P BLOCK ELEMENTS

1. Complete and balance   1x10=10

b. $Au + NO_3^- + 4H^+ + 4Cl^- \rightarrow$

c. $Na_2CO_3 + 2HCl \rightarrow$

d. $Na_2SO_3 + 2HCl \rightarrow$

f. $Br_2 + 5F_2 \rightarrow$

g. $XeF_4 + O_2F_2 \rightarrow$

h. $XeF_2 + PF_5 \rightarrow$

i. $XeF_6 + 3H_2O \rightarrow$

j. $XeF_6 + 2H_2O \rightarrow$
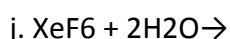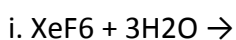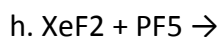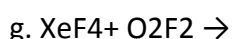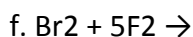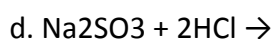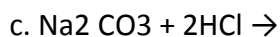
2. Draw the structures of following: 1x6=6

 (i) HOClO   (ii) HClO4   (iii) BrF3   (iv)   XeO3

(v) XeF4   (vi) XeF2
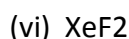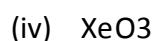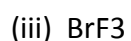
3. What are interhalogen compounds? Why are they more reactive than halogens? [2]

4. Noble gases have very low melting and boiling points. Why?   [1]

5. Name a gas used   [2]

 a) In gas – cooled nuclear reactors

 b) In fluorescent bulbs

 c) For filling electrical bulbs

 d) As cryogenic agent.

6. Give reasons-   6x1=6

 a) Halogens have smallest atomic radii in their periods
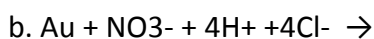
 b) The negative election gain enthalpy of fluorine is less than that of chlorine.

 c) All halogens are coloured.

 d) The only possible oxidation state of fluorine -1.

 e) Fluorine forms only one oxoacid.

 f) The stability of hydrides follows the order HF>HCl>HBr>HI.

7. Complete and balance-   5x1=5

 (i) $2F_2(g) + 2H_2O\ (l) \rightarrow$

 (ii) $4NaCl + MnO_2 + 4H_2SO_4 \rightarrow$

 (iv) $C_{10}H_{16} + 8Cl_2 \rightarrow$

 (v) $6NaOH + 3Cl_2 \rightarrow$
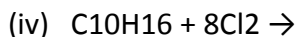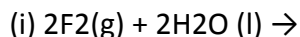
8. Chlorine water on standing loses its yellow colour. Why?   [1]

9. Explain the bleaching action of chlorine?   [1]

10. Write two uses of chlorine?   [2]

>   1. Write the characteristics of pure Ozone?   [1]
>   2. At what concentration ozone is harmful?   [1]
>   3. Draw the resonating structures of ozone?   [1]

4. Explain the oxidizing action of ozone? [1]

5. How is ozone estimated quantitatively? [1]

11. Complete and balance:- [6x1=6]

(i) $PbS(s) + 4O_3(g) \rightarrow$

(ii) $NO(g) + O_3(g) \rightarrow$

(iii) $4FeS_2(s) + 11O_2(g) \rightarrow$

(iv) $2NaOH + SO_2 \rightarrow$

(v) $2Fe^{3+} + SO_2 + 2H_2O \rightarrow$

(vi) $Cu + 2H_2SO_4(conc) \rightarrow$

12. Give a test to detect the presence of SO_2 gas? [2]

13. Give the structures of

(i) sulphurous acid and

(ii) Peroxodisulphurous acid? [1]

14. Write the various steps for preparation of sulphuric acid by contact process? [2]

15. Name different sulphates formed by sulphuric acid? [1]

16. Write the members of 16 Group. [1]

17. Give the general electronic configuration of 16 Group. [1]

18. Give reasons :- [5]

(a) Oxygen molecule is diatomic where as sulphur molecule is polyatomic.

(b) The most common oxidation state of oxygen is -2.

(c) H_2O is liquid whereas H_2S is gas at room temperature.

(d) The increasing order of acidic character in 16th group hydrides is $H_2O < H_2Se < H_2Te$.

(e) SF_6 is exceptionally stable, SH_6 does not exist.

