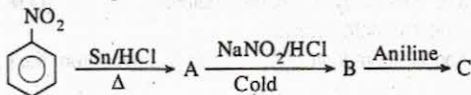


12. How is dry and pure nitrobenzene prepared in laboratory? [Q.N.28.(a), 2065]
 13. Consider the following reaction:



- Identify compounds A, B and C and write the reactions involved. [Q.N.28.(b), 2065]
 14. How is nitrobenzene prepared in laboratory in pure and dry state? How is it converted to p-hydroxy azo benzene? [Q.N. 28, 2059]
 15. Describe the preparation of pure and dry nitrobenzene in laboratory. How is it converted to (i) phenol and (ii) hydrazobenzene? [Q.N. 28, 2058]
 16. What happens when Nitrobenzene is subjected to reduction in
 (a) Acidic medium
 (b) Neutral medium [Q.N. 26, 2053]
 17. Describe the laboratory method for the preparation of Nitrobenzene. How is it purified?

Unit 15: Amino Compounds (Amines and Aniline)

15.1 Aliphatic Amines

Very Short Questions

(All questions are of equal value, 2 marks each.)

- Give a chemical test to distinguish ethanamine from N-methylmethanamine. [2] [Q.N.14, 2072'E']
- Why is methanamine more basic than aniline? 2 [Q.N.15, Supp. 2071]
- Give an example of each of the following reaction:
 i) Hoffman's bromamide reaction
 ii) Carbylamine reaction [Q.N. 15, Set 'C' 2071]
- Write the structure of isomeric amines of propanamine and their IUPAC name. [Q.N. 15, Set 'D' 2071]
- Give a chemical test to distinguish ethanamine from N-methyl methanamine. [Q.N.14, 2070 'Supp']
- Convert methanamine into ethanamine. [Q.N. 15, 2070 'C']
- Why is amine more acidic than ammonia? [Q.N. 15, Set 'A' 2069]
- Why are aliphatic amines more basic than aniline. [Q.N. 14, Set 'B' 2069]
- There are three possible isomeric amines of $\text{C}_3\text{H}_9\text{N}$. One of them is propanamine. Write other two isomers and give their IUPAC name. [Q.N. 5, 2065]
- Write the possible isomeric amines of $\text{C}_3\text{H}_9\text{N}$ and give their IUPAC names. [Q.N.8, 2063]
- Convert $\text{CH}_3\text{-CH}_2\text{-NH}_2$ into $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-NH}_2$ [Q.N. 14, 2055]
- Which of the following has most basic character? Explain.
 a) NH_3 b) $(\text{CH}_3)_2\text{NH}$ c) CH_3NH_2 d) $\text{C}_6\text{H}_5\text{NH}_2$ [Q.N. 15, 2054]
- Name:
 a. $\text{CH}_3\text{-CH}_2\text{-CH}(\text{CH}_3)\text{-CH}(\text{NH}_2)\text{-CH}_3$ [Q.N. 10(a), 2052]

Short Questions

(All questions are of equal value, 5 marks each.)

- How will you prepare ethanamine from
 (i) propanamide (ii) ethane nitril 1+1+1+2 [Q.N.29, Supp. 2071]
 What happens when ethanamine is treated with $\text{NaNO}_2 + \text{HCl}$ at low temperature convert methanamine into ethanamine.
- Write down a chemical reaction to distinguish ethanamine from N-methyl methanamines? How is ethanamine prepared from:
 i) propanamide ii) ethanenitrile [Q.N.29, Set 'C', 2071]

- Mention an example of each of Primary, Secondary and Tertiary amine. How are they separated from their mixture by Hoffmann's method? [Q.N. 29, Set 'D' 2071]
Convert ethanamine into methanamine.
- Explain the method of separation of 1°, 2° and 3° amine from their mixture by using diethyl oxalate. [Q.N. 23, 2067]
- What are amines? How are they classified? How do different classes of amines react with diethyl oxalate? [Q.N. 23, 2058]
- How would you separate 1°, 2° and 3° amines from their mixture by Hoffmann's method? [Q.N. 22, 2057]
- Discuss any one method that can be used for separation of primary, secondary and tertiary amines. [Q.N. 20, 2054]

Long Questions

(All questions are of equal value, 10 marks each.)

- Write short notes on:
 - Separation of 1°, 2° and 3° amines by Hoffman's method. [Q.N.33(d), 2072'C']
 - Separation of amines by Hoffmann's method. [Q.N. 33(d), Set 'A' 2069]
 - Separation of 1°, 2° and 3° amines by Hoffmann's method [Q.N. 33(a), Set 'B' 2069]
- What are amines? How would you separate 1°, 2° and 3° amines from their mixture by Hoffmann's method? 1+4 [Q.N. 30(b), 2070 'D']
- Give Hoffmann's method for the separation of primary, secondary and tertiary amine. [Q.N. 31(a), Supp. 2069]
- Convert the following: [Q.N. 31(b) (ii), Supp. 2069]
 - methylamine into ethylamine
- Describe the chemical method of separation of 1°, 2° and 3° amines from their mixture. [Q.N. 29(b), 2066]
- What are amines? How are they classified? Describe a suitable method for the separation of amines from their mixtures. [Q.N. 28(i), 2064]
 - How could you convert methanamine to ethanamine and vice versa? [Q.N. 28(ii), 2064]

15.2 Aromatic Amine (Aniline)

Very Short Questions

(All questions are of equal value, 2 marks each.)

- Give the major products of the following reactions: 1+1 [Q.N.15, 2072'C']
 - $\text{Benzene} + \text{Br}_2 \xrightarrow[\Delta]{\text{aq. NaOH}}$
 - $\text{Aniline} + \text{Benzenediazonium chloride} \xrightarrow{\text{warm}}$
- How does aniline react with: 1+1 [Q.N.15, 2072'D']
 - aqueous bromine
 - $\text{NaNO}_2 + \text{HCl}$ at low temperature
- Define and give an example of: Coupling reaction. [Q.N.15(ii), 2072'E']
- How are sulphaniic acid and acetanilide prepared from aniline? [Q.N. 15, 2070 'D']
- What happens when aniline is treated with; [Q.N. 15, Supp. 2069]
 - aqueous bromine
 - benzenediazonium chloride.
- Mention one example of each of the following: [Q.N.7(ii), 2065]
 - Diazotization reaction
- What happens when : [Q.N.6(i), 2063]
 - Aniline is shaken well with aq. Br_2 ?

Short Questions

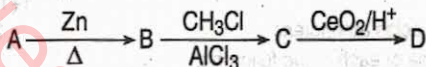
(All questions are of equal value, 5 marks each.)

- Explain why,
 - Amino group of aniline is ortho or para directing.
 - Amino group of aniline is protected before nitration.
 - Aniline is a weaker base than aliphatic amine.
- What happens when ?
 - Aniline is coupled with benzene diazonium chloride. [Q.N. 23(c), 2062]
- Write the chemical equation, with conditions for the following reaction.
 - Aniline is diazotized. [Q.N. 23(a), 2057]

Long Questions

(All questions are of equal value, 10 marks each.)

- How is pure and dry aniline prepared in the laboratory? Identify A, B, C, D in the following reaction sequences:



Compound D when reacts with zinc amalgam in presence of acid gives toluene.

6+4 [Q.N.31, 2072'D']

- How is aniline prepared in the laboratory in pure and dry state? How does aniline react with:
 - Chloroform.
 - benzene diazonium chloride
 - aq. Br₂
- Sketch a well-labelled diagram for the preparation of pure aniline in laboratory. Write the principle and process involved in it. [Q.N.30(a), 2070 'Supp']
- How is pure aniline prepared in the laboratory? [Q.N. 30 (a), 2070 'C']
- How is pure aniline prepared in the laboratory?
 - Convert aniline into: [Q.N. 31, Set 'A' 2069]
 - azodye
 - n-methyl aniline
- Convert the following:
 - Aniline into azodye
 - Benzaldehyde into cinnamic acid.
 - aniline into azodye [Q.N. 31(b), Set 'B' 2069]
- How is pure aniline prepared in the laboratory ? Starting from aniline, how would you obtain:
 - Orthonitro aniline
 - N-methyl aniline [Q.N.29, 2068]
- Describe the preparation of pure and dry aniline in the laboratory. Give its action upon:
 - aq. Br₂
 - methyl iodide [Q.N. 28, 2062]
- How is aniline prepared in the lab ? What happens when (a) benzamide, $\left(\text{C}_6\text{H}_5\text{C}(=\text{O})\text{NH}_2 \right)$, is allowed to react with bromine in presence of KOH solution
 - aniline is warmed with Chloroform and ethanolic potassium hydroxide ? Why is aniline less basic than methylamine ? [Q.N. 29, 2061]
- How is aniline prepared in laboratory ? Give its action upon (a) CHCl₃/alc KOH (b) NaNO₂/HCl under ice cold condition and (c) aq.Br₂. [Q.N. 28, 2060]
- Starting from aniline how would you obtain.
 - O-nitro aniline and
 - picric acid? [Q.N. 29(b), 2057]
- How is aniline prepared in the laboratory ? How would you convert aniline into:
 - Phenol
 - Phenyl isocyanide
 - Sulphanilic acid
 - p-benzoquinone
 - Benzene diazonium chloride [Q.N. 28, 2054]

Unit 16: Molecules of Life

Very Short Questions

(All questions are of equal value, 2 marks each.)

