

SOLID STATE

02-MARKS QUESTIONS

- Q-1 The two ions A⁺ & B⁻ have radii 88 and 200 pm. In close packed crystals of Compound AB predict the C.N.
- Q-2 What is the effect of temp. and pressure on crystal structure NaCl and CsCl ?
- Q-3 Define n-type, p-type semiconductors?
- Q-4 How the crystalline solids are classified on the basis of the nature of bonding. Give examples.
- Q-5 How many lattice points are there in one unit cell of each of following Fcc, bcc?
- Q-6 If radius of Cs⁺ ion is 160 pm and Cl⁻ 181 pm. What is the edge length of CsCl unit.
- Q-7 CsCl have bcc arrangement and its unit cell edge length is 400 pm. calculate density.
- Q-8 Analysis show that Ni Oxide has formula Ni_{0.98} O_{1.8} What fraction of Ni exist as Ni²⁺ and Ni³⁺ ions?
- Q-9 If the radius of octahedral void is r and radius of atoms in close packing is R. drive relation r & R
- Q-10 In a crystalline solids anions Y⁻ are arranged in CCP arrangements. Cation X⁺ are equally distributed between Octahedral voids are occupied write the formula of solids.

03-MARKS QUESTIONS

- Q-1 On terms of band theory what is the difference
- between conductor and insulators.
 - between conductor and semi-conductors.
- Q-2 KF has NaCl structure calculate the edge length of its unitcell if its density is 2.48 cm⁻³. molar mass of KF = 58.1 g mol⁻¹, N_A = 6.02 x 10²³ mol⁻¹.
- Q-3 In the cubic crystal of CsCl d = 3.97 g/cm³. the eight corners are occupied by Cl⁻ with Cs⁺ at centre and vice versa Calculate the distance between neighbouring Cs⁺ and Cl⁻ ions. What is the radius ratio of two ions. At mass of Cs = 132.9 and Cl = 35.46.
- Q-4 The density of chromium metal is 7.2 g cm⁻³ if the unit cell is cubic with edge length of 289 pm determine the type of unitcell .
- Q-5 Account the following:-
- Silicon is an insulator but silicon doped with phosphorus act as semiconductor.
 - Some of glass objects recovered from ancient moment look milky instead of being transparent.
 - In corundum, Oxide ions are arranged in h.c.p. array and the Al³⁺ occupy two third of octahedral Void. What is the formula of Corundum.
- Q-6 CsCl have bcc arrangement and its unit cell edge length is 400 pm. Calculate interionic distance.
- Q-7 Write differences between schottky and frenkel defects.
- Q-8 Zinc oxide is white but turns yellow on heating why?
- Q-9. Define 12-16 and 13-15 group compounds.
- Q-10 Define f centers.

SOLUTION

02-MARKS QUESTIONS:-

- Q-1 Why does vapour pressure of a liquid decrease when a non-volatile solute is added to it?
- Q-2 Why is molality of a solution preferred for expressing concentration over molarity?
- Q-3 Calculate the mass present of aspirin (C₉H₈O₄) in acetonitrile(CH₃CN) when 6.5g of aspirin is dissolved in 450g of CH₃CN
- Q-4 What is the trend in b.p. & f.p. temperatures of equimolar solutions of urea , NaCl , K₂SO₄ , K₃[Fe(CN)₆]?

- Q-5 Under what conditions is (a) vant Hoff factor less than one (b) equal to one ?
- Q-6 The vapour pressure of water is 12.3Kpa at 300K. Calculate the vapour pressure of 1 molal solution in it.
- Q-7 When 50m² of ethanol and 50m² of water are mixed, predict whether the volume of the solution is equal to, greater than or less than 100 m².
- Q-8 Out of 1M H₂SO₄ and 1m H₂SO₄ which is more concentrated and why?
- Q-9 H₂S , a toxic gas with rotten egg like smell is used for quantitative analysis. If the solubility of H₂S in water at STP is 0.195 m , Calculate Henry's constant.

03-MARKS QUESTIONS:

- Q-1 Determine the amount of CaCl₂ (i= 2.47) dissolved in 2.5 litre of water such that its osmotic pressure is 0.75 atm. At 27⁰C.
- Q-2 Calculate the mole fraction of benzene in a solution containing 30% by mass of it in carbon tetrachloride
- Q-3 8.0575 x 10⁻⁵ kg of Glauber's salt is dissolved in water to obtain 1 dm³ of a solution of density 1077.2 kgm⁻³ . Calculate the molarity and mole fraction of Na₂SO₄ in the solution.
- Q-4 Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K₂SO₄ in 2 litre of water at 25⁰C, assuming that it is completely dissociated .