4. Discuss the geometry of SF_4. [2]

6. Discuss the different types of oxides. [2]

7. Enlist some uses of dioxygen. [2]

8. Write different isotopes of oxygen. [1]

ALCHOLS, PHENOLS AND ETHERS

1. What is denatured alcohol? [1]

2. Mention two important uses of methanol. [1]

3. Arrange C_6H_5OH, C_2H_5OH & H_2O in the increasing order of acid strength. [1]

4. Give the structure of main product of action of excess of Br_2 on phenol. [1]

5. How is the presence of peroxides in ethers detected? How are peroxides removed from Ethers? [2]

6. Explain a chemical test to distinguish between primary, secondary and tertiary alcohols. [2]

7. What is Lucas test? [2]

8. What is Picric acid? How is it prepared from phenol? [1]

9. What is wood sprit? Why is it so called? [1]

10. Give equations for preparation of ethanol by fermentation. [2]

11. An organic compound ' A ' having molecular formula C_3H_6 on treatment with aq. H_2SO_4 give 'B' which on treatment with Lucas reagent gives 'C'. The compound 'C' on treatment with ethanolic KOH gives back ' A' .Identify A, B , C . [3]

12. An organic compound A (C_6H_6O) gives a characteristic colour with aq. $FeCl_3$ solution. (A) On reacting with CO_2 and NaOH at 400k under pressure gives (B) which on acidification gives a compound (C) .The

compound (C) reacts with acetyl chloride to give (D) which is a popular pain killer. Deduce the structure of A,B,C& D. [3]

13. An organic compound (X) when dissolved in ether and treated with magnesium metal forms a compound Y. The compound, Y, on treatment with acetaldehyde and the product on acid hydrolysis gives isopropyl alcohol. Identify the compound X. What is the general name of the compounds of the type Y. [3]

14. A compound 'A' with molecular formula $C_4H_{10}O$ on oxidation forms compound 'B' gives positive iodoform test and on reaction with CH_3MgBr followed by hydrolysis gives (c). Identify A, B & C. [3]

15. An aromatic compound (A) having molecular formula C_6H_6O on treatment with $CHCl_3$ and KOH gives a mixture two isomers 'B' and 'C' both of 'B' & 'C' give same product 'D' when distilled with Zn dust. Oxidation of 'D' gives 'E' of formula $C_7H_6O_2$. The sodium salt of 'E' on heating with soda lime gives 'F' which may also be obtained by distilling 'A' with zinc dust. Identify compounds 'A' to 'F' giving sequence of reactions. [3]

16. Compound 'A' of molecular formula $C_5H_{11}Br$ gives a compound 'B' of molecular formula $C_5H_{12}O$ when treated with aq. NaOH. On oxidation the compound yields a mixture of acetic acid & propionic acid. Deduce the structure of A, B & C.

Do the following conversions :-

1. Ethene to 1,2 -ethanediol
2. Phenol to Salicyldehyde
3. Butanol to Butanoic acid
4. Ethanol to propanone
5. Phenol to salicylic acid
6. Methanol to Ethanol
7. Ethanol to propanol
8. Phenol to Benzyl Alcohol
9. Ethanal to propan -2- ol
10. l – propanol to 2 – bromo propane

Give Reasons for the followings :-

1. Phenol is acidic in nature.
2. Phenol has a smaller dipole moment than methanol.
3. o- nitrophenol has lower boiling point (is more volatile) than p – nitrophenol.
4. Methanol is miscible with water while iodomethane is not.
5. Alcohols have higher boiling points than isomeric ethers.
6. Ethers are soluble in water alkanes are not.
7. The order of acidic strength in alcohols is $R\ CH_2OH > R_2\ CHOH > R_3\ COH$
8. During preparation of ester from alcohol and acid, water has to be removed as soon as it is formed.
9. Ethers can not be prepared by dehydration of secondary or tertiary alcohols.
10. Reaction of anisole with HI gives methyl iodide and phenol.

2. Write structural formula and give IUPAC names :-

i. Benzyl Alcohol
ii. Ethylene Glycol
iii. Glycerol
iv. m- cresol
vi. Ethylphenylether

vii. Methylpropylether

viii. Anisole

ix. Isopropyl methyl ether

x. Phenetole

HALO ALKANES

1. What is lucas reagent? [1]

2. Which of the following will show optical is omerism

1 – bromobutane or 2 – bromobutane? [1]

3. Arrange $CH_3CH_2CH_2CH_2Br$, $(CH_3)_3CBr$, $CH_3CH(CH_3)CH_2Br$ in order of increasing boiling points.[1]

4. Give an example of a) Fittig reaction (b) Finkelstein reaction. [2]

5. What happens when [2]

a) Thionyl chloride acts upon I - propanol.

b) Ethanol reacts with PBr_3

6. How many aromatic isomers are possible for the formula C_7H_7Cl ?

Write the structure and names. [2]

7. How is chlorobenzene prepared by [2]

(a) Direct chlorination

b) Diazotization method?