1. What are disaccharides? What happens when they get hydrolysed? 1+1 [Q.N.16, 2072'C']
2. Write an example of simple lipid. What happens when lipid gets hydrolysed?
1+1 [Q.N.17, 2072'C']
3. Define the terms : 1+1 [Q.N.16, 2072'D']
i) zwitter ions ii) denaturation of protein
4. What is saponification? Give an example of it. 1+1 [Q.N.17, 2072'D']
5. Define sugar and non-sugar with an example of each. 2 [Q.N.16, 2072'E']
6. What are essential and non-essential amino acids? Give examples in each case. [Q.N.17, 2072'E']
7. Distinguish between monosaccharides and disaccharides with an example of each.
1+1 [Q.N.16, Supp. 2071]
8. Why are amino acids amphoteric ? 2 [Q.N.17, Supp. 2071]
9. Write an example of each of the following:
i) reducing sugar ii) simple lipid
iii) non-sugar iv) disaccharide [Q.N. 16, Set 'C' 2071]
10. Name a simple lipid. What happens when simple lipid gets hydrolysed? [Q.N. 17, Set 'C' 2071]
11. Distinguish between sugar and non-sugar with an example of each. [Q.N. 16, Set 'D' 2071]
12. What is meant by peptide bond? Write an example of dipeptide. [Q.N. 17, Set 'D' 2071]
13. Write molecular formula of each of the followings.
(i) Simple lipid (ii) Dipeptide [Q.N.16, 2070 'Supp']
14. Name the products obtained by the hydrolysis of cane sugar. What is meant by invert sugar? [Q.N.18, 2070 'Supp']
15. Define essential and non-essential amino acid with an example of each. [Q.N. 16, 2070 'C']
16. What are disaccharides? What happens when they get hydrolysed? [Q.N. 17, 2070 'C']
17. Distinguish between sugars and non-sugars. [Q.N. 16, 2070 'D']
18. What is a peptide linkage? Give an example of dipeptide: [Q.N. 17, 2070 'D']
19. Define sugar and non-sugar with an example of each. [Q.N. 16, Supp. 2069]
20. Distinguish between DNA and RNA. [Q.N. 17, Supp. 2069]
21. What happens when fat gets hydrolysed? [Q.N. 16, Set 'A' 2069]
22. What is denaturation of protein? Give an example. [Q.N. 17, Set 'A' 2069]
23. What are lipids? Give one example of it. [Q.N. 18, Set 'B' 2069]
24. Mention one example of each of sugar and non-sugar. [Q.N. 19, Set 'B' 2069]
25. What is meant by simple protein ? Give an example of it. [Q.N.8, 2068]
26. How would you obtain glucose from cane sugar ? [Q.N.12, 2068]
27. Define the following terms with one correct example of each :
(i) Sugar (ii) Non-Sugar [Q.N. 10, 2067]
28. What are the constituents of nucleic acid ? [Q.N. 11, 2067]
29. What is difference between essential and non-essential amino acids ? [Q.N. 11, 2066]
30. How do glucose and fructose differ in their functional group ? [Q.N. 12, 2066]
31. Name any four nitrogen bases present in nucleic acid. [Q.N.11, 2065]
32. What are the essential conditions of denaturation of Protein ? [Q.N.12, 2065]
33. Give an example of each of the following:
(i) disaccharide [Q.N.10(iii), 2065]
34. (i) Define lipid. [Q.N. 9(i), 2064]
(ii) Name the pyrimidine bases found in RNA. [Q.N. 9(ii), 2064]

35. What happens when :
 (i) a disaccharide is hydrolysed ? [Q.N. 10(i), 2064]
 (ii) a protein is denatured ? [Q.N. 10(ii), 2064]
36. What is meant by peptide bond ? Write the structure of dipeptide. [Q.N.11, 2063]
37. Point out any two differences between RNA and DNA molecules. [Q.N.12, 2063]
38. Define protein. What is meant by denaturation of protein ? [Q.N. 11, 2062]
39. Point out any two differences between RNA and DNA. [Q.N. 12, 2062]
40. Explain how amino acids are combined to form a protein molecule ? [Q.N. 8, 2061]
41. Distinguish both chemically and physically between a fat and a vegetable oil. [Q.N. 9, 2061]
42. What is the role of hydrogen bonding in the structure of DNA ? [Q.N. 10, 2061]
43. Define Protein and Lipid. [Q.N. 10, 2060]
44. Write the open chain structure of glucose and fructose. [Q.N. 12, 2060]
45. Write the names and structures of monosaccharides produced by the hydrolysis of cane sugar. [Q.N. 9, 2059]
46. What happens when a protein is denatured? [Q.N. 10, 2059]
47. Write the names of two pyrimidine bases present in RNA and DNA molecules. [Q.N. 9, 2058]
48. What is a peptide bond ? Write an example of a dipeptide. [Q.N. 10, 2058]
49. What is a peptide bond? Write an example of a dipeptide. [Q.N. 9, 2057]
50. What happens when an oil is hydrogenated? [Q.N. 10, 2057]
51. What are enzymes and what are their role in the body ? [Q.N. 19, 2055]
52. What are two differences between DNA and RNA ? [Q.N. 20, 2055]
53. What are carbohydrates ? Give two examples. [Q.N. 18, 2054]
54. What is soap? How is soap obtained from fat ? [Q.N. 8, 2053]
55. Give the main functions of carbohydrates for living beings. [Q.N. 9, 2053]
56. What happens when protein is
 a. heated [Q.N. 17(a), 2052]
 b. hydrolysed ? [Q.N. 17(b), 2052]
57. Classify carbohydrates and give an example for each. [Q.N. 13, 2052]
58. Give a chemical reaction for hydrolysis of Dipeptide. [Q.N. 14, 2052]
59. Name four types of base residues present in DNA. [Q.N. 15, 2052]
60. What is saponification ? [Q.N. 16, 2052]

Unit 17: Chemistry in Service to Mankind

Very Short Questions

(All questions are of equal value, 2 marks each.)

1. Write down the molecular formula of monomers of
 i) Bakelite ii) Nylon -66 [1+1] [Q.N.18, 2072'C']
2. Mention an important use of each of the followings: [0.5×4=2] [Q.N.19, 2072'C']
3. Write down the molecular formula of monomers of :
 i) Bakelite ii) Nylon -66 [1+1] [Q.N.18, 2072'D']
4. Write down the structural formula of each of the following: [0.5×4=2] [Q.N.19, 2072'D']
 i) azo-dye ii) analgesic drug
 iii) pesticides iv) nitrogen fertilizer
 i) Antiseptics ii) Antibiotics
 iii) Germicides iv) Herbicides
5. What type of polymer is bakelite? Mention its monomers. [1+1] [Q.N.18, 2072'E']
6. Name any two fertilizers which supply potassium and nitrogen to the plants. [1+1] [Q.N.19, 2072'E']
7. Distinguish between addition and condensation polymers with an example of each. [1+1] [Q.N.18, Supp. 2071]

8. What is meant by analgesics ? Write an example of it. 1+1 [Q.N.19, Supp. 2071]
9. Define antiseptics giving a suitable example. [Q.N. 19, Set 'C' 2071]
10. What is meant by Co-polymer? Name a Co-polymer and monomers associated with it. 1+1 [Q.N. 18, Set 'C' 2071]
11. Mention a suitable use of each of:
a) antipyretics b) pesticides 1+1 [Q.N. 19, Set 'D' 2071]
12. Write the monomers of :
a) Nylon-66 b) Bakelite 1+1 [Q.N. 18, Set 'D' 2071]
13. Mention a suitable example of each:
(i) antibiotics (ii) phosphatic fertilizer [Q.N.19, 2070 'Supp']
(iii) herbicides (iv) Insecticides
14. Distinguish between addition polymer and condensation polymers with an example of each. [Q.N.17, 2070 'Supp']
15. What are the insecticides? Give an example. [Q.N. 18, 2070 'C']
16. Name any one condensation polymer and addition polymer. What are their monomers? [Q.N. 19, 2070 'C']
17. What are chemical fertilizers? Give two examples. [Q.N. 18, 2070 'D']
18. Write a method of preparation of each of the following polymers:
i. Bakelite iii. PVC [Q.N. 19, 2070 'D']
19. What is meant by antipyretic drug? Give one example of it. [Q.N. 18, Supp. 2069]
20. Give the name of any two insecticides with their chemical formula. [Q.N. 19, Supp. 2069]
21. Name the monomers of (i) bakelite (ii) Nylon 66. [Q.N. 18, Set 'A' 2069]
22. What are the starting materials for preparing the followings:
(i) polyvinyl chloride (ii) Bakelite [Q.N. 16, Set 'B' 2069]
23. Distinguish between antipyretics and analgesics with an example of each. [Q.N. 17, Set 'B' 2069]
24. Give the name of any two insecticides with their chemical formulae. [Q.N. 19, Set 'A' 2069]
25. Give the names of one natural and one synthetic polymer. What are the monomers present in them ? [Q.N.10, 2068]
26. What are antibiotics ? Give an example of broad spectrum antibiotic. [Q.N.11, 2068]
27. Name the monomer which on polymerization can give benzene. What type of polymerization is this ? [Q.N. 9, 2067]
28. Distinguish between antibiotic and antiseptics with one example of each. [Q.N. 12, 2067]
29. Mention one example of each of the following:
(i) Mixed Fertilizer [Q.N. 9(i), 2066]
(ii) Analgesic Drug [Q.N. 9(ii), 2066]
(iii) Antiseptic [Q.N. 9(iii), 2066]
(iv) Azodye [Q.N. 9(iv), 2066]
30. Classify polymers on the basis of monomer unit. [Q.N. 10, 2066]
31. Give an example of each of the following:
(i) antipyretic drug [Q.N.10(i), 2065]
(ii) phosphorus fertilizer [Q.N.10(ii), 2065]
(iii) Insecticide [Q.N.10(iv), 2065]
32. What is meant by condensation polymer ? Write an example of it. [Q.N.9, 2065]
33. Name any two synthetic polymers specifying the monomers of each. [Q.N. 11, 2064]
34. Write any two examples of azodyes with their formulae. [Q.N. 12, 2064]
35. Write an example of each of the followings with their formula.
i. A synthetic fertiliser [Q.N.10(i), 2063]
ii. An insecticide [Q.N.10(ii), 2063]