05-MARKS QUESTIONS-

- Q-1 (a) What is the value of vant Hoff factor for a solute of K₂SO₄ in water?
 (b) What is mole depression constant? Write the unit also.
 (c) The vapor pressure of pure benzene at a certain temp. is 0.850 bar. A non volatile , non electrolyte solid weighing 0.5g is added to 39.0g of benzene (molar mass=78g/mol). The V.P of soln is 0.845 bar. What is the mol. Mass of solid substance?
- Q-2 (a) What is the effect of temp. on the vapour pressure of a liquid?
 (b) Name any one inorganic compound which can be used as semi- permeable membrane.
 (c) Henry's constant for the molality of methane in benzene at 298 K is 4.27 x 10⁵ mm kg. Calculate the solubility of methane in benzene at 298K under 760 mmHg
- Q-3 Explain elevation in boiling point is colligative property.
- Q-4 Explain positive and negative deviation from ideal behavior

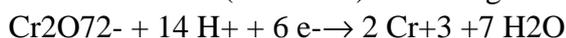
ELECTROCHEMISTRY

02-MARKS QUESTIONS

- Q-1 .Explain why:(1) E_o for Mn⁺² couple is more positive than that of Fe⁺³/Fe⁺² (Z for Mn = 25, Fe = 26)
 (Ce⁺³ can be easily oxidized to Ce⁺⁴(Z of Ce=58)
- Q-2 Calculate the equilibrium constant for the reaction?
 Cu(s) + 2Ag⁺(aq) = Cu²⁺(aq) + 2Ag(s), E_oCell=0.46V
- Q-3 Calculate the emf of the cell
 Zn/Zn²⁺(0.1M) || Cd²⁺(.01M)/Cd at 298 K
 Given E_oZn²⁺/Zn = - 0.76V; E_oCd²⁺/Cd = - 0.40 V
- Q-4 How many coulombs are required to produce
 (a) 20.0g of calcium from molten CaCl₂?
 (b) 50g of Aluminium from molten Al₂O₃?
- Q-5 Explain Kohlrausch,s law of independent migration of ions. Mention one application of the law.
- Q-6 Iron does not rust even if the zinc coating is broken in a galvanized iron pipe but rusting occurs much faster if the tin coating over iron is broken .Explain.

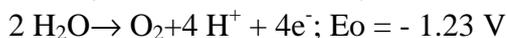
Q-7 What is the effect of decreasing concentration on the molar conductivity of weak electrolytes ? Why ?

Q-8 Calculate the quantity of electricity in coulombs that will be required to reduce 1 mol of dichromate ions ($\text{Cr}_2\text{O}_7^{2-}$) according to the reaction :



03-MARKS QUESTIONS.

Q-1 Given that , $\text{Co}^{3+} + \text{e}^- \rightarrow \text{Co}^{2+}$; $E^\circ = + 1.82 \text{ V}$



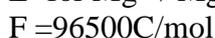
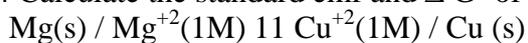
Explain why Co^{3+} is not stable in aqueous solution.

Q-2 Write the reactions of Lead storage battery when

(1) it is discharged (2) it is charge

Q-3 When a bright silver object is placed in a solution of gold chloride ,it acquires a golden tinge but nothing happens when it is placed in a solution of copper chloride State reason for this behaviour of silver.

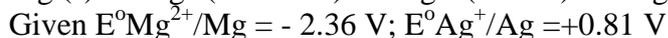
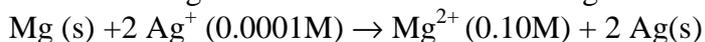
Q-4 Calculate the standard emf and ΔG° of cell reaction for the following cell at 25°C ?



Q-5 Silver is electrodeposited on a metallic vessel by passing a current of 0.2 amp. For 3 hours. Calculate the mass of silver deposited. (atomic mass of silver =108 u;F =96500 C/mol).

05-Marks Questions

Q-1 The following chemical reaction is occurring in an electrochemical cell:



For the cell, calculate/write

(1) E° value for the electrode $2\text{Ag}^+/\text{Ag}$

(2) Standard cell potential(E°)

(3) Cell potential (E)

(4) Give the symbolic representation of the above cell

(5) Will the above cell reaction be spontaneous ?

Q-2 (a) A current of 1.5 amp. was passed through an electrolyte containing AgNO_3 solution with inert electrodes. The mass of silver deposited was 1.5g. How long did the current flow ?

(b) Write the reactions taking place at anode and at cathode in the above cell.

(c) Give the reactions taking place at the two electrodes if they are made up of silver.

Q-3 (a) E° values of three metal $\text{X}^{\text{a}+}$, $\text{Y}^{\text{b}+}$ and $\text{Z}^{\text{c}+}$ are =0.52 , -3.03 , -1.18V respectively . Arrange the corresponding metals in the order of their reducing power.

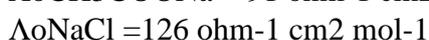
(b) Write the difference between electrochemical cell and electrolytic cell.

Q-4(a) Give the chemistry of corrosion.