8. How can we distinguish between an alkyl halide and aryl halide? [2]

2. An organic compound 'A' having molecular formula C_3H_6 on treatment with aqueous H_2SO_4 given' B' which on treatment with Lucas reagent gives 'C'. The compound 'C' on treatment with ethanolic KOH gives back on compound 'A'. Identify A, B, & C.

3. An organic compound 'A' on heating with NH_3 and cuprous oxide at high pressure gives compound 'B'. The compound 'B' on treatment with ice cold solution of $NaNO_2$ and HCl gives 'C", which on heating with copper turning and HCl gives 'A' again. Identify A, B & C. compound

8. A compound 'A' contains carbon and hydrogen only and has molecular mass of 72. Its photo chlorination gives a mixture containing only one monochloro and two dichloro hydrocarbons. Deduce the structure of A and chlorinated products.

Convert

1. 1 - Butene to 1 — chlorobutane.

2. Ethene to ethanol.

3. Chlorobenzene to phenol.

4. Methyl bromide to acetic acid.

5. 2- chlorobutane to sec- butyl ethyl ether.

6. Chlorobenzene to benzyl chloride.

7. Chlorobenzene to Benzene.

8. Methane to Ethane.

9. Benzene to o- chlorotoluene.

10. 1- chloropropane to 2- iodopropane

Explain giving reasons:- (each question carries 2 marks)

1. Thionyl chloride is preferred for converting alcohol to haloalkane.

2. Phenol cannot be converted to chlorobenzene by reacting with HCl.

3. HNO_3 is added during iodination of benzene.

4. p- dichlorobenzene has higher melting point than meta – dichlorobenzene.

5. The boiling points of isomeric haloalkenes decrease with increase in branching.

6. Hydrolysis of optically active 2- bromobutane forms optically inactive butan - 2 - ol.

7. Chlorobenzene is less reactive towards nucleophilic substitution reaction.

8. Chloroform is stored in dark coloured bottles.
9. The order of boiling points is RCl<RBr< RI.
10. Vinyl chloride is less reactive than allyl chloride.

Give the structures of following.:   1x10=10
1. 1,3-Dichloro -2-(bromomethyl) propane
2. Isobutylchloride
3. Ortho bromotoluene
4. 1 – Bromo – 4 – chlorobutane
5. 3 – Bromo – 5 – chloro – 3,5 – dimethyloctane
6. 2,3 – Dibromo – 1 – chloro -3- methylpentane
7. 2 – Chloro – 3 – ethyl -1, 4- pentadieme
8. 2,3 – Dibromo – 1 – chloro -3- methylpentane
9. 2 – Chloro – 1 – phemylpropane
10. Tert – butylchloride

POLYMERS

1. What is the monomer of natural rubber? [1]
2. How are the characteristics of natural rubber modified? [1]
3. Give two examples of synthetic rubber. [1]
4. How are neoprene & Buna – N prepared? Which one is a copolymer? [2]
5. Give one example of biodegradable polymer. [2]
6. Classify following on Homopolymer and copolymer-   PVC, Polystyrene, Buna – S, Neoprene, Buna – N, Teflon. [2]
7. Classify following an addition and condensation polymer- [2]
 Bakelite, Polythene, Nylon – 6, 6, Polyacrylonitrile
8. Write monomers of polystyrene and PVC. [2]
9. What is condensation polymerisation? [1]
10. Why is condensation polymerisation also called on step – growth polymerisation? [1]
11. Write some examples of condensation polymers. [1]
12. Give monomers and preparation of Nylon – 6, 6 and Dacron. [3]
13. How is Nylon – 6, 6 different from Nylon -6? [1]
14. What are Bakelite and Melamine? Give their structures. [2]
15. Write uses of bakelite and melamine. [2]
16. Give the formula of monomer of Nylon – 6. [1]
17. What is copolymerisation? [1]
18. Give the monomer and preparation of Buna – S. [2]
19. Name the two types of polymeristion. [1]
20. Name some initiators. [1]
21. Explain the mechanism of polymerisation of ethene. [2]
22. Name the two type of polyethene. [1]
23. Differentiate between LDP and HDP. [2]
24. Write the monomer of Teflon.   [1]
25. Give preparation of polyacrylonitrile. [1]
26. Write one use of each – Teflon and polyacrylonitrile. [2]
27. Define polymers. [1]
28. Write various uses of polymers. [3]
29. On what basis are polymers classified? [2]
30. What is the difference between a homopolymer and a copolymer? [1]
31. Classify the following substances as natural, semi – synthetic and synthetic polymers [3]

32. Give two examples of each (i) linear polymer (ii) Network polymer. [2]
33. How are addition polymers different from condensation polymers? [2]
34. What is the basic difference between following pairs: [2]
 (a) Elastomers and fibres
 (b) Thermo setting polymer &thermo plastic polymers.

