Council of Higher Secondary Education ,Odisha
Question Bank
Sub: Chemistry

Topic: Solutions (Unit- I)

One mark questions

1. What is the freezing point of water at 1 atm pressure in Kelvin scale?
2. Vapour pressure of a liquid _____ with rise of temperature.
3. Viscosity of a liquid _____ with rise of temperature.
4. Between water and ether _____ has higher vapour pressure.
5. Solubility of a saturated solution _____ with increase in temperature.
6. When 1gm equi. Of a solute dissolved in 1 lit. of solution. It is called _____.
7. What is the SI unit of viscosity?
8. What is the SI unit of surface tension?
9. When 1 gm mole of a solute dissolved in 1 lit. of solution. It is called _____.
10. Cleaning action of soap is due to
    (a) viscosity of water
    (b) surface tension of water
    (c) polarity of water
    (d) high boiling point of water
11. The unit of viscosity in CGS system
    (a) Dyne cm^{-1}
    (b) Dyne
    (c) Dyne $cm^{-2}sec^{-1}$
    (d) Dyne cm
12. The effect of pressure on solubility of gas is described by which law?
    (a) Boyle's law
    (b) Charle's law
    (c) Henry's law
    (d) Ostwald's dilution law
13. Mole fraction of solute × solute =

    (a) $\frac{No.\ of\ moles\ of\ solute}{No.\ of\ moles\ of\ solute + No.\ of\ moles\ of\ solvent}$

    (b) $\frac{No.\ of\ moles\ of\ solvent}{No.\ of\ moles\ of\ solute + No.\ of\ moles\ of\ solvent}$

    (c) $\frac{No.\ of\ moles\ of\ solute}{No.\ of\ moles\ of\ solute + No.\ of\ moles\ of\ solution}$

    (d) None of these

14. Parts per Million (ppm) =

(a) $\frac{Mass\ of\ solute}{Mass\ of\ solution} \times 10^6$

(b) $\frac{Mass\ of\ solute}{Mass\ of\ solution} \times 10^5$

(c) $\frac{Mass\ of\ solvent}{Mass\ of\ solution} \times 10^6$

(d) $\frac{Mass\ of\ solute}{Mass\ of\ solvent} \times 10^5$

15. Molality =

(a) $\frac{Moles\ of\ solute}{Mass\ of\ solvent\ in\ kg}$

(b) $\frac{Mass\ of\ solute}{Mass\ of\ solvent\ in\ kg}$

(c) $\frac{Mass\ of\ solvent}{Mass\ of\ solute\ in\ kg}$

(d) $\frac{Mass\ of\ solute}{Mass\ of\ solution}$

16. Ideal solutions obey which law?

(a) Henry's law
(b) Roult's law
(c) Boyle's law
(d) Charle's law

17. For an ideal solution $\Delta H_{mix} =$

(a) Zero
(b) One
(c) Two
(d) Not known

18. The properties of dilute solutions which depend on the number of solute particles are called _____.

19. Which of the following are colligative properties?

(i) Elevation in boiling point
(ii) Depression in freezing point
(iii) Viscosity

(a) (i) **(c) All of the above**
(b) Both (i) & (ii) **(d) Both (ii) & (iii)**

20. Vant-Hoff's factor =

(a) $\frac{observed\ value\ of\ colligative\ property}{calculated\ value\ of\ colligative\ property}$

(b) $\frac{calculated\ value\ of\ colligative\ property}{observed\ value\ of\ colligative\ property}$

(c) $\frac{No.\ of\ moles\ of\ solute}{No.\ of\ moles\ of\ solvent}$

(d) None of the above

21. The boiling point of water in a pressure cooker is
(a) Below 100^0C
(b) Above 100^0C
(c) 100^0C
(d) None of the above

ANSWERS

1. 273 K
2. Increases
3. Decreases
4. ether
5. Increases
6. Normality
7. Pascal × sec or Kg m^{-1} sec
8. Newton/mt
9. Molarity
10. (b)
11. (c)
12. (c)
13. (a)
14. (a)
15. (a)
16. (b)
17. (a)
18. colligative properties
19. (b)
20. (a)
21. (a)

2 Mark questions/ 3 Marks questions

1. What is a saturated solution? What is the effect of temperature on solubility of saturated solution?
2. Explain why NaCl is not soluble in CCl_4.
3. What is the effect of temperature and pressure on solubility?
4. Define Normality of a solution. Give the formula.

5. **If 20 gm of NaOH is dissolved in 500 mL of solution. What is the normality.**
6. **Define Molarity of a solution. Give the formula.**
7. **How many grams of Na_2CO_3 is required to make 500 mL of 0.01 M solution?**
8. **Define Molality of a solution. What is the effect of temperature on Molality?**
9. **Calculate the Mass to Mass percentage if 10 gm of solute in 50 gm of solution.**
10. **Calculate the Molality of 2.5 gm of ethanoic acid in 75 gm of benzene.**
11. **What is the Molality and Normality of 49 gm H_2SO_4 dissolved in 1 lit of solution.**
12. **What are the factors on which the solubility of a gas in liquid depends?**
13. **Define vapour pressure of a liquid. What is the SI unit?**
14. **Define boiling point of a liquid. Plot the variation of vapour pressure of liquid with temp. for water.**
15. **What are the characteristics of ideal solutions?**
16. **Define a non-ideal solution.**
17. **State and Explain Roult's Law.**
18. **Define colligative properties of a solution. Give examples.**
19. **What is elevation of boiling point (ΔT_b)? How to find out molecular mass of solute using ΔT_b ?**
20. **What is depression of freezing point? How to find out molecular mass of solute using ΔT_f ?**
21. **Define osmosis. How it differs from diffusion?**
22. **What do you mean by osmotic pressure? Define an Isotonic solution.**
23. **Derive Vant-Hoff's equation for dilute solution.**
24. **What is Vant-Hoff's factor? Discuss its applications.**
25. **A 5% solution of $CaCl_2$ at 0^0C developed an osmotic pressure of 15 atmosphere. Calculate the degree of dissociation.**

7 Mark questions

1. **Write notes on**
   (a) Viscosity (b) Osmosis
2. **Explain the effect on the boiling point and freezing point when non-volatile solute is dissolved in a solvent.**
3. **State Roult's law. Derive its mathematical expression for a solution of a non-volatile solute in a volatile solvent.**
4. **Discuss Minimum boiling azeotropes and maximum boiling azeotropes.**
5. **What is Abnormal Molecular Mass? Discuss its being in Molecular Association/Dissociation.**
6. **What is Vant-Hoff factor? How it helps in the determination of degree of dissociation.**
7. **(a) Define the terms osmosis and osmotic pressure.**
   (b) Calculate the boiling point of a solution prepared by adding 15 gm of NaCl to 250 gm of water. (K_b for H_2O = 0.512 Kg mol^{-1}, Molar mass of NaCl = 58.5 gm).
8. **(a) Why elevation in boiling point is a colligative property?**
   (b) Calculate the osmotic pressure in pascal exerted by a solution prepared by dissolving 1 gm of polymer of molar mass 1,85,000 in 450 mL of water at 37^0C.

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Unit – II

Electrochemistry

One Mark questions:

1. **Write down the unit of cell constant.**
2. **The quantity of charge required for the reduction of Al^{3+} to Al is _____.**
3. **The product of electrolysis at cathode using Ag electrode in an aq. solution of $AgNO_3$ is _____.**
4. **The SI unit of molar conductivity is _____.**
5. **Electrical conductance of metal _____ with increase in temperature.**
6. **A galvanic cell directly converts _____ energy to electrical energy.**
7. **What is standard electrode potential?**
8. **Protection of Fe by coating with Zn is called _____.**
9. **Write down the expression for conductivity (k).**
10. **How molar conductivity of a weak electrolyte varies with concentration.**
11. **Write down the relation between** ΔG & E_{cell}.
12. **Define a primary cell.**
13. **Which electrolyte is used in fuel cell?**
14. **Which one of the following is not a good conductor of electricity?**
    (a) CH_3COONa
    (b) C_2H_5OH
    (c) NaCl
    (d) KOH
15. **The number of e^- s required to balance the following equation** $NO_3^- + 4H^+ + e^- \rightarrow 2H_2O + NO$ **is**
    (a) 5
    (b) 4
    (c) 3
    (d) 2
16. **What amount of electric charge is required for the reduction of 1 mole of** $Cr_2O_7^{2-}$ **into Cr^{3+}**
    (a) 6 F
    (b) 3 F
    (c) 1 F
    (d) 4 F
17. **One Faraday of electricity is passed through a solution of $CuSO_4$. The mass of Cu deposited at cathode is _____ (At mass of Cu = 63.5 amu)**
    (a) 2 g

(b) 12.7 gm
(c) 63.5 gm
(d) 31.75 gm

18. An increase in equivalent conductance of a strong electrolyte with dilution is mainly due to
(a) Increase in number of ions
(b) Increase in ionic mobility of ions
(c) 100 % ionization of electrolyte at normal dilution
(d) Increase in both i.e. number of ions & ionic mobility of ions.

19. $\Lambda_m^0(NH_4OH)$ **is equal to**
(a) $\Lambda_m^0(NH_4OH) + \Lambda_m^0(NH_4Cl) - \Lambda_m^0(HCl)$
(b) $\Lambda_m^0(NH_4Cl) + \Lambda_m^0(NH_4OH) - \Lambda_m^0(NaCl)$
(c) $\Lambda_m^0(NH_4Cl) + \Lambda_m^0(NaCl) - \Lambda_m^0(NaOH)$
(d) none of these

20. In a galvanic cell, the salt bridge
(a) Participate chemically with cell reaction
(b) stops diffusion of ions from one e^- to another
(c) is not necessary for the occurrence of cell reaction
(d) increases the mixing of two electrolytic solutions

ANSWERS

1. cm^{-1}
2. 3×96500 **C**
3. **Ag**
4. Sm^2mol^{-1}
5. **Decreases**
6. **Chemical**
7. **potential at 298 K, 1 atm pressure and 1M solution**
8. **Galvanization**
9. $k = \frac{1}{R} \times cell\ const.$
10. **Increases with decreases in cm.**
11. $\Delta G = -nFE_{cell}$
12. **Redox reaction occurs only once**
13. **Concentrated aq. KOH**
14. **(b)**
15. **(c)**
16. **(b)**
17. **(d)**
18. **(b)**
19. **(b)**
20. **(b)**