36. What are natural and synthetic dyes ? Give one example of each. [Q.N.9, 2063]
37. What are insecticides ? Write any two example of insecticides. [Q.N. 9, 2062]
38. What is an antipyretic drug ? Write an example with its structure. [Q.N. 10, 2062]
39. What is insecticide ? Write the name of any two insecticides. [Q.N. 11, 2061]
40. What is meant by a synthetic fertilizer ? Write the formula of any two synthetic fertilizers. [Q.N. 12, 2061]
41. What are insecticides ? Write any two examples of insecticides. [Q.N. 9, 2060]
42. Specify the monomers of Bakelite and Nylon. [Q.N. 11, 2060]
43. Give an example each from analgesic and antipyretic drugs. [Q.N. 11, 2059]
44. What is an azo dye? Give one example with structure. [Q.N. 12, 2059]
45. Give an example of azodye and write its structure. [Q.N. 11, 2058]
46. Define polymerisation and write an example. [Q.N. 12, 2058]
47. Give the name and structure of an antipyretic drug. [Q.N. 11, 2057]
48. Name the monomers of Bakelite and Nylon. [Q.N. 12, 2057]
49. Give two characteristics of a Dye. [Q.N. 10, 2056]
50. Name any two synthetic polymers. [Q.N. 18, 2055]
51. What is the difference between an antiseptic and an antipyretic drug ? [Q.N. 19, 2054]
52. What is an azo dye ? [Q.N. 10, 2053]
53. Name the group of vitamins present in vitamin B-complex. [Q.N. 12, 2053]

Section C : Inorganic Chemistry

Unit 18: Heavy Metals

18.1. Copper

Very Short Questions

(All questions are of equal value, 2 marks each.)

1. Give reasons: 1+1 [Q.N.21(ii), 2072'C]
i) Metallic copper turns black when exposed to moist air ... ?
2. Write an important use of each of the following: [Q.N.21(i), (iii), Supp. 2071]
(a) red oxide (b) blue vitriol
3. What is meant by copper matter? [Q.N. 21, Set 'C' 2071]
4. Write an important use of each of the following: [Q.N. 21, Set 'D' 2071]
a) red oxide (b) blue vitriol
5. Write a reaction for the preparation of each of the following:
i) CuO (ii) Cu₂O [Q.N. 22, 2070 'C']
6. Give the action of :
(a) KI on copper sulphate solution [Q.N. 18,(i) 2063]
7. A light blue colored precipitate 'A' obtained by the addition of caustic soda in the solution of cupric sulphate is converted to a black precipitate 'B' on heating. What are 'A' and 'B' ? [Q.N.18, 2060]
8. Write a compound of Cu (II) which is insoluble in water but soluble in dilute acid without effervescence. [Q.N.16, 2059]
9. What happens when NH₃ is passed over red-hot CuO? [Q.N.14, 2058]
10. Name two important ores of copper with formulae. [Q.N.18, 2057]
11. Give any one method of conversion of cupric sulphate into cuprous oxide with chemical equations. [Q.N.18, 2056]
12. What is a transition element ? Mention two of its important characteristics. [Q.N. 9, 2054]
13. What is the effect of heat on copper sulphate penta-hydrate? [Group A, Q.N.18, 2053]

Short Questions

(All questions are of equal value, 5 marks each.)

- How would you obtain blister copper from copper pyrites? 5 [Q.N.26, 2072'C']
- How would you obtain blister copper from copper pyrites? 5 [Q.N.26, 2072'D']
- How is blister copper extracted from its copper pyrite ore? [5] [Q.N.29, 2072'E']
- Write the preparations, properties and uses of litharge. [Q.N.29(or), 2072'E']
- Starting from copper pyrites, how can you obtain blister copper? [Q.N.29, 2070 'Supp']
- Write the preparations, properties and uses of Blue vitriol. 5 [Q.N. 29, 2070 'D']
- Starting from copper pyrites how would you obtain blister copper? 5 [Q.N. 23 Supp.,2069]
- How would you convert copper into blue vitriol? Name any one alloy of each of : 4+1
 - Copper and Zinc.
 - Copper and tin. [Q.N. 29, 2067]
- Write the chemistry of blue vitriol. 5 [Q.N. 28, 2065, Q.N. 23, Set 'A' 2069]
- Mention the preparations, properties and uses of blue vitriol. [Q.N. 29, Set 'B' 2069]
- Explain with suitable chemical reactions.
 - Copper Sulphate crystal turns white powder on heating. [Q.N.28(a), 2062]
 - A brown gas is obtained when copper is treated with conc. nitric acid. [Q.N.28(c), 2062]
 - Copper becomes green when exposed to air for long time. [Q.N.28(d), 2062]
- Write a method of preparation of blue vitriol. Describe its action with:
 - ammonia solution till excess
 - aqueous potassium iodide. [Q.N.28, 2059]
- When copper wire is put into a solution of silver nitrate beautiful crystals are deposited on the surface of the copper. What are these crystals chemically? Write the reaction involved. [Group A, Q.N.2, 2053]

Long Questions

(All questions are of equal value, 10 marks each.)

- Write short notes on :
 - Extraction of blister copper. [Q.N.33(d), Supp. 2071]
 - Extraction of blister copper. [Q.N. 33 (d), Set 'C' 2071]
 - Chemistry of Blue vitriol [Q.N. 33 (a), 2070 'C']
 - Postulates of kinetic theory of gas [Q.N.33 (b), 2057]
 - Definition and general properties of Transition elements. [Q.N. 31(b), 2055]
 - Chemistry of Blue Vitriol. [Q.N.31 (c), 2055]
- Starting from copper pyrite, how would you obtain pure copper? Explain the steps involved in the process with necessary diagram for it. Give the chemical reaction for the followings : 7+1+2
 - Copper is exposed to moist air.
 - Conversion of copper into blue vitriol. [Q.N.32, 2066]
 - Chemistry of black oxide of copper [Q.No.33 (d), Set 'D', 2071]
- How is blister copper extracted from copper pyrite? How does the metal react with :
 - moist air
 - conc. H_2SO_4
 - conc. HNO_3
 Mention the important uses of the metal. [Q.N. 32, 2064]
- How is metal copper extracted from its pyrite ore? How is it refined? Write the action of it upon :
 - moist air and
 - Conc. H_2SO_4 . [Q.N. 31. 2063]
- How is pure copper extracted from copper pyrite? Discuss its metallurgical operations with necessary chemical reactions and diagrams. [Q.N.30, 2060]

6. How is metal copper extracted from its sulphide ore? How is it refined? [Q.N.32, 2057]
7. How is blister copper extracted starting from concentrated copper pyrites ore? How is it refined electrolytically? [Q.N.31, 2056]
8. Point out the important processes involved in the extraction of copper from its sulphide ore. [Group B, Q.N.2, 2053]
9. What happens when:
 - (a) Ammonia gas is passed in copper sulphate solution. [Q.N.28 (a), 2061]
 - (b) Ammonium hydroxide is added to a solution of copper sulphate. [Q.N.27 (b), 2054]
 - (c) Copper turning is treated with conc. HNO_3 . [Group B, Q.N.7 (c), 2053]
 - (d) A copper coin is dropped into concentrated nitric acid in a test tube. [Group B, Q.N.7 (c), 2051]

18.2 Zinc

Very Short Questions

(All questions are of equal value, 2 marks each.)