CHEMICAL KINETICS

1. What is the effect of catalyst on rate constant? [1]
2. How is activation energy affected on adding a catalyst? [1]
3. What do you mean by the term- collision frequency? [2]
4. How does collision theory explain formation of products in a chemical reaction? [1]
5. What is the drawback of collision theory? [2]
6. How does the number of collisions change on increasing the temperature? [2]
7. There is no bar on the no. of collisions among the reaching species. Why most of the reactions do not take place under normal conditions? [2]
9. The activation energy of reaction is 75.2 KJ/mol in the absence of a catalyst and 50.14 KJ/Mol in the presence of a catalyst. How many times will the reaction grow in the presence of a catalyst, if the reaction proceeds at 250C? [2]
10. The rate of a particular reaction quadruples when the temperature changes from 293 K to 313 K. Calculate activation energy for such a reaction. [2]
11. Give an example of pseudo – first order reaction ? [1]
12. Write the expression for half – life period of a first order reaction? [1]
13. A first order reaction is found to have a rate constant K = 5.5 × 10-14 sec -1. Find half life of reaction?[1]
14. The time required to decompose SO2Cl2 to half of its initial amount is 60 min. If the decomposition is a first order reaction, calculate the rate constant of the reaction? [2]
15. The rate constant for the first order decomposition of N2O5 at 250C is 3X10-2 min-1. It the initial concentration of N2O5 is 2X10-3 mol/L, How long will it take to drop the concentration to 5X10-4 mol /L ? [2]
16. Write Arrhenius equation. [1]
17. If the activation energy of a reaction is zero, will the rate of reaction still depend on temperature? [2]
18. In general it is observed that the rate of a chemical reaction doubles with every 100 rise in temperature. If this generalization holds for a reaction in the temperature range295K to 305K, what would be the activation energy for this reaction? (R=8.314Jk-1 mol-1) [3]
19. The rate constant for a reaction is 1.5× 107 s-1 at 500C and 4.5× 107 s-1at 1000C. Calculate the value of activation energy for the reaction R=8.314 JK-1 mol-1? [3]
20. Plot a graph showing variation of potential energy with reaction .coordinate? [1]
21. Identify the reaction order for from each of the following rate constant – a) k = 2.3 ×10-5 L mol-1 s-1 b) k = 3.1 × 10-4 s-1 [1]
22. Consider the equation 2 NO (q) + 2H2 (g) → N2 (g) + 2H2O (g) The rate law for this equation is first order with respect to H2 and second order with respect to NO. write the rate law for this reaction. [1]
23. The rate Law for the reaction A+B → C is rate = K [A]2 [B] . What would the reaction rate be when concentration of both A and B are doubled? [2]
24. Write the integrated rate equation for – i) zero order reaction. ii) first order reaction. [2]
25. Draw a graph for a) Concentration of reactant against time for a zero order reaction. b) Log [Ro]/ [R] against time for a first order reaction. [2]
26. What is the use of integrated rate equation? [2]
27. For first order reaction – A →B Write (1) Differential rate law. (2) Integrated rate law. [2]
28. Is rate of reaction always constant? [1]

29. Enlist the factors affecting rate of a reaction? [1]
30. What do you understand by rate law expression? [2]
31. Is it possible to determine or predict the rate law theoretically by merely looking at the equation? [1]
32. Define the terms – i) Order of a reaction ii) Molecularity of a reaction. [2]
33. What are elementary and complex reactions? [2]
34. Differentiate between order and molecularity of a reaction? [2]
35. Determine the overall order of a reaction which has the rate law $R = K[A]^{5/2}[B]^{3/2}$ [2]
36. What are the units of a rate constant of a   [2]
 a) First order reaction
 b) nth order reaction.
37. For the reaction A+B → C+D, the rate of reaction doubles when the   concentration of a doubles, provided the concentration of B is constant. To what order does A enter into the rate expression?   [2]
38. Define the term chemical kinetics? [1]
39. Define – Rate of reaction? [1]
40. What is average rate of a reaction? How is it determined? [2]
41. What are the units of rate of a reaction? [1]
42. What is instantaneous rate of a reaction? How is it determined? [2]