2 Mark questions/ 3 Mark questions

1. **What is the use of salt bridge in galvanic cell?**
2. **What is the free energy change for (a) galvanic cell (b) electrolytic cell?**
3. **Can we store $ZnSO_4$ solution in a Cu container. Give reasons.**
4. **What is an electrochemical series? Write any two applications.**
5. **Give the relationship between equivalent conductance and molar conductance of a given solution.**
6. **Write down the expression for degree of dissociation (α) relating to molar conductivity.**
7. **Define electrode potential.**
8. **Why does Zn react with dil. H_2SO_4 but Cu does not?**
9. **Write Nernst equation to calculate the cell potential of** $Mg(s)\left|Mg^{2+}(aq)\right\|Ag^{+}(aq)\left|Ag(s)\right.$.
10. **State and explain Kohlrausch's law.**
11. $2AgCl(s)+H_2(g)(1atm)\rightarrow 2Ag(s)+2H^{+}(0.1M)+2Cl^{-}(0.1M)$ **for the above reaction** ΔG^0 **= - 43600J at 25⁰C find out** ΔG^0.
12. **Calculate the emf of the cell in which the following reaction takes place.** $Ni(s)+2Ag^{+}(0.002M)\rightarrow Ni^{2+}(0.16M)+2Ag(s)$ **Given that** $E^0_{cell}=1.05V.$
13. **If a current of 0.5 amp flows through a metallic wire for 2 hours, then how many** $e^{-}s$ **flow through the wire.**
14. **At 25⁰C the standard EMF of the cell** $Zn(s)\left|Zn^{2+}(1M)\right\|Cu^{2+}(0.1M)+Cu(s)$ **is 1.3 volt. Calculate the emf of the cell.**
15. **Conductivity of 0.00214 M acetic acid is 7.8×10^{-5} S cm^{-1}.**
    (i) Calculate its molar conductivity. Given that Λ^0 **= 390.5 S cm^2 mol^{-1}.**
    (ii) Calculate degree of dissociation.
16. **Predict the feasibility of the reaction.**
    (i) Ag^{+}(aq) with Cu (s) $E^0_{Ag^{+},Ag}=0.8V,\ E^0_{Cu^{2+},Cu}=0.34V.$
    (ii) Fe^{3+}(aq) with Ag (s) $E^0_{Fe^{3+},Fe^{2+}}=0.77V.$
17. **State and explain Faraday's laws of electrolysis.**
18. **Differentiate between fuel cell and batteries.**
19. **What are the different types of fuel cells.**
20. **What is corrosion? Explain the different types of it.**

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Unit – III

Chemical Kinetics

Group - A

MCQ:

1. **What is the unit of zero order reaction?**
   (a) moles/lit^{-1}/sec^{-1}
   (b) sec^{-1}
   (c) mole^{-1}.lit.sec^{-1}
   (d) mole^{-2}.lit^{2} .sec
2. **Unit of first order rate constant is:**
   (a) sec^{-1}
   (b) moles. lit^{-2}.sec^{-2}
   (c) mole^{-1}.lit.sec^{-1}
   (d) mole^{-2}.lit^{2} .sec^{-1}
3. **Which of the following is the unit of second order rate constant?**
   (a) sec^{-1}
   (b) moles. lit^{-2}.sec^{-2}
   (c) mole^{-1}.lit.sec^{-1}
   (d) mole^{-2}.lit^{2} .sec^{-1}
4. **Which of these is the relation between half-life and rate constant for first order reaction?**
   (a) $\frac{0.693}{K}$
   (b) $\frac{2.303}{K}$
   (c) 0.693 K
   (d) $\frac{a}{2K}$
5. **The specific rate constant of a first order reaction depends on the**
   (a) concentration of the reactant
   (b) concentration of the product
   (c) time
   (d) temperature
6. **What will be a constant of** $^{53}1^{128}$ **left after 50 minutes ($t_{1/2}$ == 25 minutes)**
   (a) ½
   (b) ¼
   (c) 1/3
   (d) 1/8

7. 75 % reaction is completed 3n 32 minutes. 50 % of the reaction will be completed is
(a) 24 minutes
(b) 16 minutes
(c) 8 minutes
(d) 32 minutes

8. The hydrolysis ethyl acetate in acid medium is a reaction of the:
(a) Zero order
(b) First order
(c) Second order
(d) Third order

9. The hydrolysis of ester in acidic medium is:
(a) Third order reaction
(b) Zero order reaction
(c) First order reaction
(d) Second order reaction

10. The rate expression of a chemical change is $\frac{dx}{dt} = K[A]^2[B][C]^0$ **. The order of the reaction is:**
(a) 2
(b) 3
(c) 1
(d) 0

11. The half-life period if a reaction is 100 seconds in 400 seconds the initial concentration of 2.0 g will be come:
(a) 0.25 g
(b) 0.35 g
(c) 0.125 g
(d) 30.3 g

12. When a graph is plotted between is K cased $\frac{b}{T}$ **for a first order reaction. We get a straight line. The slope of the these is equal to:**

(a) $-\frac{E_a}{2.303}$

(b) $-\frac{2.303}{E_a.K}$

(c) $\frac{E_a}{2.303K}$

(d) $-\frac{E_a}{K}$

13. Which one of the following did not influence is the rate of reaction:
(a) Nature of reactant
(b)Temperature
(c) Molecularity

(d) Concentration of the reactant.

14. In which of the following cases does the reaction go through to completion:
    (a) $K = 10^2$
    (b) $K = 10^{-2}$
    (c) $K = 10$
    (d) $K = 1$
15. For an endothermic reaction where ΔH is the enthalpy of reaction in kg/mole. The minimum value of activated energy will be:
    (a) Less than ΔH
    (b) Zero
    (c) Equal to ΔH
    (d) More than ΔH
16. What is the unit of second order rate constant?
17. Name any two factors that influence rate of reaction.
18. Give one example of zero order reaction.
19. Calculate the order of the reaction having rad expression. Rate = $K[B]^{1/2}\ [B]^{3/2}$
20. Write the expression for Arrhenius equation for reaction rate.
21. The rate constant of a first order reaction is 8.93×10^{-4} sec^{-1}. The Half-life period is _____.
22. The hydrolysis ester in acid medium is _____ order reaction.
23. Saponification ester is a _____ order reaction.
24. The rate of the reaction having unit of rate constant $mol^{-1}.lit.sec^{-1}$ is _____.
25. The Threshold energy (E_{th}) and Activation energy λE_0 are related as _____.

ANSWERS

1. (a)
2. (a)
3. (c)
4. (a)
5. (d)
6. (b)
7. (b)
8. (b)
9. (d)
10. (b)
11. (c)
12. (c)
13. (c)
14. (a)
15. (c)
16. $Lmol^{-1}s^{-1}$
17. Temperature, Concentration of reactant
18. $H_{2(g)} + Cl_{2(g)} \rightarrow 2HCl_{(g)}$
19. Second order
20. $K = A.\ E^{-Ea/RT}$
21. 10^3 sec

22. **First order**
23. **Second order**
24. **Second order**
25. **$E_a = E_{ts} - E_r$**

2/3 Marks

Group – B

1. **Define rate of reaction write its unit.**
2. **Define order and molecularity with examples.**
3. **Define activation energy. Explain with diagram.**
4. **What are the factors that influence rate of reaction?**
5. **Derive the relation between rate constant and half-life of a first order reaction.**
6. **The half-life period of a first order reaction is 100 sec. What is the rate constant?**
7. **A first order is completed 50% in 30 minutes. How much time it will take to complete 75% of the reaction?**
8. **Write notes in half-life period.**
9. **A reaction is completed 20% in 20 minutes. How much time it will take to complete 80% of the reaction?**
10. **Calculate the rate constant of first order reaction. Which is 90% complete in 10 minutes?**
11. **The rate of chemical reaction doubles for an increase of 10 K in absolute temperature from 298K. Calculate E_a.**
12. **What are the differences between order and molecularity with example?**
13. **Define effective collision.**
14. **What is zero order reaction give one example?**
15. **Derive an expression for the half-life period of a zero-order reaction.**
16. **What is Threshold and Activation energy? Explain with examples.**
17. **What is the effect of temperature on rate of reaction?**
18. **The decomposition of Hydrocarbon follows the equation. $K = (4.5 \times 10^{11} s^{-1}) e^{-28000K/T}$. What is the value of E_a?**
19. **According to collision theory. What is the expression for rate of reaction?**
20. **What is the effect of catalyst on rate of reaction explain with diagram?**

Long Questions

1. **Derive an expression for the rate constant of a first order reaction. What is the relation between half-life and rate constant?**
2. **Derive an expression for zero order rates constant. Derive an expression for half-life of a zero-order reaction.**
3. **(a) Difference between order and molecularity with example.**
   (b) Derive Arrhenius equation of reaction rate.

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Unit – IV

d and f – block elements

Group – A

Short Question (1 Mark):

1. **Which one of the following is a Transition element?**
   (a) Ca
   (b) Al
   (c) Co
   (d) Na
2. **Which one of the following is a d-block element?**
   (a) Ca
   (b) U
   (c) Mn
   (d) Al
3. **Which of the following statements about transmission element is wrong?**
   (a) They form colored compounds
   (b) All their compounds are diamagnetic
   (c) They exhibit variable valency
   (d) They contain partially filled d-orbital.
4. **LunarCaustic is**
   (a) $AgNO_3$
   (b) $MgNO_3$
   (c) $(CH_3COO)_2Pb$
   (d) $CuSO_4$
5. **The Matte obtained in the extraction of copper contains:**
   (a) $FeSiO_3$
   (b) $FeS + SiO_2$
   (c) $FeS + Cu_2S$
   (d) $CuS + SiO_2 + FeO$
6. **Purest form of Iron is:**
   (a) Cast Iron
   (b) Pig Iron
   (c) Wrought Iron
   (d) Steel
7. **Mohr's salt is a**
   (a) Normal Salt
   (b) Acid Salt
   (c) Basic Salt
   (d) Double Salt
8. **Rust is:**
   (a) $Fe_2O_3 . 2H_2O$
   (b) $FeO .2H_2O$

(c) $Fe_3O_4.H_2O$
(d) Fe_2O_3

9. **Copper is extracted from Sulphide ore using the method:**
   (a) Carbon reduction
   (b) Base reduction
   (c) Carbon monoxide reduction
   (d) none of the above
10. **Which is used for stopping bleeding?**
   (a) $FeCl_3$
   (b) Mohr's Salt
   (c) Green vitriol
   (d) Sodium Nitro-pruside
11. **ZnO is:**
   (a) Acidic
   (b) Basic
   (c) Amphoteric
   (d) None
12. **Which one of the following is a f-block element?**
   (a) Cu
   (b) U
   (c) Fe
   (d) Al
13. **What is the Oxidation number of Mn in $KMnO_4$?**
   (a) +6
   (b) +7
   (c) +3
   (d) +1
14. **Name the member of Lanthanoidseries which is will know to exhibit +4 oxidation state:**
   (a) Ce
   (b) La
   (c) Eu
   (d) Lu
15. **The most common oxidation state in Lanthanoid:**
   (a) +3
   (b) +2
   (c) +4
   (d) +1
16. **Which one of the following is colored?**
   (a) Zn^{2+}
   (b) Hg^{2+}
   (c) Sc^{3+}
   (d) Fe^{2+}
17. **Which one of the following is diamagnetic?**
   (a) Zn^{2+}
   (b) Sc^{2+}
   (c) Fe^{2+}
   (d) Mn^{2+}
18. **What is the general electronic configuration of transition elements?**
19. **Between Fe^{2+} and Fe^{3+} in paramagnetic.**
20. **Name one ore of Iron.**