1. What is Rinman's green? Write its importance uses. 1+1 [Q.N.22, 2072 'C']
2. How is Rinman's green prepared? Write its one important use. 1+1 [Q.N.22, Supp. 2071]
3. Give a correct balanced chemical reaction for the preparation of:
 - a) White vitriol [Q.N. 22(a), Set 'C' 2071]
 - b) Philosopher's wool [Q.N. 22(b), Set 'C' 2071]
4. What happens when zinc white is:
 - a) heated with cobalt nitrate [Q.N. 22(a), Set 'D' 2071]
 - b) dissolved with caustic alkali [Q.N. 22(b), Set 'D' 2071]
5. How is Rinman's green prepared? Give its one importance use. [Q.N.22, 2070 'Supp']
6. What happens when:
 - a. Metallic zinc is dissolved in hot conc. NaOH [Q.N. 21, 2070 'D']
 - b. Zinc white is heated with cobalt nitrate. [Q.N. 21, 2070 'D']
 - c. Zinc oxide is heated with cobalt nitrate. [Q.N.19(b), 2063]
7. Write the molecular formula of:
 - i) Philosopher's wool [Q.N. 20 (i), Set 'B' 2069]
 - ii) Rinman's green [Q.N. 20 (ii), Set 'B' 2069]
 - iii) Calamine [Q.N. 20(iv), Set 'B' 2069]
8. Write action of heat on white vitriol. [Q.N. 22(Or), 2070 'C']
9. What is Galvanisation? [Q.N. 20, Supp. 2069]
10. What happens when zinc white is heated? [Q.N. 20, Set 'A' 2069]
11. Give the molecular formula of: [Q.N.18, 2068]
 - (i) Philosopher's wool
12. What is the action of heat on white vitriol? [Q.N.22, 2068]
13. Why do Zinc become dull in moist air? [Q.N. 19, 2067]
14. Name one important ore of each of the followings:
 - (i) Zinc [Q.N. 18, 2066]
15. Write an important use of each of the following substances:
 - i) white zinc [Q.N. 19(iv), 2064]
 - ii) White vitriol [Q.N. 20(iii), 2062]
16. Write the name of two ores of Zinc with their molecular formulae. [Q.N. 18, 2061]
17. What action takes place when aqueous sodium hydroxide is added to zinc sulphate solution drop by drop till excess? [Q.N. 20, 2059]
18. Name two ores of zinc with their formulae. [Q.N. 19, 2058]

19. Why zinc displace copper from copper sulphate solution ? [Q.N. 6, 2056]
 20. Why is zinc not considered as a transition element ? [Q.N. 12, 2056]
 21. How will you obtain crystals of white vitriol ? Give a chemical reaction. [Q.N. 7, 2052]
 22. Write action of:
 a. Heat [Q.N. 6(a), 2052]
 b. Cobalt nitrate on zinc oxide. [Q.N. 6(b), 2052]

Short Questions*(All questions are of equal value, 5 marks each.)*

1. How is zinc extracted from zinc blende ? 5 [Q.N.26, Supp. 2071]
 2. Give the chemistry of Zinc white. [Q.N. 29(Or), Set 'B' 2069]
 3. Starting from Zinc blende, how would you obtain pure Zinc ? What is Galvanization ? [Q.N. 27, 2067]
 4. Explain the principle and process sketching a well-labelled diagram for the extraction of zinc from its ore. What happens when zinc is exposed to moist air ? [Q.N.27, 2065]
 5. Write two chemical reactions for the preparation of Zinc white, and justify its amphoteric nature by giving suitable chemical reactions. Write its one important use. [Q.N. 27, 2062]
 6. How is Zinc extracted from its ore ? [Q.N. 24, 2061]
 7. Write the preparation, properties and uses of white vitriol. [Q.N. 27, 2058]
 8. Describe the different steps involved in extraction of zinc from zinc blende. [Q.N. 26, 2054]

Long Questions*(All questions are of equal value, 10 marks each.)*

1. Name the important ores of zinc. Describe the extraction of pure zinc from its sulphide ore. Give the chemistry of white vitriol. [Q.N. 29, 2056]
 2. Write short notes on :
 (a) Chemistry of zinc white [Q.N.33(c), 2072'D']
 (b) Chemistry of white vitriol [Q.N.33(b), 2072'C']
 (c) Chemistry of zinc white [Q.N. 33 (c), Set 'C' 2071]
 (d) Chemistry of white vitriol [Q.N.33(c), 2070 'Supp']
 (e) Chemistry of white vitriol. [Q.N. 33 (a), 2070 'D']
 (f) Extraction of zinc from zinc blende. [Q.N. 33 (b), 2070 'C']
 (g) Extraction of Zinc from Zinc blende [Q.N. 33 (b), Supp. 2069]
 (h) Extraction of Zinc from zinc blende. [Q.N.3(i), 2068], Q.No. 33 (b), Set 'A' 2069]
 (i) Chemistry of white vitriol. [Q.N. 31(iv), 2064]
 (j) Chemistry of white vitriol [Q.N.31(iii), 2063]
 (k) Extraction of zinc. [Q.N. 31(ii), 2060]
 (l) Chemistry of White Vitriol [Q.N. 31(c), 2057]

18.3 Mercury**Very Short Questions***(All questions are of equal value, 2 marks each.)*

1. Write down a balanced chemical equation for the preparation of calomel. What happens when calomel is treated with ammonia solution? 1+1 [Q.N.20, 2072'C']
 2. What happens when Corrosive sublimate is : 1+1 [Q.N.20, 2072'D']
 i) treated with excess KI solution?
 ii) heated with excess SnCl₄ solution.
 3. How would you convert calomel into corrosive sublimate and vice versa giving suitable chemical equations? [1+1] [Q.N.21, 2072'E']

4. Write an important use of each of the following: [Q.N.21(ii), (iv), Supp. 2071]
(a) corrosive sublimate (b) calomel
5. Write an important use of each of the following: [Q.N. 21, Set 'D' 2071]
a) corrosive sublimate b) calomel
6. Give a balanced chemical equation for the preparation of corrosive sublimate. What is its action on KI solution? [Q.N.21, 2070 'Supp']
7. What is Nessler's reagent? How is it prepared? [Q.N. 21, 2070 'C',]
8. What is Nessler's reagent? How is it prepared? [Q.N. 20, 2070 'D']
9. What is Nessler's reagent? Give its one important use. [Q.N. 21, Supp. 2069]
10. How is corrosive sublimate converted into calomel and vice-versa? [Q.N. 21, Set 'A' 2069]
11. How is Nessler's reagent prepared? Give its one use. [Q.N. 21, Set 'B' 2069]
12. Give the molecular formula of: [Q.N.18, 2068]
(i) Calamine (ii) Nessler's reagent
13. Write any one use of each of the following:
(i) Calomel [Q.N.18(iv), 2065]
14. Write an important use of each of the following substances :
i) Calomel [Q.N. 19(ii), 2064]
ii) Corrosive sublimate [Q.N. 20(ii), 2062]
15. Write the formulae of the following ores of metals :
i. Calamine [Q.N.20(ii), 2063]
16. What happens when HgCl_2 is allowed to react with SnCl_2 ? [Q.N. 20, 2061]
17. What happens when mercuric chloride reacts with excess of KI solution?
[Q.N. 20, 2058]
18. Write action of:
a. mercury with aqua regia [Q.N. 20(i), 2064]

Short Questions

(All questions are of equal value, 5 marks each.)

1. Explain the process of extraction of mercury from its ore. [Q.N.29(Or), 2070 'Supp']
2. How is mercury extracted from its ore and refined? 5 [Q.N. 26, 2070 'C']
3. How is mercury extracted from its ore and refined? 5 [Q.N. 29(Or), 2070 'D']
4. How is mercury extracted from Cinnabar? 5 [Q.N. 23(or), Supp. 2069]
5. How is mercury extracted from cinnabar? [Q.N. 23(or), Set 'A' 2069]
6. How can you obtain calomel from corrosive sublimate and vice versa? [Q.N. 20, 2060]
7. Write two methods of preparation of corrosive sublimate. Give its action upon.
a) excess of KI and (b) NH_3 . [Q.N. 27, 2057]
8. How is mercury extracted from its ore? [Q.N. 24, 2055]
9. How is calomel prepared? Give its important properties and uses. [Q.N. 20, 2053]
10. Briefly describe the metallurgy of mercury. [Q.N. 20, 2052]

Long Questions

(All questions are of equal value, 10 marks each.)

1. Write one method of preparation of HgCl_2 and Hg_2Cl_2 of each. What happens when an aqueous solution of HgCl_2 is treated with:
i) an aqueous solution of KI ii) an aqueous solution of SnCl_2
what peculiar behaviour does mercury have? [Q.N.27, 2068]

2. Write short notes on :
- | | |
|---|-----------------------------|
| (a) Chemistry of calomel | [Q.N.33(ii), 2072'E'] |
| (b) Chemistry of corrosive sublimate | [Q.N.33(c), Supp. 2071] |
| (c) Extraction of mercury from Cinnabar | [Q.N. 33 (c), Set 'D' 2071] |
| (d) Extraction of Mercury from cinnabar | [Q.N. 33 (b), Set 'B' 2069] |
| (e) Extraction of Mercury | [Q.N. 31(ii), 2066] |
| (f) Chemistry of Calomel. | [Q.N.31(ii), 2065] |
| (g) Extraction of Hg. | [Q.N. 31(iii), 2064] |
| (h) Extraction of Mercury | [Q.N.31(ii), 2063] |
| (i) Extraction of Mercury | [Q.N. 31(b), 2062] |
| (j) Chemistry of Calomel. | [Q.N. 31(i), 2061] |
| (k) Extraction of Mercury | [Q.N. 31(d), 2059] |
| (l) Extraction of Mercury | [Q.N. 31(b), 2058, |
| (m) Calomel | [Q.N.31(b), 2056] |
| (n) Purification of Mercury | [Q.N. 30(a), 2054] |

18.4. Iron

Very Short Questions

(All questions are of equal value, 2 marks each.)