(b) Rusting of iron is quicker in saline water than in ordinary water. Explain why ?

Q-5 (i) For a weak electrolyte its molar conductance in dilute solution increases sharply as its concentration in solution is decreased. Why?

(ii) Calculate the molar conductivity of acetic acid at infinite dilution from the following data.



CHEMICAL KINETICS

02-Marks Questions

- Q-1: If slope of line obtained by plot of $\log [N_2O_5]$ vs Time is $-2.147 \times 10^{-4} s^{-1}$. Calculate the value of 'k'.
- Q-2: The rate constant of a first order reaction is $60 s^{-1}$. How much time will it take to reduce initial conc. Of the reactant to $1/16^{th}$ value?
- Q-3: Define pseudo unimolecular reaction. Give two examples .
- Q-4: The rate of decomposition of NH_3 on platinum surface is zero order. What is the rate of production of N_2 and H_2 , If $k = 2.5 \times 10^{-4} Ms^{-1}$.?
- Q-5: What is the shape of graph between $\log k$ vs $1/T$? What is the relation between its shape and activation energy .
- Q-6: The half life of radioactive decay of C_6^{14} IS 5730 years . An archeological artefact contained wood had only 80% of the C_6^{14} found in living tree . Estimate the age of the sample .
- Q-7: At 300 k , a certain reaction is 50% complete in minutes. At 350 k , the same reaction is 50% complete in 5 minutes . Calculate the activation energy of the reaction.
- Q-8: Sucrose decomposes in acid solution into glucose and fructose according to the first order reaction with half life period 3 hours . What fraction of sucrose remains after 8 hours ?
- Q-9: The decomposition of hydrocarbon follows the equation ,
 $k = (4.5 \times 10^{11} s^{-1}) e^{-28000 k/T}$. Calculate E_a .

03-Marks Questions

- Q-1: Define (1) rate law (2) order of reaction (3) molecularity
- Q-2: What is the effect of catalyst on rate of reaction ?
- Q-3: The following results have been obtained during the kinetic study of the reaction :
 $2A + B \rightarrow C + D$
- | Experiment | [A] | [B] | initial rate of formation |
|------------|-----|-----|--------------------------------------|
| 1 | 0.1 | 0.1 | $6.0 \times 10^{-3} \text{ mol/L/s}$ |
| 2 | 0.3 | 0.2 | 7.2×10^{-2} |
| 3 | 0.3 | 0.4 | 2.88×10^{-1} |
| 4 | 0.4 | 0.1 | 2.40×10^{-2} |
- determine the rate law and the rate constant for the reaction.
- Q-4: The activation energy for the reaction :
 $2 HI(g) \rightarrow H_2(g) + I_2(g)$, is 209.5 kJ /mol at 581 K . Calculate the fraction of molecules of reactants having energy equal to or greater than activation energy ?
- Q-5: A first order reaction is 20 % complete in 10 minutes . Calculate the time for 75 % completion of the reaction .
- Q-6: State and explain Arrhenius equation. How can we determine the activation energy of a reaction using this equation ?
- Q-7: Two similar reactions have the same rate constant at 250 C, but at 350C one of the reaction has a higher rate constant than the other . Account for these observations.
- Q-8: Nitric oxide, NO, reacts with oxygen to produce nitrogen dioxide ,
 $2 NO(g) + O_2(g) \rightarrow 2NO_2(g)$
What is the predicted rate law , if the mechanism is :
 $NO + O_2 \rightleftharpoons NO_3$ (fast)
 $NO_3 + NO \rightarrow NO_2 + NO_2$ (Slow)
- Q-9: The time required for 10 % completion of a first order reaction at 298 K is equal to that required for its 25 % completion at 308 K, if the value of A is $4 \times 10^{10} s^{-1}$. Calculate k at 318 K and E_a .
- Q-10: The reaction $SO_2 + Cl_2 \rightarrow SO_2Cl_2$, is a first order reaction with $k = 2.2 \times 10^{-5} s^{-1}$ at 575 K. What %age of a initial amount of $SO_2 Cl_2$ will get decomposed in 90 minutes when the reaction is carried out at 575 K ?

