01. SOLID STATE

SHORT ANSWER QUESTIONS (4 MARKS)

01. Derive Bragg's equation. **AP Mar 15, 16, 17, Sep 21, May 22; TS Mar 15, 16. 19, 20, May 22**

02. Describe the two main types of semiconductors and contrast their conduction mechanism. **AP Mar 18, 19**

03. Classify each of the following as either a p-type or a n-type semiconductor.
1) Ge doped with In 2) Si doped with B. **AP Mar 18**

VERY SHORT ANSWER QUESTIONS (2 MARKS)

04. What is Schottky defect ? **AP Mar 15, Sep 21; TS Mar 15, 18, May 22**

05. What is Frenkel defect ? **AP Mar 15, 20, May 22; TS Mar 18, 20**

06. Explain antiferromagnetism with suitable example. **AP Mar 20**

02. SOLUTIONS

SHORT ANSWER QUESTIONS (4 MARKS)

01. What is an ideal solution ? **TS May 22**

02. What is meant by positive deviations from Raoult's law and how is the sign of ΔH_{mix} related to positive deviation from Raoult's law ?

03. What is meant by negative deviation from Raoult's law and how is the sign of ΔH_{mix} related to negative deviation from Raoult's law ?

04. What is relative lowering of vapour pressure ? How is it useful to determine the molar mass of a solute ? **TS Mar 15; AP May 22**

PROBLEMS

05. A solution of glucose in water is labelled as 10% w / w . What would be the Molarity of the solution ? **AP Mar 15**

06. A solution of sucrose in water is labelled as 20%(w / w) . What would be the mole fraction of each component in the solution ?

07. Calculate the fraction of ethylene glycol ($C_2H_6O_2$) in a solution containing 20% of $C_2H_6O_2$ by mass. **TS Mar 15; INTEXT QUESTIONS**

08. Calculate the molarity of a solution containing 5 g of NaOH in 450 mℓ solution. **AP Mar 15; TS Mar 15, 19, 20; INTEXT QUESTOINS**

09. Calculate molality of 2.5 g of ethanoic acid (CH_3COOH) in 75 g of benzene. **TS Mar 15; INTEXT QUESTOINS**

10. Calculate the mass of a non-volatile solute (Molar mass 40 g mol^{-1}) which should be dissolved in 114 gm of octane to reduce its vapour pressure to 80%. **Mar 14; TS Mar 16; AP Mar 20**

11. Vapour pressure of water at 293 K is 17.535 mm Hg . Calculate the vapour pressure of the solution at 293 K when 25 g of glucose is dissolved in 450 g of water. **AP Mar 19; Sep 20**

12. The vapour pressure of pure benzene at a certain temperature is 0.850 bar . A non-volatile, non-electrolyte solid weighing 0.5 g when added to 39.0 g of benzene (molar mass 78 g mol^{-1}), vapour pressure of the solution then, is 0.845 bar . What is the Molar mass of the solid substance ? **AP Mar 16, 18; INTEXT QUESTOINS**

VERY SHORT ANSWER QUESTIONS (2 MARKS)

13. Define mole fraction. TS Mar 18
14. Define molarity. TS Mar 20
15. Define molality. AP Mar 15
16. Define molality. Calculate molality of 10 gm of glucose in 90 gm of water. AP Mar 15; ADD. VSAQ
17. Calculate the mole fraction of H_2SO_4 in a solution containing 98% H_2SO_4 by mass. Mar 14; AP Mar 16, 18, May 22; TS Mar 16, 18, May 22
18. State Henry's law. TS Mar 20, May 22
19. State Raoult's law and give its two limitations ? Mar 14; AP Mar 16, 18; TS Mar 16, 18, 20, May 22
20. What are colligative properties ? AP Mar 20; ADD. VSAQ
21. What is Ebullioscopic constant ?
22. What is cryoscopic constant ?
23. Define osmotic pressure. AP Mar 15, 16, 18; TS May 22
24. What are isotonic solutions ? Give example. AP Mar 15, 17, Sep 21, May 22; TS Mar 16, 19

03. ELECTRO CHEMISTRY & CHEMICAL KINETICS

3.1.ELECTRO CHEMISTRY

SHORT ANSWER QUESTIONS (4 MARKS)