21. **Give electronic configuration of Cu.**
22. **Give the formula of amine complex of copper.**
23. **What is the formula its copper pyrite?**
24. **Define Transition element.**
25. **What is the oxidation number of Mn in MnO_4?**
26. **What are refers present in will metal?**
27. **Why $FeCl_3$ is a Lewis acid?**
28. **Why Transition metals are paramagnetic?**
29. **Why transition elements are used as catalyst?**
30. **What is percentage of carbon in steel?**

ANSWERS

1. **(c)**
2. **(c)**
3. **(b)**
4. **(b)**
5. **(c)**
6. **(c)**
7. **(d)**
8. **(a)**
9. **(d)**
10. **(a)**
11. **(c)**
12. **(b)**
13. **(b)**
14. **(a)**
15. **(a)**
16. **(d)**
17. **(a)**
18. **$(n-1)d^{1-10}nS^{1-2}$**
19. **Fe^{3+}**
20. **Hematite**
21. **$[Ar]_{18}3d^{10}4s^1$**
22. **$\{(Cu/NH_3)_4\}SO_4$**
23. **$CuFeS_2$**
25. **+7**
26. **Cu and Sn**
30. **2%**

Two/Three marks:

1. **Mention any two characterization of Transition element.**
2. **How do your account for the variable oxide on state of transition elements?**
3. **What happens when KI solution is added to $CuSO_4$ solution?**
4. **Why Iron become passive with conc. HNO_3 acid solution?**
5. **Why chromium has higher boiling point then zinc?**
6. **Why transition metal compounds are colored?**

7. **Silver atom has completely filled outermost orbit in its ground state. Why it is a transition element?**
8. **How would you account for the increasing oxidizing power in the series?**
   $$VO_2^+ < Cr_2O_7^{2-} < MnO_4^-$$
9. **How would you account for the irregular variation of ionization enthalpy is in the first-row transition series?**
10. **Which is a stronger reducing agent Cr^{2+} or Fe^{1+}.**
11. **Why is the highest oxidation state of a metal exhibited in its Oxides or Fluorides? Why?**
12. **Calculate the magnetic moment of Mn^{2+}.**
13. **Between Fe^{2+} and Fe^{3+}. Which is more magnetic and why?**
14. **What is meant by disproportionation of an oxidation state? Give an example.**
15. **Lanthanides have variable oxidation state. Why?**
16. **What is Lanthanide contraction?**
17. **What are the Oxidation states exhibited by Lanthanoids?**
18. **The enthalpies of atomization of the transition metals are high.**
19. **Transition metal their compossible are very good catalyst. Why?**
20. **The 'd' configuration in very unstable. Explain.**

Long Questions

1. **Define Transition element. Discuss three Characteristics of transition element.**
2. **What is Lanthanoid contraction? Write down the consequence of Lanthanide contraction.**
3. **Write the electronic configuration of Lanthanoids. Why the Lanthanoids has might stable oxidation +3?**
4. **Give reasons of the following:**
   (i) The lowest oxide of transition metal is basic whereas the highest oxide is. amphoteric or acidic.
   (ii) The highest oxidation is exhibited in oxo-anions of a metal.
   (iii) The generally the transition metal compound are colored.
5. **(a) Why the transition metal form compose compound?**
   (b) What is Effective atomic number rule?
   (c) What are interstitial compounds?

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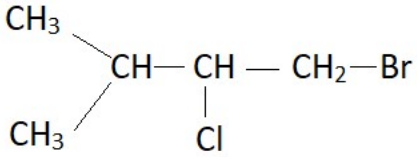
Unit – VI

Haloalkanes and Haloarenes
Group - A

Multiple Choice questions (1 Mark Each)

1. Write the IUPAC Name of the following compound



(a) 4 – Bromo – 3 – chloro – 2 – methylbutane
(b) 1 – Bromo – 2 – chloro – 3 – methylbutane
(c) 1 – Bromo – 2 – chloro – 2,2 – dimethylpropane
(d) 2 – methyl – 2 – chloro – 3 – bromopropane

2. Which one is optically active compound?
(a) $CH_3 – CH(Cl)C_2H_5$
(b) $CH_3 – CH(Br) – CH_3$
(c) $C_2H_5 - C(Cl) - CH_2 - Cl$
(d) $CH_3 – CH_2 – CH_2 – Br$

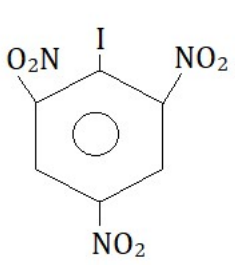
3. Which of the following will not give iodoform reaction?
(a) Propanone
(b) Acetaldehyde
(c) Ethyl alcohol
(d) Methanol

4. When Propyl alcohol reacts with phosphorous tri-halide the product obtain is:
(a) Isopropyl halide
(b) 1 – halo propane
(c) 3 – halopropane
(d) Propanal

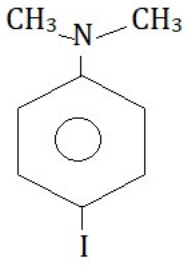
5. Alkyl halide reacts with alcoholic KOH to give
(a) Alcohol
(b) Alkyne
(c) Alkane
(d) Alkene

6. What is the correct of reactivity of halogen acid towards alcohol?
(a) HI > HBr > HCl
(b) HCl > HBr > HI
(c) HCl > HI > HBr
(d) HI > HCl > HBr

7. Correct order of reactivity towards nucleophilic substitution reaction of the compounds



(i)



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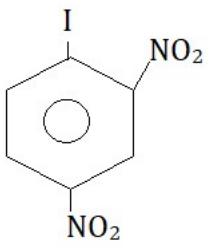

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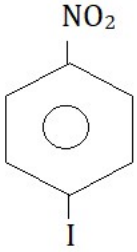


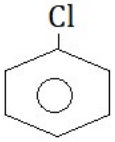
(iv)

(a) (i)(ii)(iii)(iv)
(b) (ii)(iii)(i)(iv)
(c) (i)(iii)(iv)(ii)
(d) (ii)(iii)(iv)(i)

8. Which compound has highest melting point?
   (a) P – Dibromobenzene
   (b) M – Dibromobenzene
   (c) O – Dibromobrnzene
   (d) Bromobenzene

9. Sulphonalin of Chlorobenzene produces major product:
   (a) 2 – Chlorobenzene sulphonic acid
   (b) 4 – Chlorobenzene sulphonic acid
   (c) 2,4 – Chlorobenzene disulphonic acid
   (d) 3 – Chlorobenzene sulphonic acid

10. Which statement is incorrect for the following assumption between chlorobenzene and methyl chloride regarding bond length between "C – Cl":



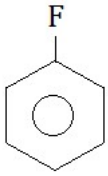
CH_3 - Cl

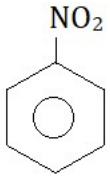
(a) sp^2 hybridised 'C' atom	sp^3 hybridised 'C' atom
(b) resonance in a bone structure	Inductive effect
(c) % of 'S' character	% of 'S' – character
(d) + I effect	- I effect

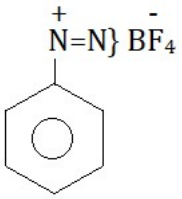
11. $C_2H_5 - Br + C_2H_5\overset{\ominus}{O}K^+ \rightarrow C_2H_5 - O - C_2H_5 + KBr$. The name of the above reaction is:
   (a) Relmer Tiemann reaction
   (b) Aldol condensation
   (c) Williamson synthesis
   (d) Kolbe's reaction

12. Aniline when treated with $NaNO_2$(HBr) at 273 K will produce:

(a)

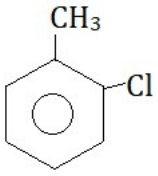


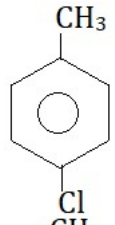
(b) 

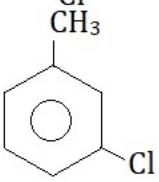
(c) 

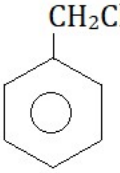
(d) None of these

13. Toluene when treated with chlorine gas in presence of sunlight will give:

(a) 

(b) 

(c) 

(d) 

14. Ethyl iodine reacts with sodiumpropoxide will generally yield
    (a) Ethylpropyl ether
    (b) Diethyl ether
    (c) Pentane
    (d) Propoxy ethane
15. DDT is used for
    (a) powerful insecticide
    (b) powerful fungicide
    (c) preparation of detergent
    (d) none of these
16. What happens when 2 – propanal is treated with thionylchloride? Give equation:
17. Complete the reaction $R-CN \xrightarrow{Na/C_2H_5OH} R-CH_2-NH_2 \xrightarrow[\Delta]{NaNO_2/HCl} ?$
18. Why boiling point of alkyl halide is higher than the corresponding hydrocarbon?
19. Write the name of the monomer of Teflon.

20. How many δ and π – bonds are present in Isopropyl chloride?
21. What is Wurtz –Fittig reaction?
22. Complete the reaction $CH_3 – CH_2 – I + AgCN \rightarrow$
23. Chlorobenzene is less reactive towards nucleophilic substitution reaction, why?
24. What is freons?
25. What happen when bromobenzene reacts with nitric acid in the presence of sulphuric acid.
26. Write the use of trichloromethane.
27. What is Sandmeyer reactions?
28. $CH_3 - CH_2 - Cl \xrightarrow[\text{Ether}]{CH_3 - CH_2 - COOAg} ?$ Complete the reactions.
29. $CH_3 - CH_2 - Cl \xrightarrow[\text{alcohol}]{KCN} A \xrightarrow{H_3O^+} B$ Complete the reaction.
30. Write the product. $R - NC \xrightarrow[\triangle OH]{\text{Reduction}}$
31. In Williamson's reaction, an alkyl halide is treated with which reagent. Give equation for this.
32. Complete the reaction

$$CH_3 - CH = CH_2 + HBr \xrightarrow{\text{Peroxide}} \text{'B'}$$

$$\downarrow \text{ No peroxide}$$

'A'

33. Complete the reaction

(a) $CH_3CH_2OH + PCl_5 \rightarrow$_____ + _____+ HCl

(b) $CH_3CH_2Br + KOH$ (alc) →_____ + _____ + _____

(c) $CH_3CH_2 – COOAg + Br_2 \rightarrow$ _____ + _____ + _____

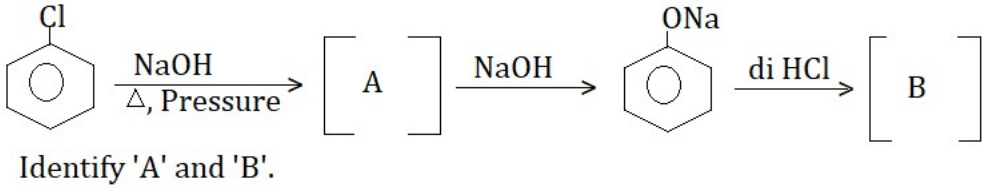
34. Which one has higher boiling point and why? $C_2H_5 – Cl$, $C_2H_5 – Br$, $C_2H_5 – I$
35. In the pair $(CH_3)_3C – Cl$ and CH_3Cl, which one undergo SN^2reaction and why?
36. Explain SN^1 mechanism in tert.Butylbromide with aq. KOH solution.