SURFACE CHEMISTRY

02-Marks Questions

1. What is the sign of dH , dS & dG when a gas is adsorbed by an adsorbent?
2. Explain why lyophilic sols are relatively more stable than lyophobic sols.
3. Explain the following :-
 - (a) detergents with straight chain hydrocarbons are preferred to branched chain hydrocarbons.
 - (b) smoke is passed through charged plates before allowing it to pass through chimneys.
 - (b) Colloidal dispersions need to be purified.
4. How can we prepare a colloidal solution of silver?
5. Define specific area of the solid.
6. What is meant by activity & selectivity of catalyst? Give eg.
7. Show that adsorption is an exothermic process.
8. What is shape selective catalysis?
9. Give reasons: Δ is formed when river water falls in sea water.
10. Blood coagulation occurs faster if $FeCl_3$ is used instead of $NaCl$.
11. Justify the statement: Activated charcoal is used as gas mask.
12. Alums are used in dyeing of clothes. What happens when freshly prepared $Fe(OH)_3$ is shaken with little amount of dilute solution of $FeCl_3$. When $Fe(OH)_3$ is shaken with little amount of $NaCl$.
13. Write 2 points of differences between chemical and physical adsorption.
14. What is the difference between peptisation and coagulation?
15. State the phenomenon in following
Scattering of light when it passes through colloidal solution.
Purification of colloidal sols using semipermeable membrane under the influence of electric current.
16. Give an e.g. Of : 1 Shape selective catalysis 2 Homogeneous catalysis
17. State Hardy-Sulze rule.

03-Marks Questions

1. Explain what is observed when:

An electrolyte is added to $Fe(OH)_3$ sol.

- a) An emulsion is subjected to centrifugation.
 - b) Direct current is passed through a colloidal sol.
2. a) In which of the following does adsorption take place and why?
Silica gel placed in the atmosphere saturated with water.
Anhyd. $CaCl_2$ placed in the atmosphere saturated with water.
 - b) Differentiate- macromolecular colloids, multimolecular colloids and micelles. How does BF_3 act as a catalyst in industrial process?
3. How does chemical adsorption of a gas on a solid vary with temperature?
 4. What happens when an electric field is applied to a colloidal dispersion?
 5. Give a mathematical expression showing the relation between the amount of a gas absorbed on the solid surface and pressure of the gas?

GENERAL PRINCIPLES AND PROCESSES OF ISOLATION OF ELEMENTS

02-Marks Questions

- Q-1. What is stainless steel? Give its one property.
- Q-2. How is leaching carried in low grade copper ores?
- Q-3. Explain Zone refining?

- Q-4.State roll of silica in metallurgy.
 Q-5.What are the diff. Rxn of blast furnace?
 Q-6. Why cryolite is added to alumina for its electrolysis?
 Q-7. What are two important limitations of Ellingham diagram ?
 Q-8. What is stationary phase in chromatography?
 Q-9. What is electrolytic reduction of obtaining metals in gp I gp II?
 Q-10. The value of ΔG° for formation of Cr_2O_3 is -540 KJ/M and that of Al_2O_3 is -827 KJ/M . Is the reduction of Cr_2O_3 possible with Al?
 Q-11. Write differences between roasting and calcinations
 Q-12. Explain Mond's and van Arkel process.
 Q-13. Describe the principle of extraction of Al from bauxite

P –Block Elements.

01-Marks Questions

- 1-Ques- Draw the structure of XeF_2 .
 2-Ques- Write the state of hybridization of N in NO_3^- .
 3-Ques- Why does oxygen not show +4 and +6 oxidation state like S ?
 4-Ques- Bond angle in PH_4^+ is higher than PH_3 , why?
 5-Ques- Why do noble gases form compounds with F_2 and O_2 only?
 6-Ques- Why does F atom not form polyhalide?
 7-Ques- Why is NH_3 a good Lewis base?
 8-Ques – Why is N_2 least reactive at room temperature?
 9-Ques- Why NCl_5 does not exist?
 10-Ques- Why S_2 vapours are paramagnetic in nature? (SL)

02-Marks Questions

- 1-Ques- Why does PCl_3 fumes in moisture?
 2-Ques- Account for (a) The reducing behaviour of H_3PO_2
 3-Ques- H_2S is less acidic than H_2Te , why?(SL)
 4-Ques- Nitrogen exists as N_2 while phosphorous as P_4 , why?(SL)
 5-Ques- Noble gases have very low boiling, why?
 6-Ques- Why is helium used in diving apparatus?(SL)
 7-Ques- Give the structure of H_3PO_4 along with hybridization.
 8-Ques- What happens when phosphorous is heated in NaOH ?(SL)
 9-Ques- Why are halogens are coloured?
 10-Ques- How would you prepare Cl_2 gas in laboratory?

03-Marks Questions

- 1-Ques- Draw the shapes of following:
 SiF_4 , SiF_6^{2-} and PF_5
 2-Ques- Write balanced equations for
 (i) $\text{Cu} + \text{H}_2\text{SO}_4 \rightarrow$
 (ii) $\text{SF}_4 + \text{H}_2\text{O} \rightarrow$
 (iii) $\text{H}_2\text{S} + \text{SO}_2 \rightarrow$
 3-Ques- When conc. H_2SO_4 was added to a unknown salt present in a test tube, a brown gas 'A' was evolved. This gas intensified when Cu turnings were added in test tube. On cooling gas 'A' changes into colourless 'B'. Identify A and B with equation.
 4-Ques- Arrange the following as per the property indicated against it
 $\text{F}_2, \text{Cl}_2, \text{Br}_2, \text{I}_2$ (Increasing bond dissociation enthalpy)
 $\text{HF}, \text{HCl}, \text{HBr}, \text{HI}$ (Increasing acid strength)

NH₃, PH₃, AsH₃ (Increasing base strength)

5-Ques-Give chemical equation for formation of XeF₂, XeF₄, XeF₆ compounds and draw their structures also.