01. What are galvanic cells ? Explain the working of a galvanic cell with neat sketch taking daniel cell as example. AP Mar 15, 18, Sep 21; TS Mar 15, 18, 20
02. Give the construction and working of a standard hydrogen electrode with a neat diagram.
03. Define EMF. Calculate the EMF of the following galvanic cell. AP May 16

$Zn_{(s)} + Cu^{+2}_{(aq)} \rightarrow Zn^{+2}_{(aq)} + Cu_{(s)}$; $E^0_{Zn^{+2}/Zn} = -0.76$ u : $E^0_{Cu^{+2}/Cu} = +0.34$ u .

04. State and explain Nernst equation with the help of a metallic electrode and a non metallic electrode.
05. State and explain Kohlrausch's law of independent migration of ions. AP Mar 15, Sep 21, May 22; TS May 22
06. What is electrolysis ? State Faraday's laws of electrolysis. AP Mar 15; TS May 22
07. What are the primary and secondary batteries ? Give one example for each. AP Mar 19
08. What are fuel cells ? How they are different from galvanic cells ? Give the construction of $H_2 - O_2$ fuel cell. TS Mar 20

PROBLEMS

09. The standard emf of Daniel cell is 1.1 V . Calculate the standard Gibbs energy for the cell reaction: $Zn_{(s)} + Cu^{2+}_{(aq)} \rightarrow Zn^{2+}_{(aq)} + Cu_{(s)}$. SOLVED PROBLEM
10. A solution of $CuSO_4$ is electrolysed for 10 minutes with a current of 1.5 amperes. What is the mass of copper deposited at the cathode ? Mar 14; TS Mar 15; AP Mar 15; SOLVED PROBLEM

VERY SHORT ANSWER QUESTIONS (2 MARKS)

11. What is a galvanic cell (or) a voltaic cell ? Give one example.
12. State Faraday's first law of electrolysis. Mar 14; AP Mar 16, 18, 20; TS Mar 15
13. State Faraday's second law of electrolysis. Mar 14; AP Mar 20; TS Mar 18
14. What is a primary battery ? Give one example. AP Mar 17
15. What is metallic corrosion ? Give example. AP Mar 15

3.2.CHEMICAL KINETICS

LONG ANSWER QUESTIONS (8 MARKS)

01. Give a detailed account of the collision theory of reaction rates of Bimolecular gaseous reactions. **Mar 14; TS Mar 16, 18, 19**

SHORT ANSWER QUESTIONS (4 MARKS)

02. What is 'Molecularity' of a reaction ? How is it different from the 'Order' of a reaction ? Name one bimolecular and one trimolecular gaseous reactions. **Mar 14; AP Mar 18, 20, Sep 21**

03. What is half-life ($t_{1/2}$) of a reaction ? Derive the equations for the 'half-life' value of zero and first order reactions.

04. What is Arrhenius equation ? Derive an equation which describes the effect of rise of temperature (T) on the rate constant (K) of a reaction. **AP May 22**

PROBLEMS

05. Identify the reaction order from each of the following rate constants.

i) $K = 2.3 \times 10^{-5}$ L mol^{-1} s^{-1} ii) $K = 3 \times 10^{-4}$ s^{-1} **AP Mar 20; SOLVED PROBLEM**

06. A reaction has a Half-life of 10 minutes. Calculate the rate constant for the first order reaction. **TS Mar 16; PROBLEM**

07. The rate constant for a first order reaction is $60\ sec^{-1}$. How much time will it take to reduce the initial concentration of the reactants to its $1/16^{th}$ value ? **PROBLEM**

08. A first order reaction is found to have a rate constant $K = 5.5 \times 10^{-14}$ s^{-1}. Find the half-life of the reaction. **SOLVED PROBLEM**

VERY SHORT ANSWER QUESTIONS (2 MARKS)

09. Define order of a reaction. Illustrate your answer with an example. **TS Mar 15, May 22**
10. Give two examples for zero order reactions. **TS Mar 19**
11. Give two examples for gaseous first order reactions. **Mar 14**
12. What are pseudo first order reactions ? Give one example. **AP May 16**