- Write chemical reactions involved in zone of reduction of blast furnace during extraction of iron. 2 [Q.N.22, 2072'D']
- What is the composition of stainless steel? Write its uses. [1+1] [Q.N.22, 2072'E']
- What is the composition of stainless steel? Write its one use. 1+1 [Q.N.20, Supp. 2071]
- What is the composition of spiegeleisen? Write its one use. [Q.N. 20, Set 'C' 2071]
- What is meant by quenching of steel? 2[Q.N. 20, Set 'D' 2071]
- What is the composition of steel? Write its one use. 1+1 [Q.N.20, 2070 'Supp']
- Differentiate between cast iron and wrought iron. [Q.N. 20, 2070 'C']
- Why is open-hearth process more advantageous than Bessemer process of manufacture of steel? [Q.N. 22, 2070 'D']
- Name any two main ores of iron and mention the percentage of iron in stainless steel. [Q.N. 22, Supp. 2069]
- Write the molecular formula of :
 - Mohr's salt [Q.N. 22(a), Set 'A' 2069]
 - Green vitriol [Q.N. 22(b), Set 'A' 2069]
 - Mohr's salt [Q.N. 20(iii), Set 'B' 2069]
- Write chemical reaction occurring in zone of reduction in the extraction of iron. [Q.N. 22, Set 'B' 2069]
- What is meant by tempering of steel? Mention one important use of tempered steel. [Q.N.19, 2068]
- What reaction occurs in the combustion zone in the blast furnace during extraction of iron? [Q.N. 20, 2067]
- Name one important ore of each of the followings:
 - Iron [Q.N. 18, 2066]
- Mention the function of Spiegeleisen in the manufacture of Steel. [Q.N. 20, 2066]
- Write the formulae of the following ores of metals :
 - Magnetite [Q.N.20(i), 2063]

17. What happens when :
 a. Few drops of potassium ferrocyanide is added to aqueous solution of FeCl_3 . [Q.N.19(a), 2063]
 Write an important use of each of the following substances :
 i) Green vitriol [Q.N. 19(iii), 2064]
 ii) Wrought iron [Q.N. 20(iv), 2062]
19. What is meant by galvanization ? [Q.N. 19, 2062]
 20. Write two methods by which rusting of iron can be prevented. [Q.N. 19, 2061]
 21. What is tempering of steel ? [Q.N. 19, 2060]
 22. What is stainless steel? [Q.N. 19, 2059]
 23. Write two methods of prevention of corrosion. [Q.N. 19, 2057]
 24. What is the function of limestone in the smelting of iron ? [Q.N. 13, 2056]
 25. Give two ways to prevent corrosion. [Q.N. 10, 2055]
 26. Give two methods for preventing rusting of iron. [Q.N. 17, 2053]
 27. Write the principle involved in manufacture of steel by open-hearth process. [Q.N. 18, 2053]

Short Questions

(All questions are of equal value, 5 marks each.)

1. How is cast iron extracted from Iron pyrites? [Q.N. 26, Set 'D' 2071]
 2. How is cast iron extracted from Iron pyrites? [Q.N. 28, Set 'C' 2071]
 3. Draw a neat labelled sketch of blast furnace for the extraction of pig iron and write down the chemical reactions involved at different zones. [Q.N. 27, 2064]
 4. How is steel manufactured by open hearth process ? What is quenching of steel ? [Q.N.27, 2063]
 5. What is rusting? Describe electrochemical theory of rusting of iron. List any two methods of prevention of iron rust. [Q.N. 27, 2059]
 6. How is steel manufactured by open hearth process ? Mention its advantage over Bessemer process. [Q.N. 23, 2056]
 7. Explain any four methods for preventing rusting of iron. [Q.N. 21, 2052]

Long Questions

(All questions are of equal value, 10 marks each.)

1. Write short notes on :
 (a) Rusting to iron [Q.N.33(b), 2072'D']
 (b) Rusting to iron [Q.N.33(a), 2072'C']
 (c) Manufacture of steel by Open Hearth process [Q.N.33(i), 2072'E']
 (d) Manufacture of steel by open hearth process. [Q.N.33(d), 2070 'Supp']
 (e) Theory of corrosion. [Q.N. 33 (a)(Or), 2070 'C']
 (f) Rusting of iron. [Q.N. 33 (b), 2070 'D']
 (g) Manufacture of steel by open hearth process. [Q.N. 33 (a), Supp. 2069]
 (h) Rusting of iron. [Q.N. 33 (a), Set 'A' 2069]
 (i) Manufacture of steel by Bessemer's process [Q.N. 33 (c), Set 'B' 2069]
 (j) Rusting of iron and its prevention. [Q.N.3(ii), 2068]
 (k) Manufacture of steel by open hearth process. [Q.N. 31(iii), 2067]
 (l) Rusting of iron. [Q.N. 31(iii), 2066]
 (m) Manufacture of steel by Open-Hearth Process. [Q.N.31(iii), 2065]
 (n) Manufacture of Steel by Bessemer Process. [Q.N. 31(ii), 2061]

- (o) Rusting of iron. [Q.N. 31(iii), 2060]
 (p) Rusting of iron [Q.N. 31(c), 2058]
 (q) Ferric chloride. [Q.N. 28(c), 2052]
2. Describe the extraction of iron from its principal ores, giving a neat sketch of the furnace used and the probable reactions occurring therein. [Q.N. 29, 2055]
3. How is cast iron produced from iron ores? Discuss the reactions involved. [Q.N. 29, 2054]

18.5. Silver

Very Short Questions

(All questions are of equal value, 2 marks each.)

1. Give reasons: 1+1[Q.N.21(i), 2072'C']
 (i) Silver nitrate produces permanent black stain on the skin?
2. Why does silver nitrate produces permanent black stain on the skin? Write an important use of silver nitrate. 1+1[Q.N.21, 2072'D']
3. Why does silver nitrate solution produce black-stain on the skin in presence of sunlight? [Q.N. 18, 2064]
4. What is the action of heat on silver nitrate? [Q.N.18, 2062]
5. What do you mean by noble metals? Give any two examples. [Q.N.9, 2061]
6. What happens when AgNO_3 is heated at 450°C ? [Q.N.12, 2058]
7. Give two uses of silver nitrate. [Q.N.20, 2055]
8. How is the presence of halide ions are tested with silver nitrate solution? [Group A, Q.N.19, 2053]
9. Why silver ores are leached with metal cyanides for the extraction of silver? [Group A, Q.N.22, 2053]
10. What do you mean noble metals? Name at least three noble metals you know. [Group A, Q.N.25, 2053]

Short Questions

(All questions are of equal value, 5 marks each.)

1. Write the balanced chemical equations for the preparation of silver chloride from metallic silver via the formation of AgNO_3 . How does AgCl react with (i) aq. NH_3 (ii) $\text{Na}_2\text{S}_2\text{O}_3$ and (iii) KCN ? [Q.N.28, 2060]
2. How is silver extracted from its ore? [Q.N.27, 2058]
3. What happens when:
 (a) Silver chloride is treated with dilute ammonia solution. [Q.N.28 (b), 2061]
 (b) AgNO_3 is heated [Q.N.27 (a), 2055]
4. Give the various steps involved in the extraction of silver from silver glance. [Q.N.25, 2054]

Long Questions

(All questions are of equal value, 10 marks each.)

1. What happens when:
 (a) A precipitate obtained by adding silver nitrate solution in a chloride salt solution is treated with ammonia solution. (write with balanced chemical equations) [Q.N.32 (v), 2059]
2. Write short notes on:
 (a) Chemistry behind photography [Q.N.33 (a), 2057]
 (b) Chemistry behind photography [Q.N.32 (d), 2056]

2. CHEMISTRY

Exam Questions

Section A: General & Physical Chemistry

Unit 1: Chemical Bonding and Shape of Molecules

Very Short Questions

(All questions are of equal value, 2 marks each.)

- How would you predict the geometry of ammonia molecule on the basis of VSEPR theory? 2 [Q.N.1, 2073 'C']
- Ammonia molecule has got trigonal pyramidal geometry even though nitrogen of ammonia gets sp^3 hybridization. Give reason. 2[Q.N.1, 2073 'D']
- Predict the mode of hybridization in the central atom of the molecules having
i) trigonal planar ii) tetra-hedral structure with an examples of each. 1+1 [Q.N.1, Supp. 2072]

Short Questions

(All questions are of equal value, 5 marks each.)

No Questions has been asked in this year.

Long Questions

(All questions are of equal value, 10 marks each.)

No Questions has been asked in this year.

Unit 2: Volumetric Analysis

Very Short Questions

(All questions are of equal value, 2 marks each.)

- Define the terms:
(i) Normality factor (ii) Secondary standard solution 1+1 [Q.N.2, 2073 'C']
- Why is crystal oxalic acid regarded as a good substance for the preparation of primary standard solution? 2[Q.N.2, 2073 'D']

Short Questions

(All questions are of equal value, 5 marks each.)

No Questions has been asked in this year.

Long Questions

No Questions has been asked in this year.