ANSWERS

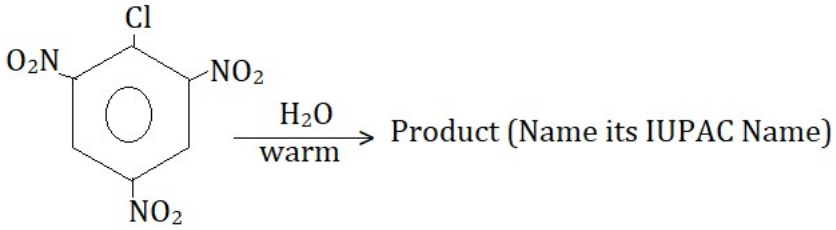
1. (b)
2. (a)
3. (d)
4. (b)
5. (d)
6. (a)
7. (c)
8. (a)
9. (b)
10. (d)
11. (c)
12. (a)
13. (d)

14. (a)
15. (a)

Two/ Three- Mark Questions:

1. Write a note on D.D.T.
2. How can you prepare diethyl ether from ethyl chloride? Give equation.
3. What happens when silver acetate is treated with bromine? Give equation.
4. Identify A, B and C in the following reaction $C_2H_5OH \xrightarrow{conc.H_2SO_4} A \xrightarrow{Br_2} B \xrightarrow{alc\ KOH} C$
5. Explain, why alkyl halide of lower alkane when treated with metallic sodium give higher alkanes?
6. Explain, why for a given alkyl group, the order of reactivity is RI > RBr > RCl > I?
7. Convert Toluene to benzyl alcohol.
8. How can you convert aniline to chlorobenzene?
9. How will you distinguish between benzyl bromide and p-bromotoluene?
10. Explain, chlorine present in chlorobenzene is ortho and para –directing.
11. How can you convert Benzene to 4 – Bromonitrobenzene?
12. Aryl halides are extremely less reaction towards nucleophilic substitution reaction why?
13. 

Identify 'A' and 'B'.
14. How Benzene Hexachloride is prepared from Benzene? Give equation. Write one important use of BHC.
15. Complete the reaction:



16. If Cl_2 gas is passed for a larger time through toluene, then what product is obtained at the last?
17. What is diazotization reaction? Explain with example.

Long Questions

1. How can you prepare chlorobenzene from
   (a) benzene diazonium chloride
   (b) benzene
   What happens when chlorobenzene reacts with
   (a) aq. NaOH at 300^0C under pressure
   (b) Cl_2 in presence of Anhydrous $FeCl_3$
2. Describe the general method of preparation of an alkyl halide. How does it react with?
   (a) NH_3
   (b) Metallic sodium
   (c) dilute caustic potash

3. Write notes on
   (a) Iodoform reaction
   (b) Williamson synthesis
4. Write state notes on
   (a) Wurtz – Filtig reaction
   (b) Ullaman reaction
5. Write notes on
   (a) Freons
   (b) Chloroform
   (c) DDT
6. What are the various methods of preparing ethyl iodide? How does it react with?
   (i) Aqueous KOH
   (ii) Sodium ethoxide
   (iii) Ammonia
   (iv) Alcoholic KOH solution
7. Bring about the following conversion.
   (i) Methane to Methyl cyanide
   (ii) Ethane to Ethyl alcohol
   (iii) Methyl alcohol to Acetic acid
8. Give two examples for the electrophilic substitution in chlorobenzene. Also write the mechanism of reaction.
9. Write the preparation and uses of the following:
   (i) DDT
   (ii) $CHCl_3$
   (iii) BHC

****

Unit – VII
Alcohols, Phenols & Ethers
Group - A

MCQ:

1. How many alcohols can be possible with molecular formula $C_4H_{10}O$? Which are chiral in nature?
   (a) 1
   (b) 2
   (c) 3
   (d) 4
2. Which of the following is most acidic compound?
   (a) Benzyl alcohol
   (b) Cyclohexanol
   (c) Phenol
   (d) M-chlorophenol
3. What is the correct order of reactivity of alcohols in the following reaction?
   $C_2H_5OH + HCl \xrightarrow{ZnCl_2} C_2H_5 - Cl + H_2O$
   (a) $3^0 > 1^0 > 2^0$
   (b) $1^0 < 2^0 < 3^0$
   (c) $3^0 > 2^0 > 1^0$
   (d) $1^0 < 3^0 < 2^0$
4. $CH_3 - CH_2 - Cl_2 - OH$ can be converted to $CH_3 - CH_2 - Cl$ by using
   (a) $LiAlH_4$
   (b) $KMnO_4$
   (c) PCC
   (d) H_2/Ni
5. Order of reactivity of alcohols towards sodium metal is
   (a) Primary > Secondary > Tertiary
   (b) Primary > Tertiary > Secondary
   (c) Primary < Secondary > Tertiary
   (d) Primary < Secondary < Tertiary
6. In the following sequence of reactions
   $CH_3 - CH_2 - OH \xrightarrow[\Delta]{P/I_2} A \xrightarrow{Mg} B \xrightarrow{HCHO} C \xrightarrow{H_2O} D$. The compound D is
   (a) n-Propyl alcohol
   (b) Propanol
   (c) Butanal
   (d) n-Butyl alcohol
7. In the following reaction, identify 'X'
   $$\text{Formal dehyde + Methyl Magnesium halide} \xrightarrow[\text{ether}]{\text{dry}} \text{Intermediate} \xrightarrow[H_3O]{HCl} \text{'X'}$$
   (a) CH_3COCH_3
   (b) $CH_3 - O - CH_3$
   (c) $CH_3 - CH_2 - OH$
   (d) HCHO
8. Oxidation of Phenol with CrO_3 gives
   (a) Cyclohexane
   (b) P – Benzoquinone

(c) Benzoic acid
(d) none

9. Hydroboration – Oxidation reaction in propane will yield
(a) n – propyl alcohol
(b) Isopropyl alcohol
(c) Propanal
(d) Propanone

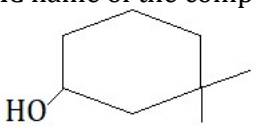
10. Which alcohol gives positive iodoform test?
(a) Ethyl alcohol
(b) tert. Butyl alcohol
(c) Phenol
(d) Propanol – 1

11. Lucas' reagent is
(a) Conc. HCl
(b) $SOCl_2$
(c) Conc. HCl + Zn Cl_2
(d) Conc. HCl + anhy. $MgCl_2$

12. Order of acidity of following compounds is:
(i) Phenol
(ii) O-nitrophenol
(iii) M-nitrophenol
(iv) P-nitrophenol
(a) (iv) > (i) > (ii) > (iii)
(b) (iv) > (iii) > (i) > (ii)
(c) (iv) > (iii) > (ii) > (i)
(d) (iii) > (i) > (ii) > (iv)

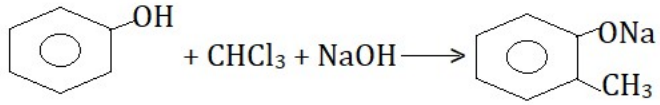
13. Which compound has highest boiling point?
(a) Ethanol
(b) Butan – 2 – ol
(c) Propan – 1 – ol
(d) Butan – 1 – ol

14. The IUPAC name of the compound



(a) 3, 3 – Dimethyl – 1 – hydroxyl – cyclohexane
(b) 1, 1 – Dimethyl – 3 –cyclohexanol
(c) 3, 3 – Dimethyl – cyclohexanol
(d) 1, 1 – Dimethyl – 3 – hydroxy cyclohexane

15. The electrophile involved in this reaction is



(a) $\oplus CHCl_3$

(b) $\overset{\oplus}{:}CCl_2$

(c) $:\overset{\ominus}{C}Cl_3$

(d) $:\overset{\ominus}{C}Cl_2$

16. In the following sequence of reaction, the compound 'B' is:

$$CH_3 - CH_2 - OH \xrightarrow{P + I_2} A \xrightarrow[ether]{Mg} B$$

(a) Ethyl Iodide
(b) Ethyl Magnesium iodide
(c) Ethanal
(d) none

17. o – Nitrophenol is less soluble in water than p – and m – nitrophenol because
(a) o – Nitrophenol shown intramolecular H – bonding
(b) o – Nitrophenol shown intermolecular H – bonding
(c) Melting point of o – Nitrophenol is lower than those of m- and p – isomer
(d) O – Nitrophenol is more volatile in steam than m- and p – isomer

18. $C_6H_5 – O – CH_3$, when treated with HI at 373K, the following are the products
(a) $CH_3 – OH$ and C_6H_5I
(b) C_6H_5I and CH_3I
(c) CH_3I and C_6H_5OH
(d) C_6H_5OH and $CH_3 – OH$

19. Ether reacts with conc. H_2SO_4 to form
(a) Alkyl free radicals
(b) Oxyanion
(c) Zwitter ion
(d) Oxonium ion

20. Formation of starch solution to ethyl alcohol does not require
(a) Diastage
(b) Invertage
(c) Maltage
(d) Zymase

ANSWERS

1. (a)
2. (d)
3. (c)
4. (c)
5. (a)
6. (a)
7. (c)
8. (b)
9. (a)
10. (a)
11. (c)
12. (b)
13. (d)
14. (c)
15. (b)

16. (b)
17. (a)
18. (b)
19. (d)
20. (b)

Two- or Three-Mark Questions:

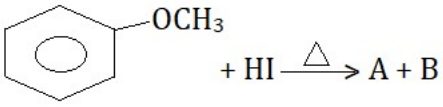
1. Write the equations, what happens when ethyl alcohol vapour is passed over reduced copper at 300^0C.
2. Complete the reaction: $R-CH_2-OH \xrightarrow{PI_3} A \xrightarrow{ASNO_2} (B)$
3. Complete the reaction:

$$CH_3CH_2\text{-}OH \xrightarrow{PCl_5} A \xrightarrow{KCN} B \xrightarrow[H_2O]{H^+} C$$

4. How will you convert methanol to ethanol and vice versa?
5. Explain, why ethanol is less acidic than phenol?
6. How will you convert ethanol to 2 – hydroxylbut-3-enoic acid?
7. Identify A, B, C, D in the following sequence of reaction.

$$C_2H_5OH \xrightarrow[H_2SO_4]{K_2Cr_2O_7} A \xrightarrow{(O)} (B) \xrightarrow{NH_3} (C)$$

8. How can you carry nitration in phenol? Give equation.
9. What is Reimer –Tiemann Reaction?
10. How can you prepare aspirin from salicylic acid? Give equation.
11. Explain acidity of Phenol. How substituents affect acidity of phenol.
12. Complete the reactions: $C_6H_5OH + CHCl_3 + KOH \rightarrow$
13. Convert phenol to picric acid.
14. Write the mechanism of the reaction of HI with methoxymethane.
15. Predict the product A and B:



16. Give an example for the synthesis of unsymmetrical ether by Williamson synthesis.

Long Questions:

1. Discuss the electrophilic substitution reaction like halogenations, nitration and Friedel Craft reaction of Aryl Alkyl Ether.
2. Describe general method of preparation of alcohols (any two). How does it react with?
   (a)Na
   (b) PCl_5
   (c) CH_3COOH
3. How can you distinguish between 1^0, 2^0 and 3^0 alcohol by oxidation method?
4. (a) How ethanol is manufactured from starch?
   (b) What happens when conc. H_2SO_4 reacts with excess of ethanol?
5. Describe the preparation of phenol from benzene sulphonic acid. How phenol reacts with?
   (a) Sulphuric acid (conc.)
   (b) dil. HNO_3
   (c) CH_3Cl in presence of anhy. $AlCl_3$
6. (a) Write down the preparation of ethyl alcohol from ethylene.
   (b) What happens when ethyl alcohol is heated with (i) iodine/NaOH (ii) PCl_5 (iii) CH_3COOH.