04. SURFACE CHEMISTRY

LONG ANSWER QUESTIONS (8 MARKS)

01. What are micelles ? Discuss the mechanism of micelle formation and cleaning action of soap.
02. Describe the properties of colloids with necessary diagrams wherever necessary.
03. What are emulsions ? How are they classified ? Describe the applications of emulsions. **AP Mar 17; TS Mar 16**

SHORT ANSWER QUESTIONS (4 MARKS)

04. What are different types of Adsorption ? Give any four differences between characteristics of the different types. **AP Mar15, Sep 21, May 22; TS Mar 15, 19, 20, May 22**
05. What is catalysis ? How is catalysis classified ? Give two examples for each type of catalysis. **Mar 14; AP Mar 16, 20; TS Mar 15**

VERY SHORT ANSWER QUESTIONS (2 MARKS)

06. What is adsorption ? Give one example. **AP Sep 20**
07. What is an emulsifying agent ? **AP Mar 13**

05. GENERAL PRINCIPLES OF METALLURGY

SHORT ANSWER QUESTIONS (4 MARKS)

01. Explain the purification of sulphide ore by froth floatation method.
AP Mar 15, 17, 18, 19; TS Mar 15, 20

02. Giving examples to differentiate roasting and calcination.
Mar 14; AP Mar 16; TS Mar 16, 18, 19

03. Write down the chemical reactions taking place in different zones in the blast furnace during the extraction of iron.

04. Explain the extraction of zinc from zinc blende.

05. Explain briefly the extraction of aluminium from bauxite. TS Mar 17

06. Outline the principles of refining of metals by the following methods.
a) Zone refining b) Electrolytic refining c) Poling d) Vapour phase refining. AP Mar 15

VERY SHORT ANSWER QUESTIONS (2 MARKS)

07. What is the difference between a mineral and an ore ?

08. Write any two ores with formulae of the following metals ?
a) Aluminium b) Zinc c) Iron d) Copper Mar 14, AP Mar 20; TS Mar 15

09. State the role of silica in the metallurgy of copper. Mar 14

10. What is matte? Give its composition. TS Mar 18

11. What is blister copper? Why is it so called ? TS Mar 18

12. What is the role of cryolite in the metallurgy of aluminium ? AP Mar 20; TS Mar 15, 16

13. Explain "poling" ? AP Mar 15, 16

14. Give the composition of the following alloys.
a) Brass b) Bronze c) German silver Mar 14; TS Mar 19; AP Mar 17, 18, 19

06. p-BLOCK ELEMENTS

6.1. p-Block Elements (Group 15)

LONG ANSWER QUESTIONS (8 MARKS)

01. How is ammonia manufactured by Haber's process ? Explain the reactions of ammonia with
a) $ZnSO_{4(aq)}$ b) $CuSO_{4(aq)}$ c) $AgC\ell_{(s)}$ AP Mar 18; TS Mar 20

02. How is nitric acid manufactured by Ostwald's process ? How does it react with the following ?
a) Copper b) Zn c) S_8 d) P_4 AP Mar 17, May 22; TS Mar 19, May 22

SHORT ANSWER QUESTIONS (4 MARKS)

03. How does $PC\ell_5$ react with the following ?
a) Water b) C_2H_5OH c) CH_3COOH d) Ag AP Mar 20

VERY SHORT ANSWER QUESTIONS (2 MARKS)

04. Nitrogen exists as diatomic molecule and phosphorus as P_4 why ? TS Mar 15

05. Nitrogen molecule is highly stable why ? Mar 14; AP Sep 21

06. NH_3 forms hydrogen bonds but PH_3 does not - why ? TS Mar 15

07. PH_3 has lower boiling point than NH_3. Why ? TS Mar 16

08. Ammonia is a good complexing agent. Explain with an example ? Mar 14

09. Iron becomes passive in conc. HNO_3. Why ? TS Mar 15

10. What is allotropy ? Explain the different allotropic forms of phosphorus ?

11. What happens when white phosphorus is heated with conc. NaOH solution in an inert atmosphere of CO_2 ? AP Mar 15, 19

12. How does $PC\ell_3$ react with a) CH_3COOH b) C_2H_5OH and c) Water ?

13. Draw the structure of $PC\ell_5$. AP May 15; INTEXT QUESTIONS

6.2. p-Block Elements (Group 16)