Numerical Problems

- What is meant by acidity of base? 500cc of 2N Na_2CO_3 are mixed with 400cc of 3N H_2SO_4 and volume was diluted to one litre. Will the resulting solution acidic, basic or neutral? Also calculate the molarity of the dilute solution. 1+2+2[Q.N.24, 2073 'C']
(Ans: Solution will be acidic, Molarity = 0.107 M)
- Define redox titration. 10 g of NaOH was added to 200 cc of $\frac{N}{2}$ ($f = 1.5$) H_2SO_4 . The volume was diluted to two litres. Predict whether the dilute solution is acidic, basic or neutral and also calculate the resulting molarity of the dilute solution. 1+2+2[Q.N.24, 2073 'D']
(Ans: Solution will be basic and molarity will be 0.05 M)
- How would you convert 500 cc. of 2M H_2SO_4 into
i) gram/liter ii) Normality 1+1[Q.N.2, Supp. 2072]
(Ans: (i) 196, g/L (ii) 4N)
- What is meant by acidimetry? A solution of conc. HCl contain 38% HCl by mass:
i) What is the molarity of this solution if the density of the solution is 1.19g/cc?
ii) What volume of the conc. HCl is required to neutralize one liter of 0.1M NaOH solution? 1+2+2[Q.N.25, Supp. 2072]
(Ans: (i) 12.39 M (ii) 8.07 mL)

Unit 3: Ionic Equilibrium

Very Short Questions

(All questions are of equal value, 2 marks each.)

1. State Ostwald's dilution law and mention its limitation. 1+1 [Q.N.3, 2073 'C']
2. Define: 1+1
 (i) Degree of ionization. (ii) Ostwald's dilution law. [Q.N.3, 2073 'D']
3. What are the limitation of Lew's concept of acid and base? 1+1 [Q.N.3, Supp. 2072]

Short Questions

(All questions are of equal value, 5 marks each.)

No Questions has been asked in this year.

Long Questions

(All questions are of equal value, 10 marks each.)

No Questions has been asked in this year.

Numerical Problems

1. What is the common-ion effect? Explain its main applications. The solubility product constant (K_{sp}) of $\text{Ca}(\text{OH})_2$ at 25°C is 4.42×10^{-5} . A 500 mL of saturated solution of $\text{Ca}(\text{OH})_2$ is mixed with an equal volume of 0.4M NaOH. What mass of $\text{Ca}(\text{OH})_2$ is precipitated out? 2+4+4 [Q.N.32, 2073 'C']
 (Ans: 759.684 mg)
2. State solubility product constant. What is the proper condition of precipitation of salt from its solution? Explain application of the solubility product principle and common ion effect. What is the minimum volume of water required to dissolve 1 g of calcium sulphate at 298 K? 1+1+4+4 [Q.N.32, 2073 'D']
 [given, solubility product (K_{sp}) for $\text{CaSO}_4 = 9.1 \times 10^{-6}$]
 (Ans: 2.437 L)
3. State Ostwald's dilution law. What is the limitation of this law? Define the terms i) ionic product of water ii) common ion effect iii) degree of ionisation iv) pH value. What will be the resultant pH when 200mL of an aqueous solution of HCl (pH = 2) is mixed with 300mL of an aqueous solution of NaOH (pH = 12)? 1+1+1+1+1+4 [Q.N.32, Supp. 2072]
 (Ans: 11.3)

Unit 4: Electrochemistry

Very Short Questions

(All questions are of equal value, 2 marks each.)

1. Predict whether the following reaction will occur spontaneously or not. Why? 1+1 [Q.N.4, 2073 'C']
 $\text{Pb}^{2+} + 2\text{Ag} \rightarrow 2\text{Ag}^+ + \text{Pb}$
 Given, $E^\circ_{\text{Ag}^+/\text{Ag}} = 0.80 \text{ V}$
 $E^\circ_{\text{Pb}^{2+}/\text{Pb}} = -0.13 \text{ V}$
 (Ans: Not spontaneous)
2. Predict whether the following reaction will occur spontaneously or not. Why? 1+1
[Q.N.4, 2073 'D']
 $\text{Pb}^{2+} + 2\text{Ag} \rightarrow 2\text{Ag}^+ + \text{Pb}$
 Given, $E^\circ_{\text{Ag}^+/\text{Ag}} = 0.80 \text{ V}$
 $E^\circ_{\text{Pb}^{2+}/\text{Pb}} = -0.13 \text{ V}$
 (Ans: No)
3. What is meant by single electrode potential? How is it measured? 1+1 [Q.N.4, Supp. 2072]

Short Questions

(All questions are of equal value, 5 marks each.)

No Questions has been asked in this year.

Long Questions

(All questions are of equal value, 10 marks each.)

No Questions has been asked in this year.

Numerical Problems

- How does molar conductivity vary with concentration for weak electrolyte? Give reason for its variations. A solution contains 2 g of anhydrous BaCl_2 in 400 cm^3 , its conductivity is found to be $5.8 \times 10^{-3} \text{ cm}^{-1}$. Calculate the molar conductivity of BaCl_2 (At.wt. of Ba = 137) 3+2[Q.N.23, 2073 'C']
(Ans: 241.67 siemens $\text{cm}^2 \text{ mol}^{-1}$)
- State Faraday's laws of electrolysis. Establish relationship between electro-chemical equivalent and chemical equivalent.
0.197 g of copper is deposited by a current of 0.2A in 50 minutes. Calculate its electrochemical equivalent. 2+1+2[Q.N.23, 2073 'D']
(Ans: $3.283 \times 10^{-4} \text{ gC}^{-1}$)
- Define weak electrolytic cell giving an example of it. Chromium metal can be plated out from an acidic solution containing CrO_3 according to the following equation.
 $\text{CrO}_3(\text{aq}) + 6\text{H}^+ + 6\text{e}^- \rightarrow \text{Cr}(\text{s}) + \text{H}_2\text{O}$
Calculate:
i) How many gram of Cr will be planted out by 2400 coulomb.
ii) How long will it take to plate out 1.5g of Cr by using 12.5 ampere current. (At mass of Cr = 52) 1+2+2[Q.N.23, Supp. 2072]
(Ans: (i) 0.22 g (ii) 1336.15s)

Unit 5: Energetics of Chemical Reactions

Very Short Questions

(All questions are of equal value, 2 marks each.)

No Questions has been asked in this year.

Short Questions

(All questions are of equal value, 5 marks each.)

No Questions has been asked in this year.

Long Questions

(All questions are of equal value, 10 marks each.)

- Write short notes on: Hess's law of constant heat summation and its application. [Q.N.33(iii), 2073 'C']
- Write short notes on: Hess's law of constant heat summation and its applications. [Q.N.33(iii), 2073 'D']
- Write short notes on: Hess's law of constant heat summation and its application. [Q.N.33(i), Supp. 2072]

Numerical Problems

- Define standard enthalpy of formation. If heat change for the following reaction is 1648kJ, what is the standard enthalpy of formation of Fe_2O_3
 $4\text{Fe}(\text{s}) + 3\text{O}_2(\text{g}) \rightarrow 2\text{Fe}_2\text{O}_3(\text{s})$ 2[Q.N.5, 2073 'C']
(Ans: 824 kJ mol^{-1})
- What is meant by enthalpy of reaction? If standard enthalpy of formation of ammonia is -46 kJ mol^{-1} . What is the enthalpy change of the following reaction? 1+1[Q.N.5, 2073 'D']
 $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$
(Ans: -92 kJ mol^{-1})
- Calculate the standard enthalpy of formation of water in the following reaction: 1+1
 $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\text{l}), \Delta\text{H} = -136 \text{ Kcal}$ [Q.N.5, Supp. 2072]
(Ans: $-68 \text{ Kcal mol}^{-1}$)

Unit 6: Chemical Thermodynamics

Very Short Questions

(All questions are of equal value, 2 marks each.)

- Under what conditions is the reaction expected to occur 1+1 [Q.N.6, 2073 'C']
 - spontaneous
 - non-spontaneous, if ΔH and ΔS are positive for the reaction ?
- Under what conditions is the reaction expected to occur 1+1[Q.N.6, 2073 'D']
 - spontaneous
 - non-spontaneous, if ΔH and ΔS are negative.
- Mention the proper conditions of a chemical reaction to become spontaneous if its ΔH and ΔS are positive. 2[Q.N.6, Supp. 2072]

Short Questions

(All questions are of equal value, 5 marks each.)

No Questions has been asked in this year.

Long Questions

(All questions are of equal value, 10 marks each.)

No Questions has been asked in this year.

Numerical Problems

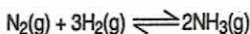
No Questions has been asked in this year.

Unit 7: Chemical Kinetics

Very Short Questions

(All questions are of equal value, 2 marks each.)

- Draw an energy profile diagram to show influence of catalyst in the rate of chemical reaction. 2 [Q.N.7, 2073 'C']
- What are the essential conditions for the effective collision of reacting species ? 2 [Q.N.7, 2073 'D']
- Write the rate expression of each components is the following reaction: 1.5+0.5[Q.N.7, Supp. 2072]



What is the unit of reaction rate?

Short Questions

(All questions are of equal value, 5 marks each.)

No Questions has been asked in this year.

Long Questions

(All questions are of equal value, 10 marks each.)

No Questions has been asked in this year.