Unit – VIII

Aldehyde, Ketones & Carboxylic acid
Group - A

MCQ:

1. The compound that reduces Tollen's reagent is _____
   (a) CH_3COCH_3
   (b) CH_3CHO
   (c) CH_3COOH
   (d) CH_3CH_2OH

2. 40% aqueous solution of formaldehyde is called
   (a) Formation
   (b) Urotropine
   (c) Bake lite
   (d) None of these

3. _____ respond Cannizzaro reaction.
   (a) HCHO
   (b) C_6H_5CHO
   (c) CC_3CHO
   (d) all of these

4. _____ respond Aldol condensation.
   (a) CH_3CHO
   (b) C_6H_5CHO
   (c) HCHO
   (d) None of these

5. _____ do not respond iodoform reaction.
   (a) HCHO
   (b) CH_3CHO
   (c) CH_3COCH_3
   (d) CH_3CH_2OH

6. The reagent with which both acetal dehyde and acetone react easily is _____.
   (a) Tollen's reacgent
   (b) Schiff's reagent
   (c) Fehling reagent
   (d) Grignard reagent

7. When acetal dehyde react with Fehling solution. It gives a precipitate of _____.
   (a) Cu
   (b) CuO
   (c) Cu_2O
   (d) None of these

8. Aldehyde can be distinguished from ketone by using _____.
(a) Schiff's Reagent
(b) Conc. H_2SO_4
(c) anhydrous Zn
(d) resorcinol

9. Formaldehyde react with Ammonia to give _____.
(a) Urotropine
(b) Formalin
(c) Bakelite
(d) None of these

10. Which reduce Tollen's reagent?
(a) CH_3COOH
(b) $C_6H_5COCH_3$
(c) HCHO
(d) None of these

11. $CH_2 = CH_2 \xrightarrow{HBr} X \xrightarrow{Hydrolysis} Y \xrightarrow[I_2]{NaOH} Z$
(a) C_2H_5I
(b) CHI_3
(c) C_2H_5OH
(d) CH_3CHO

12. Cannizzaro's reaction is an example of _____.
(a) Oxidation
(b) Reduction only
(c) Disproportional
(d) None of these

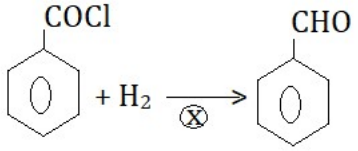
13. Formation of Cyanohydrin from a ketone an example of _____.
(a) Electrophilic addition
(b) Nucleophilic addition
(c) Nucleophilic substitution
(d) Electrophilic substitution

14. Phenol-formaldehyde resin is called _____.
(a) Nylon
(b) Bake lite
(c) Iodoform
(d) None of these

15. Calcium formate heated to give _____.
(a) HCHO
(b) CH_3CHO
(c) CH_3COCH_3
(d) CH_3CH_2OH

16. Acid chloride can be reduced to Aldehyde with H_2 in boiling xylene using Pd as catalyst supported by $BaSO_4$ is called _____
(a) Stephen's reduction
(b) Rosenmond reduction
(c) Aldol condensation
(d) Clemmenson's reduction

17. The catalyst X is _____.



(a) Pd + $BaSO_4$
(b)CrO_2Cl_2 + CCl_4
(c)$SnCl_2$ + HCl
(d) CrO_3

18. The conversion of toluene to benzaldehyde in presence of CrO_2Cl_2 and CCl_4 is called _____.
(a) Etard's reaction
(b) Stephen's reduction
(c) Gatterman reaction
(d) Sand Meyer's reaction

19. X is _____.

$$CH \equiv CH + H_2O \xrightarrow[HgSO_4 + H_2SO_4]{60^0C} X$$

(a) HCHO
(b) CH_3CHO
(c) CH_3COCH_3
(d) CH_3CH_2OH

20. Which acid is strongest?
(a) CCl_3COOH
(b) $Cl_2CHCOOH$
(c) $ClCH_2COOH$
(d) CH_3COOH

21. HCOOH is soluble in water due to _____.
(a) Inter molecular 'H' bonding
(b) Intra molecular 'H' bonding
(c) All of these
(d) None of these

22. Which of the following cannot reduce Fehling solution?
(a) Acetic acid
(b) Formaldehyde
(c) Acetaldehyde
(d) Formic acid

23. _____ reduce $HgCl_2$ to Hg_2Cl_2:
(a) HCOOH
(b) NH_3
(c) CCl_4
(d) CH_3COOH

24. 'B' is _____.

$$R\text{-}X \xrightarrow{KCN} A \xrightarrow[H_2O]{H^+} B$$

(a) Carboxylic acid
(b) Aldehyde
(c) Ketone
(d) Amines

25. 'Z' is _____.

$$\text{Phenol} \xrightarrow[\text{dust}]{\text{Zn}} \text{X} \xrightarrow[\text{Anhy. } AlCl_3]{CH_3Cl} \text{Y} \xrightarrow[KMnO_4]{\text{Alkaline}} \text{Z}$$

(a) Benzene
(b) Benzoic acid
(c) Benzaldehyde
(d) Toluene

26. HCOOH can not be distinguished from CH_3COOH by _____.
(a) Na_2CO_3
(b) Tollen's reagent
(c) Fehling solution
(d) Schiff's reagent

27. 'A' is _____.

$$C_6H_5MgBr \xrightarrow[H_3O^+]{CO_2} A$$

(a) Benzaldehyde
(b) Benzoic acid
(c) Phenol
(d)Benzophenone

28. Strings of bee contain _____.
(a) Formalin
(b) Formic acid
(c) Benzene
(d) Acetic acid

29. _____ weakest acid.
(a) F – CH_2COOH
(b) Cl – CH_2COOH
(c) Br – CH_2COOH
(d) I – CH_2 – COOH

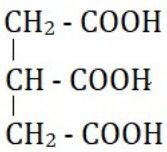
30. _____ is stronger than benzoic acid.
(a) P – Methyl benzoic acid
(b) P – Chloro benzoic acid
(c) P – Nitro benzoic acid
(d) O – Chloro benzoic acid

Group – B

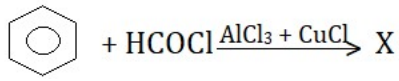
31. Methyl Cyanide on hydrolysis gives _____.
32. Identify A and B in the following reaction.

$$C_6H_5COOH \xrightarrow{SOCl_2} A \xrightarrow[Pd/BaSO_4]{H_2} B$$

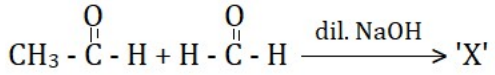
33. What is vinegar?
34. Which acid does not contain – COOH group?
35. What is Tollen's reagent?
36. Write the IUPAC name of



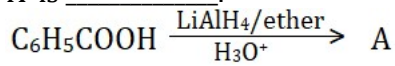
37. Name the compound which ozonolysis to give only Acetaldehyde.
38. 'X' is _____.



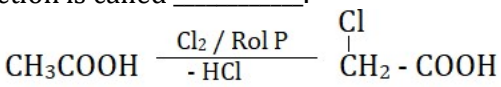
39. 'X' is _____ and reaction is _____.



40. Write the structure of urotropine.
41. Urotropine used as _____.
42. What is Fehling solution?
43. Calcium acetate heated to give _____.
44. Name the functional isomer propanone (CH_3COCH_3).
45. Which reagent distinguish pentan- 2 - one and pantan – 3 – one?
46. Write the decreasing order of acidity of O – Toluic acid, Benzoic acid, M – Toluic acid, P – Toluic acid.
47. 'A' is _____.



48. This reaction is called _____.



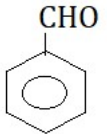
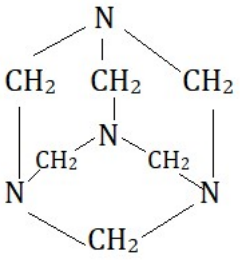
49. Write one use of HCOOH.
50. Which acid reducing tollen's reagent and fehling solution?
51. $2C_6H_5CHO$ + conc. NaOH → X + 4
52. In esterification _____ of alcohol and _____ of Carboxylic acid are removed as water.
53. Ethanamide an heating with P_2O_5 gives _____.
54. Williamson's synthesis involves the reaction of _____ with _____.
55. Alkaline hydrolysis of ester is called _____.
56. Ketone on reduction in neutral or alkaline medium give _____.
57. Sodalime decarboxylation of sodium propionate gives _____.
58. Toluene an oxidation with CrO_2Cl_2 gives _____ and the reaction is called _____.
59. Monocarboxylic acid reacts with _____ to give pure acid chloride.
60. Isopropyl alcohol an oxidation gives _____.