LONG ANSWER QUESTIONS (8 MARKS)

01. How is ozone prepared from oxygen ? Explain its reaction with.
a) C_2H_4 b) KI c) Hg d) PbS e) NO f) Ag
Mar 14; AP Mar 16, 17, 18, Sep 21, May 22

02. Explain in detail the manufacture of sulphuric acid by contact process.
AP Mar 20; TS Mar 18

SHORT ANSWER QUESTIONS (4 MARKS)

03. How is ozone prepared ? How does it react with the following ?
a) PbS b) KI c) Hg d) Ag AP Mar 17, 18, 19; TS Mar 20

04. Describe the manufacture of H_2SO_4 by contact process. TS Mar 16

05. Write the structure of oxoacids of sulphur ? TS May 16

VERY SHORT ANSWER QUESTIONS (2 MARKS)

06. Name the most abundant element present in earth's crust. AP May 16

07. Which element of group - 16 shows highest catenation ?

08. H_2O is neutral while H_2S is acidic explain. TS May 15, Mar 16

09. Give the hybridization of sulphur in the following:
a) SO_2 b) SO_3 c) SF_4 d) SF_6 AP Mar 20

10. What is tailing of mercury ? How is it removed ? AP Mar 15; TS Mar 15, May 22

11. SO_2 can be used as an anti-chlor. Explain. AP May 22

12. Write any two uses each for O_3 and H_2SO_4. TS Mar 16

6.3. p-Block Elements (Group 17)

LONG ANSWER QUESTIONS (8 MARKS)

01. How is chlorine prepared in the laboratory ? How does it react with the following ?
a) Iron b) Hot and conc. NaOH c) Acidified $FeSO_4$ AP Mar 20, Sep 21;
d) Iodine e) H_2S f) $Na_2S_2O_3$ TS Mar 15

02. How is chlorine prepared by electrolytic method ? Explain its reactions with
a) NaOH b) NH_3 under different conditions AP Mar15, 16, Sep 21; TS May 22

SHORT ANSWER QUESTIONS (4 MARKS)

03. How can you prepare $C\ell_2$ from $HC\ell$ and $HC\ell$ from $C\ell_2$? Write the reactions.

04. Write balanced equations for the following ?

a) $NaC\ell$ is heated with conc. H_2SO_4 in the presence of MnO_2.

b) Chlorine is passed into a solution of NaI in water. **Mar 14**

05. How is chlorine obtained in the laboratory ? How does it react with the following ?

a) Cold dil NaOH b) Excess NH_3 c) KI **AP Mar 16, 18, May 22; TS Mar 16**

06. What are inter halogen compounds ? Give some examples to illustrate the definition. How are they classified ?

07. Explain the structures of a) BrF_5 b) IF_7 ?

VERY SHORT ANSWER QUESTIONS (2 MARKS)

08. Write the reaction of "F_2" and "$C\ell_2$" with water ? **Mar 14**

09. What happens when $C\ell_2$ reacts with dry slaked lime ? **AP Mar 17, 18, 20; TS Mar 18**

10. Chlorine acts as an oxidising agent-explain with two examples ? **AP Mar 16**

11. How is chlorine manufactured by Deacon's method ? **AP Mar 17, 19; TS Mar 16, 19**

12. Give the oxidation states of halogens in the following:

a) $C\ell_2O$ b) $C\ell O_2^-$ c) $KBrO_3$ d) $NaC\ell O_4$ **TS Mar 15**

13. What are inter halogen compounds ? Give two examples.

6.4. p-Block Elements (Group 18)

LONG ANSWER QUESTIONS (8 MARKS)

01. How are XeF_2, XeF_4 and XeF_6 prepared ? Explain their reaction with water ? Discuss their structures. **AP Mar 19**

SHORT ANSWER QUESTIONS (4 MARKS)