Numerical Problems

- Define (i) rate law (ii) Half-life period of a reaction.
In a first order reaction 40% of reactant gets converted into product in 30 minutes. What time would it required to convert 75% into product ? 1+1+3[Q.N.26, 2073 'C']
(Ans: 81.50 min)
- Define rate law. The reaction $\text{P} + \text{Q} \rightarrow \text{Z}$ is first order with respect to P and zero order with respect to Q . If so, fill in the blanks in the following. 1+4[Q.N.26, 2073 'D']

| Expt. | [P] M | [Q] M | initial rate of formation [Z] M min ⁻¹ |
|-------|-------|-------|---|
| I | 0.1 | 0.1 | 2×10^{-2} |
| II | - | 0.2 | 4×10^{-2} |
| III | 0.4 | 0.4 | - |
| IV | - | 0.2 | 2×10^{-2} |

(Ans: II[P] = 0.2, II[R] = 8×10^{-2} , IV[P] = 0.1)

3. Define the terms:
 i) rate law ii) order of a reaction iii) molecularity of a reaction
 A first order reaction will take 100 minutes to complete 60% of reactant into product.
 What time will it take to complete 75% of the reactant into product?
 (Ans: 151.37 min) 1+1+1+2[Q.N.24, Supp. 2072]

Section B: Organic Chemistry

Unit 8: Aromatic Hydrocarbon

Very Short Questions

(All questions are of equal value, 2 marks each.)

- What happens when : 1+1[Q.N.8, 2073 'C']
 (i) Sodiumbenzoate is heated with soda-lime.
 (ii) Benzene is heated with hydrogen in presence of nickel powder.
- Starting from phenol how would you obtain cyclohexane. 2 [Q.N.8, 2073 'D']
- What are aromatic compounds according to Huckel's rule? 2[Q.N.8, Supp. 2072]

Short Questions

(All questions are of equal value, 5 marks each.)

No Questions has been asked in this year.

Long Questions

(All questions are of equal value, 10 marks each.)

No Questions has been asked in this year.

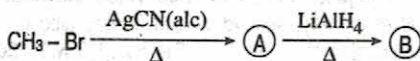
Unit 9: Haloalkanes and Haloarenes

9.1. Haloalkanes

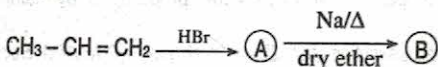
Very Short Questions

(All questions are of equal value, 2 marks each.)

- Identify (A) and (B) and give their IUPAC names in the following sequence of reaction. 1+1[Q.N.9, 2073 'C']



- Identify (A) and (B) in the following sequence of the reaction and give their IUPAC Name. 2 [Q.N.9, 2073 'D']



- Write down the structure and IUPAC name of secondary haloalkane of $\text{C}_3\text{H}_7\text{X}$. What happens when the secondary haloalkane is heated with Na in presence of dry ether? 1+1[Q.N.9, Supp. 2072]

Short Questions

(All questions are of equal value, 5 marks each.)

- An aliphatic compound (A) reacts with aq. NaOH to give (B). (B) on oxidation with $\text{K}_2\text{Cr}_2\text{O}_7/\text{H}^+$ produce (C). The compound (C) undergoes clemmensen reduction to give propane. If compound (C) responds positive Iodoform test, identify (A), (B) and (C). What product would you expect when (A) is heated with H_2/Ni ? 5

[Q.N.29, 2073 'C']

Long Questions

(All questions are of equal value, 10 marks each.)

1. Write short notes on: 2×5=10
 (i) Laboratory preparation of trichloromethane. [Q.N.33(ii), Supp. 2072]

9.2 Haloarenes

Very Short Questions

(All questions are of equal value, 2 marks each.)

No Questions has been asked in this year.

Short Questions

(All questions are of equal value, 5 marks each.)

No Questions has been asked in this year.

Long Questions

(All questions are of equal value, 10 marks each.)

No Questions has been asked in this year.

Unit 10: Alcohols and Phenols**10.1. Alcohols**

Very Short Questions

(All questions are of equal value, 2 marks each.)

1. What is the structure of isomeric alcohol of C_3H_8O that gives iodoform test? Write the test reaction. 1+1[Q.N.10, Supp. 2072]

Short Questions

(All questions are of equal value, 5 marks each.)

1. An aliphatic compound (A) reacts with $SOCl_2$ to give (B). (B) on dehydrohalogenation yields (C). The compound (C) on ozonolysis gives mixture of ethanol and methanol. If (A) is an alcohol which responded iodoform test. Identify (A), (B) and (C). What product would you expect when compound (B) is heated with H_2/Ni ? 5 [Q.N.29, 2073 'D']

Long Questions

(All questions are of equal value, 10 marks each.)

1. What are the oxidation products of primary, secondary and tertiary alcohol? Write down suitable methods for the conversion of 5+2.5+2.5[Q.N.31, 2073 'C']
 (i) Ethanol to propanol
 (ii) Chloroform to dimethyl amine
2. How would you distinguish propan-2-ol from 2-methyl propan-2-ol by using Victor Meyers method. 5 [Q.N.31, 2073 'D']
3. Write Victor-Mayer's method for the distinction of 1°, 2° and 3° alcohol. 5[Q.N.31(b), Supp. 2072]

10.2. Phenol

Very Short Questions

(All questions are of equal value, 2 marks each.)

1. How does phenol react with 1+1[Q.N.10, 2073 'C']
 (i) aqueous bromine
 (ii) Benzene diazonium chloride
2. How is phenol obtained from 1+1[Q.N.10, 2073 'D']
 (i) benzene diazonium chloride
 (ii) chlorobenzene

Short Questions

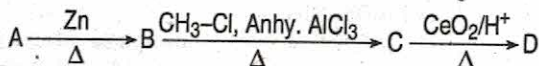
(All questions are of equal value, 5 marks each.)

No Questions has been asked in this year.

Long Questions

(All questions are of equal value, 10 marks each.)

1. Identify the major products A, B, C, D in the following reaction sequence:



compound D gives methylbenzene when heated with alc. KOH and hydrazine.

4+1[Q.N.30(b), Supp. 2072]

Unit 11: Ethers

11.1 Aliphatic Ethers

Very Short Questions

(All questions are of equal value, 2 marks each.)

- Write down isomeric ether of isopropyl alcohol and use Williamson's synthesis process for the preparation of such ether. 1+1[Q.N.11, 2073 'C']
- Write down an isomeric ether of isopropyl alcohol. What happens when the isomeric ether is heated with excess HI? 1+1[Q.N.11, 2073 'D']
- Write down the possible unsymmetrical ethers of $\text{C}_4\text{H}_{10}\text{O}$ and their IUPAC names. 2[Q.N.11, Supp. 2072]

Short Questions

(All questions are of equal value, 5 marks each.)

- Describe the laboratory method of preparation of ethoxyethane. What happens when ethoxyethane is exposed to air? 4+1[Q.N.27, 2073 'D']
- Write down laboratory method of preparation of ethoxyethane. 5[Q.N.28, Supp. 2072]

Long Questions

(All questions are of equal value, 10 marks each.)

No Questions has been asked in this year.

11.2 Aromatic Ether

Very Short Questions

(All questions are of equal value, 2 marks each.)

No Questions has been asked in this year.

Short Questions

(All questions are of equal value, 5 marks each.)

No questions have been asked in this chapter yet.

Unit 12: Aldehydes and Ketones

12.1 Aliphatic Aldehydes and Ketones

Very Short Questions

(All questions are of equal value, 2 marks each.)

- How would you obtain
(i) 3-hydroxybutanal and 1+1[Q.N.12, 2073 'C']
(ii) 2-hydroxy propanoic acid from ethanal?
- Write an example of
(i) Cannizzaro's reaction
(ii) Aldol Condensation 1+1[Q.N.12, 2073 'D']

Short Questions

(All questions are of equal value, 5 marks each.)

- Give chemical reactions for the preparation of propanone from (i) 2, 2 dibromopropane (ii) calcium acetate (iii) propane-2-ol.
How is propanone converted into 2-methylpropan-2-ol? 1+1+1+2[Q.N.28, 2073 'C']

2. Give chemical reactions for the preparation of ethanal from (i) 1, 1-dibromo ethane (ii) ethyne (iii) ethanoyl chloride. How is ethanal converted into propan-2-ol ? 3+2
[Q.N.28, 2073 'D']

Long Questions*(All questions are of equal value, 10 marks each.)*

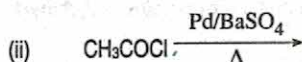
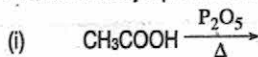
1. How is propanone prepared from: 3+2[Q.N.31(a), Supp. 2072]
i) 2, 2-dichloro propane ii) isopropyl alcohol iii) propyne

12.2 Aromatic Aldehydes and Ketones**Very Short Questions***(All questions are of equal value, 2 marks each.)*

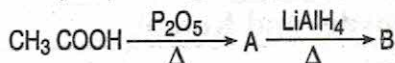
1. What happens when benzaldehyde is treated with: 1+1[Q.N.12, Supp. 2072]
i) conc. NaOH solution ii) hydrazine

Short Questions*(All questions are of equal value, 5 marks each.)**No Questions has been asked in this year.***Long Questions***(All questions are of equal value, 10 marks each.)**No Questions has been asked in this year.***Unit 13: Carboxylic Acids****13.1 Aliphatic Carboxylic Acids****Very Short Questions***(All questions are of equal value, 2 marks each.)*

1. Predict the major products of the following reactions 1+1[Q.N.13, 2073 'C']



2. Why is chloroacetic acid stronger acid than acetic acid ? 2[Q.N.13, 2073 'D']
3. Identify the product (A) and (B) and give their IUPAC name. 1+1[Q.N.13, Supp. 2072]

**Short Questions***(All questions are of equal value, 5 marks each.)*

1. Describe the laboratory method of preparation of anhydrous formic acid. How does it react with tollens' reagent ? 4+1[Q.N.27, 2073 'C']
2. Write down a chemical reaction for the preparation of methanoic acid from Oxalic acid. How is methanoic acid converted into ethanoic acid? 2+3[Q.N.27, Supp. 2072]