D BLOCK ELEMENTS

02-Marks Questions

- Q-1. What are INTERSTITIAL COMPOUNDS? Write any 2 characteristics.
- Q-2. Why transition metals have the tendency to form complexes?
- Q-3.(i) Why are tripositive ions of lanthanides are coloured?
(ii) Name the lanthanide with maximum paramagnetic character
- Q-4. (a) Why are Zn, Cd & Hg volatile metals?
(b) Compounds of Cu(I), Zn(II), Cd(II), & Hg(II) are usually white . Explain.
- Q-5. (a) Which trivalent cation is largest in the lanthanide series?
(b) Why is KMnO₄ kept in dark bottles?
- Q-6.(a) Why La(OH)₃ is more basic than Lu(OH)₃.
(b) Why is separation of lanthanides difficult?
- Q-7. Why do Cu(I) compounds undergo disproportionation reaction in aqueous solution?
- Q-8 What are inner transition elements. Write their electronic configurations.
- Q-9 Explain briefly the magnetic behaviour of first row transition metal ions.
- Q-10 Why do transition metals form complexes.
- Q-11 What are interstitial compounds. Explain them with reference to transition metals and mention their two important properties.
- Q-12 Explain Lanthanide contraction

03-Marks Questions

- Q-1. Account for the following:
- E_o M³⁺/M²⁺ for Sc is low.
 - E_o M³⁺/M²⁺ is highest for Zn in the 1st transitional series.
 - The process involves removal of an electron from the stable d¹⁰ configuration of Zn²⁺
- Q-2. Give reason:
- Zr & Hf exhibit almost similar properties.
 - K₂PtCl₆ is well known compound whereas corresponding Ni compound is not known.
 - Pt⁴⁺ is thermodynamically more stable than Ni⁴⁺ i.e. energy required to remove 4 electrons in Pt is less than that of Ni.
- Q-3. The chemistry of the actinoids is not so smooth as that of lanthanoids. Justify this statement by giving some examples from the oxidation state of these elements.
- Q-4 Write the chemical equation in support of fact that KMnO₄ acts as a powerful oxidizing agent in neutral, alkaline & acidic in the ionic equation.
- Q-5. What are inner transition elements? Decide which of the following atomic numbers are of the inner transition elements: 29, 59, 74, 95, 102, 104.
- Q-6. (a) Actinide Contraction > Lanthanide Contraction from element to element. Why?
(b) Which is a stronger reducing agent- Cr²⁺ or Fe²⁺ & why?
- Q-7 Write the steps in the preparation of K₂Cr₂O₇ from Chromite ore.
- Q-8 Describe briefly the following physico-chemical properties of transition metals:
[i] ionisation energy [ii] ionic radii [iii] complex formation
- Q-9 Describe briefly the gradation of the following physico-chemical properties of transition metals
[i] metallic character [ii] ionic radii [iii] complex formation
- Q-10 What are lanthanides Discuss briefly the physical and chemical properties of lanthanide.

Q-11 Write the chemical equations for the conversion of

[i] chromite ore to sodium chromate.

[ii] pyrolusite to potassium permanganate

[iii] potassium permanganate to manganese dioxide

Q-12[a] Give one example each of amphoteric and acidic oxides of transition metals

[b] Describe the trends in the following cases:

[i] Melting points of elements in the 3d transition series

[ii] atomic sizes of elements in the 4f inner transition series

05-Marks Questions

Q-1 Describe how potassium permanganate is made from pyrolusite. Write the chemical equations for the involved reactions. Describe with an example, each oxidising action of permanganate ion in alkaline and acidic media. What acid and alkali are usually used

Q-2 Describe how potassium dichromate is made from chromite ore and give the equations for the chemical reactions involved. Write balanced ionic equations for reacting ions to represent the action of acidified potassium dichromate solution on:

[a] potassium iodide solution

[b] Acidified ferrous sulphate solution

Q-3 (a) For M^{2+}/M & M^{3+}/M^{2+} system, the E_0 values of some metal are given:



Use this data to comment upon..

Q-4. Give e.g. if any & suggest reason.

(a) The lowest oxide of Transition metal is basic while highest is acidic.

(b) A Transition metal exhibits higher oxidation states in oxides & fluorides.

(c) The highest oxidation state is exhibited in oxoanions of a metal.

(d) Co(II) is stable in aq solution but easily oxidized in the presence of complexing agent.

Q-5 (i) Give reasons:

(a) Cr is a typically hard metal while Hg is liquid.

(b) V_2O_5 acts as a catalyst.