02. How are XeO_3 and $XeOF_4$ prepared ? **TS Mar 17, 18**

03. Explain the reaction of the following with water ? a) XeF_2 b) XeF_4 c) XeF_6 **Mar 14; AP Mar 15**

04. Explain the structure of a) XeF_6 b) $XeOF_4$ **TS Mar 15**

05. Complete the following: **AP Mar 20**

a) $XeF_2 + H_2O \rightarrow$ b) $XeF_2 + PF_5 \rightarrow$ c) $XeF_4 + SbF_5 \rightarrow$ d) $XeF_6 + AsF_5 \rightarrow$

e) $XeF_4 + O_2F_2 \rightarrow$ f) $NaF + XeF_6 \rightarrow$

06. How are XeF_2 and XeF_4 are prepared ? Give their structures. **AP Mar 17**

VERY SHORT ANSWER QUESTIONS (2 MARKS)

07. Explain the structure of XeO_3 ? **Mar 14; TS Mar 16**

08. Explain the shape of XeF_4 on the basis of VSEPR theory ? **AP Mar 18**

09. How is $XeOF_4$ prepared ? Describe its molecular shape ? **Mar 14, TS Mar 17**

10. Write the uses of helium. **ADD. VSAQ**

11. Helium is heavier than hydrogen. Yet Helium is used (instead of H_2) in filling balloons for meteorological observations. Why ?

07. d & f BLOCK ELEMENTS & COORDINATION COMPOUNDS

SHORT ANSWER QUESTIONS (4 MARKS)

01. What are interstitial compounds ? How are they formed ? Give two examples. **AP Mar 15**

02. Write the characteristic properties of transition elements. **AP Mar 15; TS May 22**

03. Explain Werner's theory of coordination compounds with suitable examples.
Mar 14; AP Mar 17, 18, 20, Sep 21, May 22; TS Mar 15, 18, May 22

04. Explain the terms i) Ligand ii) Coordination number iii) Coordination entity iv) Central metal atom/ion. **TS Mar 20**

05. Using IUPAC norms write the formulas for the following: **TS Mar 17, May 22**
i) Tetrahydroxozincate (II) ii) Hexaamminecobalt (III) sulphate
iii) Potassium tetrachloropalladate(II) and iv) Potassium tri (oxalato) chromate (III)

06. Write the IUPAC names of the following coordination compounds.
i) $K_3[Fe(CN)_6]$, ii) $K_2[PdC\ell_4]$ **INTEXT QUESTION**

07. Explain geometrical isomerism in coordination compounds giving suitable examples.
AP Mar 15

VERY SHORT ANSWER QUESTIONS (2 MARKS)

08. Scandium is a transition element, but Zinc is not. Why ? **Mar 14**

09. Why Zn^{2+} is diamagnetic whereas Mn^{2+} is paramagnetic ? **TS Mar 15; AP Mar 20**

10. Calculate the 'spin only' magnetic moment of $Fe^{2+}_{(aq)}$ ion. **AP Mar 17, May 22**

11. Aqueous Cu^{2+} ions are blue in colour whereas aqueous Zn^{2+} ions are colourless. Why ?
AP & TS Mar 16

12. Give two reactions in which transition metals (or) their compounds acts as catalysts.
TS Mar 17

13. What is an alloy ? Give example.

14. Calculate the magnetic moment of a divalent ion in aqueous solution if its atomic number is 25.
Mar 15; SOLVED EXAMPLE

15. What is lanthanoid contraction ? **TS Mar 19, 20**

16. What is misch-metal ? Give its composition and uses ? **AP Mar 16**

17. What are coordination compounds ? Give two examples.

18. What is a ligand ? Give an example. **TS Mar 18, AP Sep 21**

19. What is an ambidentate ligand ? Give example. **AP Mar 16**

20. $CuSO_4 \cdot 5H_2O$ is blue in colour whereas anhydrous $CuSO_4$ is colourless. Why ?
Mar 14; TS May 22

08. POLYMERS

SHORT ANSWER QUESTIONS (4 MARKS)

01. What are natural and synthetic polymers ? Give two example of each.

02. Explain copolymerization with an example ?

03. Write the names and structures of monomers used for getting the following polymers.
1) Polyvinyl chloride 2) Teflon 3) Bakelite 4) Polystyrene
Mar 14; AP Mar 16, 20; TS Mar 18