Group – A (ANSWERS)

1. (b)
2. (a)
3. (d)
4. (a)
5. (a)
6. (d)
7. (c)
8. (a)

9. (a)
10. (c)
11. (b)
12. (c)
13. (b)
14. (b)
15. (a)
16. (b)
17. (a)
18. (a)
19. (b)
20. (a)
21. (a)
22. (a)
23. (a)
24. (a)
25. (b)
26. (a)
27. (b)
28. (b)
29. (d)
30. (a)

Group – B (ANSWERS)

31. CH_3COOH
32. A → C_6H_5COCl
    B → C_6H_5CHO
33. 6 – 10% dilute solution of CH_3COOH
34. Picric acid
35. Ammoniacal solution of $AgNO_3$ solution
36. Propane – 1, 2, 3, - tricarboxylic acid
37. $CH_3 – CH = CH – CH_3$
38.  (benzal dehyde)
39. $HO - CH_2 - CH_2 - \overset{\overset{O}{\|}}{C} - H$
    Cross Aldol condensation
40. 
41. urinary antiseptic
42. Alkaline solution of $CuSO_4$ contains Sodium PotasiumTartarate

43. Acetone (CH_3COCH_3)
44. Propanal (CH_3CH_2CHO)
45. $NaOH + I_2$
46. O – Toluic acid > Benzoic acid > M – Toluic acid > P – Toluic acid
47. $C_6H_5CH_2OH$
48. Hell – Vohlard Zelinsky reaction
49.
50. HCOOH
51. X = $C_6H_5CH_2OH$
    Y = C_6H_5COOH
52. H and OH
53. Ethanenitrile
54. RX and R-O-Na
55. Saponification
56. Pinacols
57. Ethane
58. Benzaldehyde, Etard's reaction
59. $SOCl_2$
60. Acetone

Group – C

Two and Three Marks each

1. Discuss Reimer – Tiemann reactions.
2. Which is more acidic and why HCOOH and CH_3COOH.
3. Why Cl – CH_2 – COOH is stronger than CH_3COOH?
4. Convert HCOOH to CH_3COOH and vice versa.
5. Convert HCOH to CH_3CHO and vice versa.
6. Write the uses of Benzoic acid.
7. What is Cannizzaros reaction?
8. Discuss Iodoform recation.
9. Compare the acid strength of Carboxylic acid and Phenol.
10. How will you distinguish between CH_3CHO and HCHO?
11. Distinguish between CH_3CHO and C_6H_5CHO.
12. What happens when benzaldehyde is treated with Fehling solution and why?
13. Write with equation how urotropine is formed.
14. Give two test to distinguish between HCOOH & CH_3COOH.
15. Why aldehyde are more reactive than ketone?
16. Explain Clemmension's reduction with examples.
17. Convert Benzene to Benzoic acid.
18. How Benzoic acid converted to Benzaldehyde?
19. $C_2H_5OH \xrightarrow{PCl_5} A \xrightarrow{KCN} B \xrightarrow{H_3O^+} C \xrightarrow{SOCl_5} D$ Identify A, B, C, D.
20. What is esterification? Give examples.
21. How will you distinguish between benzoic acid and phenol?
22. How acetaldehyde is prepared from
    (i) Calcium acetate
    (ii) CH_3CN
    (iv) CH_3CH_2OH
23. How HCHO is prepared from

(i) CH_2Cl_2
(ii) $(HCOO)_2Ca$
(iii) CH_3OH

24. How benzoic acid is prepared (any three)?

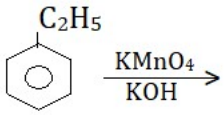
25. Discuss Etard's reaction.

26. Compound 'A' C_5H_2O O form phenyl hydrazone and gives negative tollen's reagent and iodoform test. Compound 'A' on reduction gives n-pentane. Write the structure of 'A'. Explain the reaction.

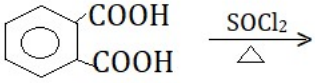
27. How HCHO react with
(i) HCN
(ii) $NaHCO_3$
(iii) CH_3MgBr

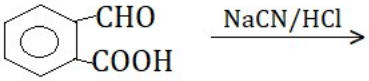
28. How C_6H_5CHO react with
(i) NH_3
(ii) Conc. HNO_3
(iii) Conc. H_2SO_4

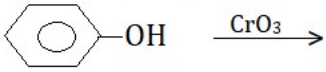
29. How tert. Butyl alcohol is prepared from CH_3COOH?
30. What happens when CH_3CHO react with iodine in dil. NaOH. Give equation.
31. How will you prepare phenyl hydrazone of acetone? Indicate with equations.
32. Why Methanal is a gas but Methanol is a liquid.
33. How will you differentiate
(i) Ethyl alcohol and acetone
(ii) Acetaldehyde and Acetic acid
34. Explain why HCHO is more reactive than CH_3CHO.
35. Give simple chemical test to distinguish between. The following pairs of compounds
(i) Benzaldehyde and Acetophenone
(ii) Ethanal and Propanal
(iii) Phenol and benzoic acid
36. Why carboxylic acid is stronger than phenol although phenoxide ion has a greater number of resonating structures?
37. Highly brunched carboxylic acids are less acidic than unbranched acid, why?
38. Why pure HCN between to react with aldehyde?
39. Why boiling point of carboxylic acid are higher than those of Aldehyde and Ketones?
40. Convert CH_3COOH to CH_3NH_2.
41. How Acetone is obtained from Ethanol.
42. An organic compound 'A' (C_3H_4) on hydration in presence of $H_2SO_4/HgSO_4$ gives compound 'B' (C_3H_6O) compound 'B' gives white crystalline product (C) with sodium hydrogen sulphite. It gives negative tollen's test and form test 'A'. Identify A, B, C and write.
43. It is necessary to control the PH of medium during the reaction of aldehyde and ketone with Ammonia derivative. Explain.
44. Complete the reaction.

(i) 

(ii) $C_6H_5CHO + NH_2NHCONH_2 \longrightarrow$

(iii) 

(iv) 

(v) 

45. What is mean by the following term? Give an example in each case?
(i) Cyanohydrin
(ii) Semicarbazide
(iii) Aldol
(iv) Oxime
(v) 2,4 – DNP derivative.

46. Show how the following compound can be converted to benzoic acid.
(i) Ethyl benzene
(ii) Acetophenone
(iii) Styrene

47. Convert the following in two steps
(i) Propanone to Propene
(ii) Benzoic acid to Benzaldehyde
(iii) Benzaldehyde to 3 – Phenyl Propanol

48. HCHO gives Cannizzaro reaction but CH_3CHO does not. Why?

49. $CH_3COOH \xrightarrow{NH_3} A \xrightarrow{\Delta} B \xrightarrow[(excess)]{Br_2+KOH} C \xrightarrow{heat,CH_3I} D$ identify A, B, C, D.

50. Write the increasing order of acidity of the following compound with proper reason. HCOOH, C_6H_5COOH, CH_3COOH.

Group - D

Long Questions:

1. Describe two general methods of preparation of ketones. State with equation how acetone reacts with
(a) Phenyl hydrazine
(b) HCN
(c) I_2 + NaOH

2. How acetone is prepared. How acetone react with
(a) NH_2OH
(b) 2, 4 – DNPH
(c) CH_3MgBr

3. How Benaldehyde is prepared from
(a) Toluene
(b) Benzoyl Chloride.

How does it react with (i) HCN, (ii) Conc. HNO_3 (iii) Cl_2 + Anhy. $AlCl_3$.

4. How Acetaldehyde is prepared (any three). How does it react with
   (a) NaOH
   (b) $NaHSO_3$
   (c) Tollen's reagent
5. How Acetaldehyde and Acetone are distinguished. How does Acetaldehyde react with?
   (a) Phenyl hydrazine
   (b) Fehling solution
   (c) I_2 + NaOH
6. How Acetic acid is prepared from CH_3MgBr what happens when acetic acid reacts with
   (i) NH_3
   (ii) $LiAlH_4$
   (iii) C_2H_5OH
   (iv) PCl_5
7. How monocarboxylic acid is prepared from ester and alkyl cyanide. How does it react with?
   (a) $SOCl_2$
   (b) $NaHCO_3$
   (c) P_2O_5
8. How benzoic acid is prepared from
   (a) Toluene
   (b) Grignard Reagent
   How CH_3 – COOH can be converted to Ethane. Explain its acidity with Acetic acid.
9. How Acetic acid is prepared from
   (i) CH_3MgBr
   (ii) $CH_3COOC_2H_5$
   (iii) CH_3CH_2OH
   (iv) CH_3CN
   Compare the acidity of CH_3OH, F – CH_2 – COOH, Cl – CH_2 – COOH.
10. How Acetic acid is prepared from vinegar process. How does CH_3COOH react with (i) PCl_3 (ii) P_2O_5 (iii) C_2H_5OH (iv) Na.
    Write two uses of it.
11. Describe two method of preparation and four chemical properties of Acetone.
12. Explain the following with examples
    (a) Cannizzaro's reaction
    (b) Aldol condensation
    (c) Iodoform reaction
    (d) Perkin reaction
13. An organic compound contains 54.54% Carbon, 9.1% Hydrogen and rest oxygen. The vapour density of the compound is 22. The compound formed a crystalline compound with $NaHSO_3$solution, and it gave red ppt. with Fehling solution. Identify the compound and give the reaction involved.
14. How HCHO is prepared (any two) how does it react with
    (a) NH_3 (b) conc. NaOH
    (c) Tollen's reagent (d) CH_3MgBr
15. An organic compound (A) molecular formula $C_8H_{16}O_2$ was hydrolyzed with dil. H_2SO_4 to a give Carboxylic acid (B) and on alcohol (C) oxidation of 'C' with Chromic acid produce (B). (C) On hydration gives butene. Write the equation for the reaction involved.
16. Compound A($C_6H_{12}O_2$) on reduction with $LiAlH_4$ yielded two compounds 'B' and 'C'. The compound 'B' an oxidation gave 'D' which when treated with aqueous alkali and subsequent

heating give 't' which hydrogenation gives 'C'. The compound 'D' was oxidized further to give 'F' which was a monoboric acid.(M.wt = 60) Deduce the structure of A, B, C, D, E and F.

17. Discuss the reaction used to distinguish between Aldehyde & Ketone. Write the order of reactivity of HCHO, CH_3CHO, CH_3COCH_3.
18. How can you convert:
    (a) Acetaldehyde to Acetone
    (b) Methanal to Ethanal
    (c) Acetylene to Acetone
    (d) Ethanal to 2 – hydroxy – propanoic acid
19. What happens when
    (a) Acetyl chloride treated with H_2 in presence of $Pd/BaSO_4$
    (b) Mixture of Calcium acetate and Calcium formate is heated
    (c) Propyne treated with dil. H_2SO_4 in presence of $HgSO_4$
    (d) HCHO treated with NH_3.
20. Discuss the following Name reaction
    (a) Rosenmond reduction
    (b) Stephen reduction
    (c) Clemmenson's reduction
    (d) Wolf-kishner reduction
    (e) HVZ reaction
    (f) Kolbe's reaction
    (g) Schmidt reaction

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Unit – IX

Amines
Group - A

MCQ:

1. Reaction between primary amine, $CHCl_3$ and alcoholic KOH is called _____.
   (a) Aldol condensation
   (b) Cannizzaro's reaction
   (c) Fridel-craft reaction
   (d) Carbylamine reaction
2. In Hoffmann's Bromamidereaction, an amide is converted to _____.
   (a) Primary amine
   (b) Secondary amine
   (c) Tertiary amine
   (d) All of these
3. Acetamide is converted to Methylamine when it is heated with
   (a) H_2SO_4
   (b) NaOH + Br_2
   (c) aq. KOH
   (d) $NaNO_2$ + HCl
4. The product formed during hydrolysis of methyl cyanide in acid medium:
   (a) CH_3CONH_2
   (b) CH_3COOH
   (c) CH_3CHO
   (d) CH_3CH_2 – COOH
5. Which of the following gives dyes test?
   (a) Aniline
   (b) Methylamine
   (c) Ethylamine
   (d) Diphenyl amine
6. $C_6H_5NO_2 \xrightarrow{Sn+HCl}$ 'X': 'X' is _____.
   (a) $C_6H_5NH_2$
   (b) $C_6H_5NO_2$
   (c) C_6H_5 – NH - NH_2
   (d) C_6H_6
7. Which of the following will react with CH_3COCl
   (a) Dimethyl amine
   (b) Trimethyl amine
   (c) Dimethyl ether
   (d) None of these
8. Which of the following Reagent convert Nitrobenzene to Aniline?
   (a) Sn
   (b) Sn + HCl
   (c) $LiAlH_4$
   (d) $SnCl_2$