(c) Transition elements show similarities along the horizontal period.

(d) How many elements are present in d-block ?

(e) Why are Transition elements so named?

Q6.(a) What is Lanthanide Contraction? Write its cause. (b) What are MISCH METAL/PYROPHORIC METALS? Write 2 uses.

Q7 Explain why transition elements

(a) Have high enthalpy of atomization.

(b) Form colored ions.

(c) Form alloys.

(d) Act as catalysts.

(e) Form complexes

COORDINATION CHEMISTRY

02-Marks Questions

Q1 How do given factors affect the stability of complex a. size of cation b. charge on cation

Q-2 Give the chemical formulae for the followings

I) potassium hexacyanoferrate(II)

II) potassium tetracyanonickelate(ii)

Q-3 What is coordination polyhedron?

Q-4 What are ambident ligands give examples what are their importance

Q-5 $[Ni(CO)_4]$ Possesses tetrahedral geometry while $[Pt(NH_3)_2Cl_2]$ has square planer why?

- Q-6 Give a chemical test to distinguish between $[\text{CO}(\text{NH}_3)_5\text{Br}]\text{SO}_4$ And $[\text{CO}(\text{NH}_3)_5\text{SO}_4]\text{Br}$
- Q-7 Give the type of isomerism exhibited by the following complex also write the name-
 $\text{K}[\text{Cr}(\text{H}_2\text{O})_2(\text{C}_2\text{O}_4)_2]$
 $[\text{Pt}(\text{NH}_3)(\text{H}_2\text{O})\text{Cl}_2]$
- Q-8 What is meant by chelate effect? Give an example
- Q-9 Why is $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ Coloured explain on the basis of distribution of electrons in d orbitals.
- Q-10 Explain the shape and magnetic behaviour of $[\text{Ni}(\text{CH}_3)_6]^{++}$
- Q-11. Briefly classify the type of ligands on the basis of their ligating ability
- Q-12. Specify the oxidation number of metals
 (a) $[\text{Cr}(\text{NH}_3)_3\text{Cl}_3]$ (b) $[\text{Co}(\text{H}_2\text{O})(\text{CN})(\text{en})_2]^{++}$ (c) $[\text{CoBr}_2(\text{en})_2]^+$
- Q-13. $[\text{NiCl}_4]^-$ is paramagnetic while $[\text{Ni}(\text{CO})_4]$ is diamagnetic though both are tetrahedral
- Q-14 What will be the correct order for the wave length of absorption in the visible region for the followings
 $[\text{Ni}(\text{NO}_2)_6]^{4-}$ $[\text{Ni}(\text{NH}_3)_6]^{++}$ $[\text{Ni}(\text{H}_2\text{O})_6]^{++}$
- Q-15 Amongst the following which is the most stable complex?
 $[\text{Fe}(\text{H}_2\text{O})_6]^{+3}$ $[\text{Fe}(\text{C}_2\text{O}_4)_3]^{-3}$ $[\text{Fe}(\text{NH}_3)_6]^{+3}$ $[\text{FeCl}_6]^{-3}$
- Q-16 A Metal ion Mn^{+} having d4 valence electronic configuration combines with three didentate ligands to form a complex compound ,assuming $\nabla_o > p$
 (I) write the electronic configuration of valence electron of $m+n$ in term of t_{2g} and e_g
 (II) what type of hybridization will $m+n$ ion have
 (III) name the type of isomerism shown by the complex
- Q-17 FeSO_4 is mixed with $(\text{NH}_4)_2\text{SO}_4$ in 1:1 molar ratio gives test of Fe^{2+} ion but CuSO_4 solution mixed with aq NH_3 IN 1:4 molar ratio does not give the test of Cu^{2+} ion explain why?
- Q-18 Calculate the overall complex dissociation equilibrium constant for $[\text{Cu}(\text{NH}_3)_4]^{2+}$ ion given for the complex is 2.1×10^{13} .
- Q-19 Explain the following
 (i) cobalt metal complexes is pink when it is octahedral and blue when tetrahedral
 (ii) $[\text{Ni}(\text{H}_2\text{O})_6]^{++}$ turns blue when changed to $[\text{Ni}(\text{NH}_3)_6]^{+++}$ By adding NH_3
 (iii) violet coloured $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ becomes bright blue when reduced to $[\text{Cr}(\text{H}_2\text{O})_6]^{++}$
- Q-20 Draw figure to show the splitting of d orbitals in an octahedral crystal field.