04. Write the names and structures of the monomers of the following polymers.
i) Buna-S ii) Buna-N iii) Dacron iv) Neoprene AP Mar 16

05. Explain the difference between natural rubber and synthetic rubber.

06. Write the names of monomers used for getting the following polymers.
i) Nylon-6,6 ii) Glyptal iii) Bakelite iv) Terylene AP Mar 20; INTEXT QUESTION

VERY SHORT ANSWER QUESTIONS (2 MARKS)

07. What is polymerization ? Give example for polymerization reaction. Mar 14

08. What are addition polymers ? Give example. TS Mar 15

09. What are co-polymers ? Give example. Mar 14

10. What are thermosetting polymers ? Give example ?

11. What is Ziegler-Natta catalyst ? AP Mar 20; TS Mar 19

12. What are the repeating monomeric units of Nylon-6, Nylon-6,6 ? TS Mar 15, 18

13. What is vulcanization of rubber ? AP Mar 19, 20; TS Mar 15, 16

14. What is PDI (Polydispersity Index) ? AP Mar 19

15. What is bio-degradable polymer ? Give one example of a bio-degradable polyesters ?
AP Mar 18

16. What is PHBV ? How is it useful to man ? AP Mar 16, 19; TS Mar 15, 16, 18

17. Give the structure of Nylon-2-Nylon-6.

09. BIOMOLECULES

LONG ANSWER QUESTIONS (8 MARKS)

01. Write notes on Importance of carbohydrates.

02. Write notes on Enzymes ?

03. Write notes on the functions of different hormones in the body. AP Jun 10, May 12

SHORT ANSWER QUESTIONS (4 MARKS)

04. Explain the denaturation of proteins. TS Mar 16

05. Write notes on vitamins. AP May 14

06. Give the sources of the following vitamins and name the diseases caused by their deficiency.
AP Mar 15, 16; TS Mar 15
a) A b) D c) E and d) K

07. What are hormones ? Give one example for each. Mar 14; AP & TS Mar 18, 19, 20

VERY SHORT ANSWER QUESTIONS (2 MARKS)

08. Define carbohydrates ?

09. What are monosaccharides ?

10. What are reducing sugars ? AP Sep 20

11. Write two methods of preparation of glucose. May 14

12. What are amino acids ? Give two examples. AP Mar 20

13. What do you mean by essential amino acids? Give two examples for non essential amino acids. (or) Mar 14; TS Mar 16
What are essential and non essential amino acids ? Give one example each. TS May 22
14. What is Zwitter ion? Give an example. AP Mar 15, May 22
15. What are proteins ? Give an example.
16. What are fibrous proteins ? Give examples. AP Mar 20
17. What are globular proteins ? Give examples. AP Mar 20
18. Differentiate between Globular and Fibrous proteins. AP Mar 20
19. Name the vitamin responsible for the coagulation of blood. Mar 09
20. Why are vitamin A and vitamin C essential to us ? Give their important sources. Mar 09, 10
21. Write the biological functions of nucleic acids.

10. CHEMISTRY IN EVERY DAY LIFE

LONG ANSWER QUESTIONS (8 MARKS)

01. Write notes on the following. AP Mar 15
i) Artificial sweetening agents ii) Food preservatives

SHORT ANSWER QUESTIONS (4 MARKS)

02. What are analgesics ? How are they classified ? Give examples. AP Mar 15; TS Mar 18
03. Write notes on antiseptics and disinfectants. TS Mar 15

VERY SHORT ANSWER QUESTIONS (2 MARKS)

04. What are antacids ? Give example. Mar 14; TS Mar 20
05. What are antihistamines ? Give example. Mar 14
06. What are tranquilizers ? Give example. TS Mar 16
07. What are analgesics ? How are they classified ? TS Mar 18, AP Mar 19
08. What are antibiotics ? Give example. AP Mar 16, 18, TS 19
09. What are antiseptics? Give example. TS Mar 15; AP Mar 15, 19
10. What are disinfectants? Give example. TS Mar 15, 17; AP 17, 19
11. What are antifertility drugs. Give examples.
12. What are artificial sweetening agents ? Give example. AP Mar 15, 16, 20; TS Mar 15
13. What are food preservatives ? Give example. TS Mar 16, AP Mar 17
14. What is the difference between a soap and a synthetic detergent ? Mar 14; AP Mar 18