Long Questions*(All questions are of equal value, 10 marks each.)*

1. Write short notes on: Laboratory preparation of formic acid. [Q.N.33(iv), 2073 'D']
2. Give suitable chemical reaction for the conversion of ethanoic acid into
i) Methane ii) methyl ethanoate [Q.N.31(a), Supp. 2072]

13.2 Derivatives of Carboxylic Acid:**Very Short Questions***(All questions are of equal value, 2 marks each.)**No Questions has been asked in this year.***Short Questions***(All questions are of equal value, 5 marks each.)**The short answer questions have not been asked from this lesson yet.***Long Questions***(All questions are of equal value, 10 marks each.)**No Questions has been asked in this year.***13.3 Aromatic Carboxylic Acids:****Very Short Questions***(All questions are of equal value, 2 marks each.)**No Questions has been asked in this year.***Short Questions***(All questions are of equal value, 5 marks each.)**No Questions has been asked in this year.***Long Questions***(All questions are of equal value, 10 marks each.)**No Questions has been asked in this year.***Unit 14: Nitrocompounds****14.1 Aliphatic Nitrocompounds (Nitroalkane)****Very Short Questions***(All questions are of equal value, 2 marks each.)**No Questions has been asked in this year.***Short Questions***(All questions are of equal value, 5 marks each.)**The short answer questions have not been asked from this lesson yet.***Long Questions***(All questions are of equal value, 10 marks each.)**The long answer questions have not been asked from this lesson yet.***14.2 Aromatic Nitrocompounds****Very Short Questions***(All questions are of equal value, 2 marks each.)*

1. Why does nitrobenzene undergo electrophilic substitution at meta position ? 2

[Q.N.14, 2073 'C']

2. What happens when Nitrobenzene is 1+1[Q.N.14, 2073 'D']

(i) subjected to electrolytic reduction (ii) treated with Zn/NaOH

Short Questions*(All questions are of equal value, 5 marks each.)**No Questions has been asked in this year.***Long Questions***(All questions are of equal value, 10 marks each.)*

1. Give a chemical reaction for the preparation of nitrobenzene from benzene. Starting from nitrobenzene how will you prepare: 1+4[Q.N.30(a), Supp. 2072]
 i) azobenzene ii) oxyazobenzene iii) hydrazobenzene iv) TNT

Unit 15: Amino Compounds (Amines and Aniline)

15.1 Aliphatic Amines

Very Short Questions

(All questions are of equal value, 2 marks each.)

1. Give a suitable chemical test to distinguish ethanamine from N-methyl-methanamine. 2 [Q.N.15, 2073 'C']
 2. Give a suitable chemical test to distinguish ethanamine from N-methyl methanamine. 2 [Q.N.15, 2073 'D']
 3. Write a chemical test to distinguish aliphatic amine from aromatic amine. 2[Q.N.15, Supp. 2072]

Short Questions

(All questions are of equal value, 5 marks each.)

No Questions has been asked in this year.

Long Questions

(All questions are of equal value, 10 marks each.)

1. Write down suitable method for the conversion of: 2.5+2.5[Q.N.31, 2073 'D']
 (i) Chloroform into dimethylamine. (ii) Ethanamine into methanamine.

15.2 Aromatic Amine (Aniline)

Very Short Questions

(All questions are of equal value, 2 marks each.)

No Questions has been asked in this year.

Short Questions

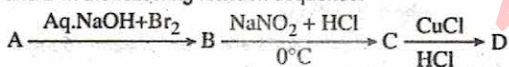
(All questions are of equal value, 5 marks each.)

No Questions has been asked in this year.

Long Questions

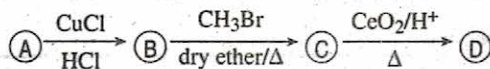
(All questions are of equal value, 10 marks each.)

1. How is pure aniline prepared in the laboratory? Identify the major products A, B, C and D in the following reaction sequence. 6+4[Q.N.30, 2073 'C']



The compound D if heated with chloral in presence of acid gives DDT.

2. How is pure and dry aniline prepared in the laboratory? Identify the major products (A), (B), (C) and (D) in the following reaction sequences. 6+4[Q.N.30, 2073 'D']



The compound D undergoes clemmensen reduction to give Toluene.

Unit 16: Molecules of Life

Very Short Questions

(All questions are of equal value, 2 marks each.)

1. Illustrate the formation of peptide bond with an example. 2[Q.N.18, 2073 'C']
 2. What are reducing sugars? Write an example of it. 1+1[Q.N.19, 2073 'C']
 3. Illustrate the formation of peptide bond with an example. 2[Q.N.18, 2073 'D']
 4. What are non-reducing sugars? Write an example of it. 1+1[Q.N.19, 2073 'D']
 5. What are carbohydrates? Write molecular formula of a disaccharides. 1+1[Q.N.16, Supp. 2072]

6. Define the terms: 1+1[Q.N.17, Supp. 2072]
 i) Co-enzyme ii) Protein

Unit 17: Chemistry in Service to Mankind

Very Short Questions

(All questions are of equal value, 2 marks each.)

- Distinguish between synthetic polymer and natural polymer with an example of each. 1+1[Q.N.16, 2073 'C']
- What is meant by antipyretic drug? Write a structure of it. 1+1[Q.N.17, 2073 'C']
- Distinguish between homopolymer and co-polymer with an example of each. 1+1
[Q.N.16, 2073 'D']
- Write down the structure of 1+1[Q.N.17, 2073 'D']
 (i) aspirin
 (ii) Paracetamol
 and mention their one use of each.
- Give suitable example of each of the following: 2[Q.N.18, Supp. 2072]
 i) Homopolymer ii) Co-polymer iii) Pesticides iv) Synthetic dye
- Give structural formula of each of the following: 2[Q.N.19, Supp. 2072]
 i) antibiotic drug ii) antipyretic drug
- What is meant by Thomas Slag? Write its one use. 1+1 [Q.N.20, Supp. 2072]

Section C : Inorganic Chemistry

Unit 18: Heavy Metals

18.1. Copper

Very Short Questions

(All questions are of equal value, 2 marks each.)

- Starting from copper how would you obtain blue vitriol? 2[Q.N.20, 2073 'C']
- Write the action of heat on blue vitriol. 2[Q.N.20, 2073 'D']
- Write down the molecular formula of: 2[Q.N.21, Supp. 2072]
 i) Copper pyrite

Short Questions

(All questions are of equal value, 5 marks each.)

- How is blister copper extracted from copper pyrites? 5[Q.N.26, Supp. 2072]

Long Questions

(All questions are of equal value, 10 marks each.)

- Write short notes on :
 (a) Extraction of blister copper from copper pyrite. [Q.N.33(i), 2073 'C']
 (b) Extraction of blister copper from copper pyrites. [Q.N.33(i), 2073 'D']

18.2 Zinc

Very Short Questions

(All questions are of equal value, 2 marks each.)

- What happens when Zinc white is 1+1[Q.N.21, 2073 'C']
 (i) heated
 (ii) treated with caustic alkali
- Give the reactions for the extraction of metallic zinc from zinc blende. 2[Q.N.21, 2073 'D']
- Write down the molecular formula of: 2[Q.N.21, Supp. 2072]
 i) Calomel

4. Starting from metallic Zinc, how would you prepare white vitriol? 2[Q.N.22, Supp. 2072]

Short Questions*(All questions are of equal value, 5 marks each.)**No Questions has been asked in this year.***Long Questions***(All questions are of equal value, 10 marks each.)**No Questions has been asked in this year.***18.3 Mercury****Very Short Questions***(All questions are of equal value, 2 marks each.)*

1. Write down the molecular formula of:
i) Calamine ii) Cinnabar 2[Q.N.21, Supp. 2072]

Short Questions*(All questions are of equal value, 5 marks each.)*

1. Write down the chemistry of corrosive sublimate. 5[Q.N.25, 2073 'C']
2. Write down the chemistry of calomel. 5[Q.N.25, 2073 'D']

Long Questions*(All questions are of equal value, 10 marks each.)*

1. Write short notes on :
(a) Extraction of mercury. [Q.N.33(iv), Supp. 2072]

18.4. Iron**Very Short Questions***(All questions are of equal value, 2 marks each.)*

1. Name any two important ores of iron. Which parts of Nepal are these ores mainly found? 1+1[Q.N.22, 2073 'C']
2. Write down chemical reactions that occur in zone of reduction of blast furnace during extraction of iron. 2[Q.N.22, 2073 'D']

Short Questions*(All questions are of equal value, 5 marks each.)**No Questions has been asked in this year.***Long Questions***(All questions are of equal value, 10 marks each.)*

1. Write short notes on :
(a) Manufacture of steel by open-hearth process. [Q.N.33(ii), 2073 'C']
(b) Rusting of iron [Q.N.33(ii), 2073 'D']
(c) Chemistry of open Hearth process for the manufacture of steel. [Q.N.33(iii), Supp. 2072]

18.5. Silver**Very Short Questions***(All questions are of equal value, 2 marks each.)**No Questions has been asked in this year.***Short Questions***(All questions are of equal value, 5 marks each.)**No Questions has been asked in this year.***Long Questions***(All questions are of equal value, 10 marks each.)**No Questions has been asked in this year.*