HALOALKANES AND HALOARENES

- Q.1 Haloarenes are chemically less reactive than haloalkanes, explain why?
- Q.2. Out of $\text{HCl}(\text{g})$ and SOCl_2 which is preferred for converting ethanol Into chloroethane ?
- Q.3. $\text{C}_2\text{H}_5\text{Cl}$ is gas, whereas $\text{C}_2\text{H}_5\text{I}$ is liquid at room temperature. Explain.
- Q.4. Why is vinyl chloride less reactive than $\text{C}_2\text{H}_5\text{Cl}$?
- Q.5. How is chloroform prepared from ethanol ?
- Q.6. Why is CHCl_3 stored in dark coloured bottles ?
- Q.7. The use of CHCl_3 as anesthetic is decreasing. Why ?
- Q.8. Give Carbylamine reaction :
- Q.9. Describe the preparation of iodoform (CHI_3) from ethanol.
- Q.11. Give important uses of freons.
- Q.12. Give uses of (a) DDT (b) BHC and (c) PFC.

ALCOHOL PHENOL AND ETHER

02-Marks Questions

Q-1 CONVERT 2-PROPANOL TO 1-PROPANOL?

Q-2 HOW IS CUMENE OBTAINED FROM BENZENE IS CONVERTED TO PHENOL

Q-3 WHAT IS OXO PROCESS EXPLAIN?

Q-4 GIVE CHEMICAL TEST TO DISTINGUISH METHANOL AND ETHANOL

Q-5 WHAT ARE NUCLEOPHILIC SUBSTITUTION REACTION?

Q-6 OUT OF $(\text{CH}_3)_2\text{CH-OH}$ AND $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{OH}$ WHICH ONE IS MORE Q-REACTIVE TOWARDS $\text{S}_\text{N}2$ NUCLEOPHILIC SUBSTITUTION REACTION

Q-7 CONVERT

(a) $(\text{CH}_3)_2\text{CH-OH}$ TO ACETONE

(b) $\text{CH}_3\text{-CH}_2\text{OH}$ TO $\text{CH}_3\text{-CH}_2\text{Cl}$

Q-8 DESCRIBE WILLIAMSON SYNTHESIS?

Q-9 GIVE CHEMICAL TEST TO DISTINGUISH PHENOL AND CYCLOHEXANOL

03-Marks Questions

Q-1 DESCRIBE THE MECHANISM OF FORMATION OF DIETHYL ETHER IN PRESENCE OF Conc. H_2SO_4

Q-2 GIVE CHEMICAL TEST TO DISTINGUISH

Q-3 PHENOL AND 2,4,6-TRINITROPHENOL

Q-4 BENZYL ALCOHOL AND PHENYL METHYL ETHER

Q-5 CONVERT

PHENOL TO ANILINE

ETHANOL TO METHANE

Q-6 PROPANOL TO 2- METHYL PROPANOIC ACID

GIVE MECHANISM FOR THE ELIMINATION OF 2- BROMOBUTANE WITH ALC. KOH .

Q-7 DISTINGUISH BETWEEN

i) Ethanol and Methanol ii) Ethanol and Propanol iii) Methanal and Ethanal

Q-8. CONVERT

(1) $\text{C}_2\text{H}_5\text{OH}$ TO BUT-1-YN

(2) PHENOL TO CHLOROBENZENE

(3)

PHENOL TO BENZENE

Aldehyde, Ketones & Carboxylic acid

02-Marks Questions

Q-1 Write IUPAC name of following :

a) $\text{CH}_3\text{CH}_2\text{CH}=\text{CHCHO}$

b) $(\text{CH}_3)_2\text{CHCHO}$

Q-2 Give names reagent to carry out following conversion a) Cyclohexane to cyclohexanone

b) But-2-ene to ethanol

Q-3 How will you convert primary & secondary alcohol into aldehyde & ketones?

Q-4 Convert the following

(1) CH_3CN to ZCH_3COOH (ii) $\text{C}_6\text{H}_5\text{CH}_3$ to $\text{C}_6\text{H}_5\text{COOH}$

Q-5 Write equation for a) esterification & b) dehydrogenation

Q-6 Convert the following

a) C_6H_6 into $\text{C}_6\text{H}_5\text{CHO}$ b) CH_3COOH into $(\text{CH}_3\text{CO})_2\text{O}$

Q-7 What happens when acetaldehyde reacts with

a) Tollen's reagent (b).zinc amalgam and conc. HCl

Q-8 Draw the structure of p,p'-dihydroxybenzophenone

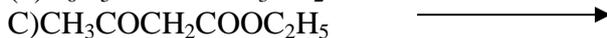
Q-9 Write the IUPAC name of Ph-CH=CH-CHO

Q-10 Why the water or ester should be removed as soon as possible during preparation of ester from carboxylic acid & alcohol?

Q-11 How will you distinguish (i) ethanal from propanal(ii) Benzaldehyde from Acetophenone?