11. HALOALKANES AND HALOARNENCES

LONG ANSWER QUESTIONS (8 MARKS)

01. Explain the mechanism of nucleophilic bimolecular substitution (SN^2) reaction with one example. AP Mar 18, Sep 20, May 22; TS Mar 18, May 22
02. Explain the mechanism of nucleophilic unimolecular substitution (SN^1) reaction with one example.
03. Define the following:
i) Racemic mixture ii) Retention of configuration iii) Enantiomers AP Mar 16
04. Explain the Grignard reagent preparation and applications with suitable examples ?
AP Mar 15; TS Mar 19

05. Write the reactions showing the major and minor products when chlorobenzene is reacted with $CH_3C\ell$ and $CH_3COC\ell$ in presence of $A\ell C\ell_3$.

SHORT ANSWER QUESTIONS (4 MARKS)

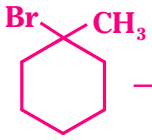
06. Give the IUPAC names of the following compounds.

i) $CH_3CH(C\ell)CH(I)CH_3$ ii) $C\ell CH_2CH = CHCH_2Br$

07. Write the structures of the following organic halides. **AP Mar 15**

i) p-bromochlorobenzene ii) 2-chloro-3-methylpentane iii) 1,4-Dibromobut-2-ene

08. Predict the alkenes that would be formed in the following reactions and identify the major alkane.

i) 

$\xrightarrow[EtOH]{NaOEt}$? ii) 2-chloro-2-methyl butane $\xrightarrow[EtOH]{NaOEt}$?

09. Write the mechanism of the following reaction.

n – Butylbromide + KCN $\xrightarrow{EtOH,H_2O}$ n – butylcyanide.

VERY SHORT ANSWER QUESTIONS (2 MARKS)

10. Write the structures of the following compounds.

i) 2-chloro-3-methylpentane ii) 1-bromo-4-sec-butyl-2-methylbenzene **AP Mar 15, TS May 16**

11. Which compound in each of the following pairs will react faster in SN^2 reaction with OH^- ?

i) CH_3Br (or) CH_3I ii) $(CH_3)_3CC\ell$ (or) $CH_3C\ell$ **Mar 14; AP Mar 19**

12. What are the ambident nucleophiles ? **TS Mar 17, 20, AP May 16, 22**

13. Treatment of alkylhalides with aq. KOH leads to the formation of alcohols, while in presence of alc. KOH what products are formed ?

14. What is the stereochemical result of SN^1 and SN^2 reactions ? **TS Mar 17**

15. What are enantiomers ? **Mar 14; TS Mar 19, 20**

16. What is Wurtz-Fittig reaction ? **AP Mar 15,17; ADD. VSAQ**

17. What is Wurtz reaction ? **AP Mar 20; ADD. VSAQ**

12. ORGANIC COMPOUNDS

12.1. Organic Compounds Containing C,H & O

LONG ANSWER QUESTIONS (8 MARKS)

01. With a suitable example write equations for the following. **TS & AP Mar 15, 16, 17, 18**

i) Kolbe's reaction ii) Reimer-Tiemann reaction iii) Williamsons ether synthesis

02. Write equations of the below given reactions: **AP Mar 19**

i) Alkylation of anisole ii) Friedel-Crafts acetylation of anisole

SHORT ANSWER QUESTIONS (4 MARKS)

03. Write structures of the compounds whose IUPAC names are as follows:

i) 2-Methyl butanol ii) 2,3-Diethylphenol

iii) 1-Ethoxypropane iv) Cyclohexylmethanol

04. Give the equations for the preparation of phenol from cumene. **TS Mar 17**
05. Write the mechanism of hydration of ethene to yield ethanol.
06. Illustrate hydroboration-oxidation reaction with a suitable example.
07. Explain the acidic nature of phenols and compare with that of alcohols. **AP Mar 17**
08. Write the products formed by the reduction and oxidation of phenol. **Mar 14**

VERY SHORT ANSWER QUESTIONS (2 MARKS)

09. Write the structures for the following compounds
    i) Ethoxyethane ii) Ethoxybutane iii) Phenoxyethane
10. Give the reagents used for the preparation of phenol from chlorobenzene.