9. Acetamide treated with _____ reagent to give $CH_3 - NH_2$.
   (a) PCl_5
   (b) Sodalime
   (c) conc. H_2SO_4
   (d) $NaOH + Br_2$
10. Conversion of phthalimide to primary amine is called _____ reaction:
   (a) Gabiel Phthlimide
   (b) Schmidt
   (c) Mendius
   (d) Curtius reaction
11. $R-COOH + N_3H \xrightarrow[\Delta]{conc.H_2SO_4} R-NH_2 + N_2 + C_2$, this reaction is called _____.
   (a) Gabiel Phthlimide
   (b) Schmidt
   (c) Mendius
   (d) Curtius reaction
12. When alkyl isocyanates are boiled with alkali and undergo hydrolysis to give _____.
   (a) 1^0 amine
   (b) 2^0 amine
   (c) 3^0 amine
   (d) None of these
13. $R - NH_2 + CHCl_3 + 3KOH \rightarrow R\text{-}\mathbf{X} + 3KCl + 3H_2O$, '**X**' is _____.
   (a) R – CN
   (b) $R - NH_2$
   (c) R – NC
   (d) R – OH
14. Aniline reacts with Bromine – water to form_____.
   (a) 2, 4, 6 – Tribromoaniline
   (b) p-bromoaniline
   (c) o-bromoaniline
   (d) m- bromoaniline
15. Which give carbylamine test?
   (a) $CH_3 - NH_2$
   (b) $CH_3 - NH - CH_3$
   (c) $(CH_3)_3N$
   (d) None of these
16. Which of the following will most stable?
   (a) $CH_3 - \overset{+}{N}_2X^-$
   (b) $C_6H_5\overset{+}{N}_2X^-$
   (c) $C_2H_5\overset{+}{N}_2X^-$
   (d) $C_6H_5CH_2 - \overset{+}{N}_2X^-$
17. $C_4H_{11}N$ has _____ no of isomer.
   (a) 2
   (b) 6
   (c) 4
   (d) 8

18. 'X' is _____.

$$CH_3 - CONH_2 \xrightarrow[ether]{LiAlH_4} 'X'$$

(a) $CH_3CH_2 - NH_2$
(b) $CH_3 - NH_2$
(c) CH_3NC
(d) None of these

19. Hinsberg Reagent is _____.
(a) C_6H_5Cl
(b) $C_6H_5SO_2$
(c) $C_6H_5SO_2Cl$
(d) C_2H_5Cl

20. IUPAC name of $(CH_3)_2$ CH – Nh_2.
(a) Propanamine
(b) Propan – 2 – amine
(c) Propan – 1 – amine
(d) N – methyl ethanamine

Group – B

21. Nitrosoamine is insoluble in water on heating with conc. H_2SO_4, they give secondary amines. The reaction is called _____.
22. Primary amine reacts with $NaNO_2$ and HCl gives _____.
23. $CH_3CN + 2H \rightarrow X \xrightarrow[\triangle]{H_3O^+} Y$, Y is _____.
24. Which amine does not react with acetyl chloride?
25. When CH_3CONH_2 react with NaOBr, The product is _____.
26. Among Methyl amine, Dimethyl amine, trimethyl amine which is strongest base.
27. Primary amines are identified by _____ reaction.
28. Mendius reaction converts Alkyl cyanide to _____.
29. An organic compound 'A' in treatment with NH_3 gives 'B' which an heating gives 'C'. 'C' on treating with Br_2 and KOH gives ethyl amine. 'A' is _____.
30. Nitrogen in amine is _____ hybridized.
31. Lower amines are soluble in water due to _____.
32. Basic nature of amines is due to _____.
33. Aniline on heating with fuming sulphuric acid gives _____.
34. This reaction is called _____.

$$C_6H_5\overset{+}{N}_2Cl^- \xrightarrow[\triangle]{HF/BF_3} C_6H_5F$$

35. When B.D.C. react with CuCl and HCl, it forms chlorobenzene the reaction is called _____.
36. B.D.C. when react with phenol in alkaline medium (PH = 9 – 10) at 0^0C gives _____.
37. 'X' is _____.

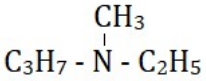
$$C_6H_5NH_2 \xrightarrow[O^0C]{NaNO_2 + HCl} X$$

38. 'Y' is _____.

$$C_6H_5\overset{+}{N}_2Cl^- \xrightarrow{CaCN/KCN} 'X' \xrightarrow{H_2O/H^4} 'Y'$$

39. B.D.C. can be converted to phenyl hydrazine in presence of _____.

40. Phenol react with NH_3 in presence of $ZnCl_2$ at 300^0C to produce _____.
41. $A(C_3H_9N)$ react with benzene sulphonyl chloride to give a solid substance insoluble in alkali. Give a structure 'A'.
42. Write the IUPAC name of



43. Lower aliphatic amines are soluble in water due to _____.
44. $C_6H_5NH_2 + CHCl_3 + 3KOH \rightarrow$ 'X' + KCl + $3H_2O$. 'X' is _____.
45. Which isomeric amine with formula C_3H_9N is least basic?
46. Give an example of Sandmeyer reaction.
47. Which indicator is obtained by coupling diazonium salt of sulphanilic acid with N, N – dimethyl aniline?
48. Reaction of HNO_2 with primary amine in the cold gives _____.
49. Action of HNO_2 an ethyl amine gives _____.
50. $CH_3Cl \xrightarrow{KCN} A \xrightarrow{Ni/H_2} B$, identify 'B'.

Group – A (ANSWERS)

1. (d)
2. (a)
3. (b)
4. (b)
5. (a)
6. (a)
7. (a)
8. (b)
9. (d)
10. (a)
11. (b)
12. (b)
13. (c)
14. (a)
15. (a)
16. (b)
17. (d)
18. (a)
19. (c)
20. (b)

Group – B (ANSWERS)

21. Liberman's nitroso reaction
22. Primary alcohol
23. $CH_3 - C \equiv N + 2H \longrightarrow CH_3 - CH = NH \xrightarrow[\triangle]{H_2O} CH_3CHO$
24. Tertiary amine
25. $CH_3 – NH_2$
26. Dimethyl amine
27. Carbylamine
28. Primary amine
29. $CH_3CH_2 – COOH$
30. SP^3
31. Hydrogen bonding
32. lone pair of electrons
33. Sulphanilic acid
34. Baltz – Schiemann reaction
35. Sandmeyer reaction
36. P – Hydroxy Azobenzene
37. $C_6H_5\overset{+}{N}_2Cl^-$ (B.D.C.)
38. Benzoic acid
39. $SnCl_2 + HCl$
40. Aniline
41. $CH_3 – CH_2 – NH – CH_3$
42. N – Ethyl – N – methyl propanamine
43. Hydrogrn bonding
44. Phenyl isocyanide (Carbylamine)
45. $(CH_3)_3N$
46. $C_6H_5\overset{(+)}{N} \equiv \overset{(-)}{N}Cl \xrightarrow{CuCl/HCl} C_6H_5 - Cl + N_2$
47. Methylorange
48. Diazonium salt
49. C_2H_5OH
50. $CH_3 – CH_2 – NH_2$ (ethylamine)

Group – C

Two/ Three Marks each:

1. Discuss carbylamines reaction.
2. What is Hofmann bromamide reaction?
3. Why Aliphatic amines are stronger base then aromatic amines?
4. Which is more basic $CH_3 – NH_2$ or Aniline ($C_6H_5NH_2$)?
5. Convert
   (a) Aniline to nitrobenzene
   (b) Aniline to chlorobenzene
6. Convert
   (a) nitrobenzene to B.D.C.
   (b) B.D.C. to benzoic acid
7. Illustrate the following reaction with an example.

(i) Sandmeyer reaction
(ii) Coupling reaction

8. Why Amines are more basic than alcohol?
9. Distinguish between ethylamine and aniline.
10. Arrange the following compound in an decreasing order of basic strength in their aqueous solution. NH_3, $CH_3 - NH_2$, $(CH_3)_2NH$, $(CH_3)_3N$. Explain why?
11. Draw the structure of
    (i) prop-2-en-1-amine
    (ii) N-methyl ethanamine
    (iii) M-methanol Propanamine
12. How can you convert
    (i) aniline to nitrobenzene
    (ii) Aniline to chlorobenzene.
13. What is diazotization reaction?
14. Why in non-polor solvent, aniline form a mixture of 4-bromoaniline(major) and 2-bromoaniline (minor) product with Bromine and not 2, 4, 6 – Tribromo aniline although $-NH_2$ group in aniline is o – and p – directing? Explain.
15. An aromatic compound 'A' on treatment with aqueous ammonia and heating form compound 'B' which on heating with Br_2 and KOH forms compound 'C' of M.F. C_6H_7N. Write the structure and IUPAC name of compound A, B, C.
16. Aniline does not undergo Fridel-Craft reaction. Explain.
17. Distinguish
    (a) Ethylamine and diethyl amine
    (b) Di-ethylamine and Triethylamine
18. Identify A, B, C in the following reactions:

$$\text{(i) } A \xrightarrow[KOH]{Br_2} B \xrightarrow[0^0C]{NaNO_2 + HCl} C \xrightarrow{P/I_2} CH_3 - I$$

$$\text{(ii) } A \xrightarrow{\triangle} B \xrightarrow[Br_2 + KOH]{} C \xrightarrow[HNO_2]{} CH_3CH_2 - OH$$

19. Explain why
    (i) Primary amines have higher boiling point than tertiary amine.
    (ii) Amides are weaker base than amines
20. Discuss the following reaction
    (a) Gottermann reaction
    (b) Gumberg reaction
    (c) Schotter – Baumann reaction
21. Convert
    (i) Toluene to P – toluidine
    (ii) Aniline to P – nitrobenzene
22. How can you prepare the following from aniline?
    (a) Iodobenzene
    (b) Nitrobenzene
    (c) Chlorobenzene
23. Convert
    (a) Benzene to B.D.C.
    (b) nitrobenzene to benzene
24. How the following compound are synthesized from B.D.C.
    (a) Phenol
    (b) Benzene
    (c) Diphenyl

25. Discuss the term
    (a) Ammonolysis
    (b) Acetylation
    (c) Acylation
    (d) Zwitter ion
26. How can you prepare p-hydroxy azobenzene from nitrobenzene?
27. $C_6H_5N_2Cl \xrightarrow{CuCN} A \xrightarrow{H_2O/H^+} B \xrightarrow{NH_3} C$, identify A, B, C. Write the structure.
28. Why excess mineral acid is used in diazo reaction?
29. Identify A, B, C

$$C_6H_5NH_2 \xrightarrow{Fe/HCl} A \xrightarrow[0^0C]{NaNO_2 + HCl} B \xrightarrow{C_6H_5OH} C$$

