.
8. How are the following conversions carried out?  
(i) Salicylic acid to Aspirin (ii) Methyl acetate to Ethyl acetate (iii) Lactic acid to Lactide.
9. Account for the reducing nature of Formic acid.
10. How is benzoic acid obtained from (i) Ethyl benzene (ii) Phenyl cyanide (iii) Carbon dioxide?
11. Explain (i) Kolbe's electrolytic reaction and (ii) trans – esterification reaction.
12. How is Oxalic acid manufactured from sodium formate?
13. What happens when benzoic acid reacts with (i) Conc.  $HNO_3$ /Conc.  $H_2SO_4$  (ii)  $Cl_2/FeCl_3$  (iii)  $PCl_5$
14. Write the preparation of salicylic acid with mechanism.

**20. ORGANIC NITROGEN COMPOUNDS (Q.NO:69A)**

1. Distinguish between primary, secondary and tertiary amines.
2. How are the following conversions carried out?  
(i) Nitrobenzene to phenyl hydroxylamine (ii) Aniline to phenyl isocyanide  
(iii) Benzene diazonium chloride to biphenyl (iv) Nitromethane to Methyl amine  
(v) Methyl amine to Methyl isocyanide
3. Write a note on the reduction nitrobenzene under different conditions.
4. How are (i) phenol, (ii) Chlorobenzene, (iii) Biphenyl prepared by using benzene diazonium chloride?
5. How does nitrous acid react with primary, secondary, and tertiary amines?
6. Explain the following reactions in aniline:  
(i) Coupling reaction (ii) Schotten – Baumann reaction (iii) Carbylamine reaction.
7. Write the following reactions: (i) Carbylamine reaction (ii) Diazotisation reaction (iii) Gomberg reaction  
(iv) Mustard oil reaction (v) Formation of Schiff's base. (vi) Gabriel's Phthalimide synthesis

**21. BIOMOLECULES (Q.NO:69B)**

1. How are carbohydrates classified? Give example for each.
2. Prove the structure of glucose.
3. Elucidate the structure of fructose.
4. Distinguish between glucose and fructose.
5. What is a peptide bond? Illustrate the formation of a peptide bond in glycyl alanine.  
Draw the structure of glucose and fructose.

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