12.2. Aldehydes, Ketones and Carboxylic Acids

LONG ANSWER QUESTIONS (8 MARKS)

01. Explain Aldol reaction. Give an example of the reaction.
02. Describe the following. **AP Mar 19**
    i) Cannizaro reaction **AP & TS May 22**
    ii) Cross aldol condensation **AP Sep 21**
    iii) Decarboxylation **AP Sep 21, TS May 22**

SHORT ANSWER QUESTIONS (4 MARKS)

03. What is Tollen's reagent ? Explain its reaction with aldehydes. **TS May 22**
04. Explain the role of electron withdrawing and electron releasing groups on the acidity of carboxylic acids.

VERY SHORT ANSWER QUESTIONS (2 MARKS)

05. Write the reaction showing α-halogenation of carboxylic acid and give its name. **AP & TS 18; TS May 22**
06. Write the mechanism of esterification. **TS Mar 15**
07. Compare the acidic strength of acetic acid, chloroacetic acid, benzoic acid and phenol.

13. ORGANIC COMPOUNDS CONTAINING NITROGEN

LONG ANSWER QUESTIONS (8 MARKS)

01. Write the mechanism of Hoffmann bromamide reaction.
02. Write the equation involved in the reaction of nitrous acid with ethylamine and aniline. **AP Mar 14**
03. Complete the following Conversions:
    Aniline to i) Fluorobenzene ii) Cyanobenzene iii) Benzene and iv) Phenol
04. Explain the following named reactions.
    i) Sandmeyer reaction ii) Gatterman reaction **AP Mar 15, 16**
05. Write the steps involved in the coupling of benzene diazonium chloride with aniline and phenol. **AP Mar 14, 15**

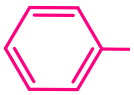
06. Complete the following Conversions

i) $CH_3NC + HgO \rightarrow ?$

ii) $? + 2H_2O \rightarrow CH_3NH_2 + HCOOH$

iii) $CH_3CN + C_2H_5MgBr \rightarrow ? \xrightarrow{H_3O^+} ?$

iv) $CH_3CH_2NH_2 + CHC\ell_3 + KOH \xrightarrow{heat} ?$

v)  $NH_2 + 3Br_2 \longrightarrow$

SHORT ANSWER QUESTIONS (4 MARKS)

07. How do you prepare the following ?

i) N, N Di methyl propanamine from ammonia ii) Propanamine from chloroethane

08.. Give one chemical test to distinguish between the following pairs of compounds.

i) Methyl amine and dimethyl amine ii) Aniline and N-methyl aniline

iii) Ethyl amine and aniline.

09. How do you carry out the following conversions ?

i) N-ethyl amine to N, N-di ethyl propanamine,

ii) Aniline to benzene sulphonamide

10. Write the reactions of (i) Delicalised aromatic and aliphatic primary amines with nitrous acid.

TS & AP Mar 18

11. Arrange the following in increasing order of their basic strength (aq).

i) $C_2H_5NH_2$, $C_6H_5NH_2$, NH_3, $C_6H_5CH_2NH_2$ and $(C_2H_5)_2NH$ TS Mar 15; INTEXT QUESTION

12. How do you prepare ethyl cyanide and ethyl isocyanide from a common alkylhalide ? Mar 14

VERY SHORT ANSWER QUESTIONS (2 MARKS)

13. Arrange the following bases in the decreasing order of pK_b values.

$C_6H_5NH_2$, $C_6H_5NHCH_3$, $C_6H_5NH_2$ and $(C_2H_5)NH$ TS Mar 15

14. Write equations for carbylamine reaction of any one aliphatic amine.

Mar 14; TS Mar 19; AP Sep 20

15. Give structures of A, B and C in the following reaction. TS Mar 17

16. Accomplish the following converstions:

i) Benzoic acid to benzamide, ii) Aniline to p-bromo aniline Mar 14; TS May 22

THE END