30. Convert Toluene to m-nitrotoluene.
31. Convert Benzene to 1, 3, 5 – tribromobenzene.
32. How p-hydroxybenzoic acid is prepared from toluene?
33. How m-Bromophenol is prepared from benzene?
34. Convert p-Toluidine to m-bromotoluene.
35. How Aniline can be converted to nitrobenzene?
36. Complete the reaction $C_2H_5OH \xrightarrow{PCl_5} A \xrightarrow{KCN} B \xrightarrow{H_3O^+} C \xrightarrow{NH_3} D$.
37. Describe a test to distinguish between Aniline, N-methylaniline, N-Ethyl-N-methylaniline.
38. How primary, secondary, tertiary amines are separated?
39. How aniline react with
    (i) Acetic anhydride
    (ii) Benzoyl chloride
    (iii) $NaNO_2$ + HCl
40. How will prepare ethyl amine from
    (i) Methyl cyanide
    (ii) Propanamide
    (iii) Nitro ethane

Group – D

Long Questions:

1. How is Benzene diazonium chloride prepared from Aniline? How does B.D.C. react with
   (a) KI
   (b) ice cold alkaline phenol
   (c) CuCN/HCN
2. How primary, secondary, tertiary amines are distinguished? Discuss the basicity of amines.
3. Describe Hinsberg test to distinguish between primary, secondary, tertiary amines. Give chemical equation. Mention its uses arrange the following in order of increasing basic strength.
   Aniline, ethylamine, ethane
4. How ethyl amine is prepared (any two)? How does it react with
   (a) Hinsberg reagent
   (b) $CHCl_3$ + KOH
   (c) C_2H_5I
5. Complete the reaction
   (a) $CH_3NH_2 + CHCl_3 \xrightarrow{KOH}$
   (b) $CH_3 - NH_2 + CH_3I(excess) \rightarrow$

(c) $C_6H_5NH_2 + CH_3COCl \rightarrow$

(d) $C_2H_5NH_2 + HNO_2 \rightarrow$

(e) $C_6H_5\overset{+}{N}_2Cl^- \xrightarrow{Cu/HCl}$

6. How the following compounds are synthesized from B.D.C.
   (a) Benzene
   (b) Phenol
   (c) Chlorobenzene
   (d) Iodobenzene
   (e) Diphenyl
   (f) Fluoro benzene
7. How methyl amine is prepared (any two)? How does it react with?
   (i) $CHCl_3$ + KOH
   (ii) HCl
   (iii) CH_3COCl
   Why $CH_3 - NH_2$ is more basic than NH_3?
8. How aniline is prepared (any two)? How does it react with?
   (i) $NaNO_2$ + HCl at 0^0C
   (ii) H_2SO_4 (conc.)
   (iii) conc. HNO_3 + H_2SO_4
   (iv) Br_2. Write its uses.
9. Convert
   (a) Toluene to p-toluidine
   (b) Aniline to benzylamine
   (c) Aniline to p-Bromoaniline
   (d) Benzoic acid to Aniline.
10. What is Aryl Diazonium salt? Why it is more stable than alkyl diazonium salt? Discuss the synthetic uses of Benzene diazonium chloride.
11. Write notes
    (a) Coupling reaction
    (b) Diazotization
    (c) Sandmeyer reaction
12. How can benzene diazonium chloride is prepared from nitrobenzene? How can you prepare (i) Iodobenzene (ii) benzoic acid from B.D.C.
13. How you will be obtained:
    (i) Nitrobenzene from azobenzene
    (ii) Iodobenzene from nitrobenzene
    (iii) nitrobenzene from azobenzene

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Biomolecules
Group - A

MCQ (1 Mark each):

1. Which base is present in RNA but not in DNA?
   (a) Uracil
   (b) Cytosine
   (c) Guanine
   (d) Thymine
2. Vitamin 'C' is the compound called _____.
   (a) Riboflavin
   (b) Ascorbic acid
   (c) Rabinose
   (d) Thiamine
3. Which amino acid has lmidazole ring?
   (a) Alanine
   (b) Lecine
   (c) Tyrosine
   (d) Histidine
4. Helical structure of protein is stabilized by
   (a) Peptide bond
   (b) H-bond
   (c) Vander-waal's force
   (d) Dipole association
5. Which of the following monosachloride is a pentose?
   (a) Glucose
   (b) Fructose
   (c) Arabinose
   (d) Galactose
6. Starch is hydrolyzed to maltose, the enzyme used is known as:
   (a) Invertase
   (b) Maltose
   (c) Zymase
   (d) Diastase
7. Diabates is detected using _____ for testing urine of patients:
   (a) Fehling solution
   (b) Tollen's reagent
   (c) Balyer's reagent
   (d) Besedict solution
8. In Fructose the possible optical isomers are _____.
   (a) 12
   (b) 8
   (c) 16
   (d) 4
9. Which is not a reducing sugar?
   (a) Glucose
   (b) Fructose
   (c) Mannose

(d) Sucrose

10. The enzyme which is active in breaking down protein into amino acid is _____.
    (a) zymose
    (b) pepsin
    (c) insulin
    (d) amylase
11. Which of the following is an example of Globular protein?
    (a) Keratine
    (b) Myosin
    (c) Collagen
    (d) Myoglobi
12. Which of the following pair give positive Tollen's test?
    (a) Glucose & Fructose
    (b) Glucose & Sucrose
    (c) Hexanol & Hexanol
    (d) Fructose & Sucrose
13. The complete hydrolysis of cellulose gives _____.
    (a) D-fructose
    (b) D-ribose
    (c) D-glucose
    (d)L-glucose
14. Which amino acid has Phenolic-OH group as its backbone?
    (a) Glycine
    (b) Leucine
    (c) Sexine
    (d) Tyrosene
15. Which α-amino acid contain aromatic side chain?
    (a) Pyroline
    (b) Tyrosine
    (c) Valine
    (d) Serine
16. Which of the following is an example of ketohexose?
    (a) Monnose
    (b) Galactose
    (c) Maltose
    (d) Fructose
17. Which of the following is Levorotatory?
    (a) Glucose
    (b) Sucrose
    (c) Fructose
    (d) None of these
18. Enzyme is a _____
    (a) Carbohydrate
    (b) Lipid
    (c) Protein
    (d) None of these
19. Diabates mellitus is caused by the deficiency of _____.
    (a) Glucose
    (b) Insulin
    (c) Iodine

(d) Adrenaline

20. The isoelectric point of glycine is _____
    (a) 0
    (b) 6
    (c) 7
    (d) 27
21. The disease night blindness is caused due to deficiency of _____.
    (a) Vitamin – A
    (b) Vitamin – B_1
    (c) Vitamin – B_2
    (d) Vitamin - C
22. Nucleic acid are the polymer of
    (a) nucleoside
    (b) protein
    (c) nucleotide
    (d) adenine
23. Increased blood pressure may be caused by the excess secretion of _____.
    (a) Insulin
    (b) Adrenaline
    (c) Testosterone
    (d) Thyroxine
24. Amino acid are best represented as _____.
    (a) Dipolor ion
    (b) isoelectric ion
    (c) amphoteric ion
    (d) Zwitter ion
25. The main structural feature of protein is _____.
    (a) ether linkage
    (b) ester linkage
    (c) peptide linkage
    (d) all of these

Group – B

Fill in the blanks: (1 Mark each)

26. Invertase brings about the conversion of _____ to _____ and _____.
27. An example of fibrous protein is the _____ is hair.
28. _____ and _____ act as heat insulator of body.
29. Aspartic and glutamic acid contain _____ side chain.
30. _____ is the name of amide bond in protein.
31. What is the nature of peptide bond in polypeptide?
32. What is cystic fibrosis?
33. Give two examples of mono-ssacharide.
34. Which carbohydrate is called table sugar?
35. What are complex carbohydrates?
36. Name two major metabolic pathway of mono-sacuhorides catabolism.
37. Adrenaline is secreted by _____.
38. The blood clot is dissolved by the enzyme _____.
39. The helical structures of DNA was proposed by _____ and _____.
40. The two form of α-D(+) glucose and B-D(+) glucose are known as _____ of glucose.

Group – A (ANSWERS)

1. (a)
2. (b)
3. (d)
4. (b)
5. (c)
6. (d)
7. (d)
8. (b)
9. (d)
10. (b)
11. (d)
12. (a)
13. (c)
14. (d)
15. (b)
16. (d)
17. (c)
18. (c)
19. (b)
20. (b)
21. (a)
22. (c)
23. (b)
24. (d)
25. (c)

Group – B (ANSWERS)

26. Sucrose, glucose and fructose
27. Keratine
28. fat and oils
29. Acidic
30. peptide
31. The bond are rigid and planar
32. respiratory disease
33. glucose and fructose
34. sucrose
35. polysaccharides (fruits, vegetable & whole grain)
36. Glycolysis and Citric acid cycle
37. Adrenal Medulla
38. Streptokinase
39. Watson and F-crick
40. Anomers

Group – C

Two/Three mark each:

1. What are biomolecules, name any three?
2. What are carbohydrates, name any two?
3. What are polysaccharides, give example?
4. Write important function of carbohydrate.
5. Explain muta-rotation.
6. What is starch? Give example.
7. Write the structure of cellulose.
8. Write the ring structure of glucose.
9. Write the structure of sucrose.
10. What is amino acid? How they are classified?
11. Classify carbohydrate, give example in each case.
12. What are essential and non-essential amino acid? Give example.
13. What is zwitter ion? Give zwitter ion structure of glycine.
14. How do amino acid form protein?
15. State the difference between globular protein and fibrous protein.
16. What are enzymes? Give example and write its characteristics.
17. What is nuclei acid? Explain their role in replication.
18. Explain the function of nucleic acid.
19. What is the difference between RNA & DNA?
20. What is the function of lipids?
21. What are hormones, how are they classified?
22. What are vitamins, why there are essential to our body? Write its importance.
23. Write the function of RNA & DNA.
24. Match the groups correctly:

Group – A	Group – B
(a) Vitamin – D	(i) Xerophthalmia
(b) Vitamin – K	(ii) Scurvy
(c) Vitamin – A	(iii) Coagulation of blood
(d) Vitamin – B	(iv) Ricket

25. Classify the protein with example.
26. Write the importance of hormones.
27. Give the structure of proline, tyrosine, valine and serine.
28. What are glycosides?
29. Write Fischer Projection of D-Glucose and L – Glucose.
30. Why Amino acids are amphoteric in nature?

Group – D

Long Questions:

1. What are Carbohydrates? How they are classified, give examples in each use.
2. Discuss the structure of glucose.
3. Write the structure of
   (a) glucose
   (b) maltose
   (c) sucrose
   (d) α-D- fructose

4. What is protein, how are they related with amino acid? Differentiate between fibrous protein and globular protein.
5. What is protein, write their structure. Write the function of protein.
6. What are enzymes? Write their function give examples.
7. What are vitamins, how they classified? Give their source and function.
8. What is nucleic acid? Write the biological function of nucleic acid. Discuss the structure of RNA & DNA.
9. Write the characteristics of enzymes. Give mechanism of enzyme action. Write its application.
10. Write notes
    (a) Carbohydrate
    (b) Protein
    (c) Enzyme
    (d) Vitamin
    (e) Nucleic acid.

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