03-Marks Questions

Q-1 complete the following reaction



Q-2 GIVE REASON Why

a) carboxylic acid is stronger acid than phenol?

b) benzoic acid does not undergo Friedel Crafts reaction

c) Formaldehyde undergoes disproportion reaction

Q-3 Define a) Cannizaro's reaction b) Aldol condensation

Q-4 How will you distinguish the following

a) Benzaldehyde & acetaldehyde

acetic acid & formic acid

propanal & propanone

Q-5 Account for the following

a) electrophilic substitution in benzoic acid takes place at meta position

b) carboxylic acid have higher boiling point than alcohols of comparable molecular mass

c) chloroacetic acid is stronger acid than acetic acid

ORGANIC COMPOUND CONTAINING NITROGEN

2 –MARKS QUESTIONS

1. How will you convert benzene to aniline ?
2. How is the basic strength of amine affected by the presence of e⁻ releasing group?
3. Aniline gets coloured on standing in air for a long time. Why?
4. Acetamide is the weaker base than ethylamine. Why?
5. Name the reaction for preparation of pure 1^o amines.
6. Which is more basic – aniline or NH₃ & Why?
7. What is carbylamine reaction?
8. Convert Nitrobenzene to benzene.
9. Ethylamine is soluble in water whereas aniline does not explain.
10. Write the order of basicity in the following. p- toluidine , aniline , p – nitroaniline

3 MARKS QUESTIONS

Q-1 How will you convert the following

(i) Ethanamine to methanamine (ii) Ethanoic acid to methanamine.

Q-2 Why are amines less acidic than alcohol.

Q-3 Write coupling reaction

Q-4 Convert (i) Cyclohexanone to cyclohexamine

(ii) n-Hexanenitrile to 1- aminopentane

Q-5 Explain the following

(i) Diazonium salt of aromatic amines are more stable than aliphatic amines.

(ii) Aniline does not undergo Friedel craft's reaction.

BIOMOLECULES

01-Marks Questions

- Q1. How many glycosidic bonds are there in a trisaccharide?
- Q2. Name the amino acid which is not optically active? Give its symbol.
- Q3. The nucleic acid has a base thymine. Name the sugar present in that nucleic acid.
- Q4. Name the biocatalyst used in the conversion of glucose to C_2H_5OH .
- Q5. Sugar and glucose are organic compounds. How do you explain their solubility in water?
- Q6. Write the Zwitter ion of alanine.
- Q7. Give the term for the loss of biological activity of proteins.
- Q8. How many peptide rings are there in tetrapeptide?
- Q9. Why can't Vit.C be stored in our body?
- Q10. Which product is obtained when glucose is treated with HI?

02-Marks Questions

- Q1. Differentiate peptide bond from glycoside bond.
- Q2. Write any 2 main biological functions of nucleic acids.
- Q3. Name the polysaccharide
 - (i) that is stored in the liver of animals.
 - (ii) that is used in jelly preparation.
- Q4. Write the structure of all the dipeptides formed using glycine and alanine.
- Q5. How is glucose commercially prepared?

03-Marks Questions

- Q1. Write the deficiency diseases of Vit.B₁, Vit.B₂, Vit.B₆, Vit.B₁₂, Vit.E and Vit.K.
- Q-2 Differentiate nucleotide from nucleoside. How is dinucleotide formed?
- Q3. Give brief explanation of primary, secondary and tertiary structures of proteins.
- Q4. What do you mean by isoelectric point, mutarotation and inversion of sugar?
- Q5. Differentiate
 - (a) Fibrous protein and globular protein.
 - (b) reducing sugar and non reducing sugar
 - (c) Starch and cellulose.
 - (c) Starch- is a polymer of α -D-glucose (straight and branched chain) and cellulose is the polymer of β -D-glucose.
- Q.6. Write any 3 reactions of glucose with (a) bromine water (b) NH_2OH , (c) acetic anhydride (d) Conc. HNO_3
- Q7. Give 3 differences between DNA and RNA.
- Q8. What are enzymes? What causes denaturation?

POLYMERS

02-Marks Questions

1. Define addition polymer, give an example
2. Give the synthesis of TEFLON?
3. Write the monomeric unit of following:
4. (a) Buna-S (b) Nylon 6.6
5. What is Vulcanization of Rubber?
6. Classify the following polymer on the basis of mode synthesis:
7. (a) Terylene (b) PVC
8. What is bio degradable polymer. Give 1 example?
9. What is co polymerization? Give an example?
10. What is low & high density polythene?
11. Write the uses of Bakelite & Melamine?

12. Arrange the following polymers in increasing order of their intermolecular force of attraction.

Nylon-6, Neoprene, PVC.

03-Marks Questions

1. Give the synthesis of (i) Poly acrylonitrile (ii) Nylon 6,10?
2. In which class, the polymer are classified on the basis of molecular Forces.
3. Write the name & structure of common initiator used in free radical addition polymerization..
4. Why should one always use purest in monomer is free radical Polymerisation?

CHEMISTRY IN EVERDAY LIFE

02-Marks Questions

Q-1 NAME THE ARTIFICIAL SWEETENER WHICH IS METHYL ESTER OF DIPEPTIDE.WHY IT CANNOT BE USED IN COOKING FOOD?

Q-2 GIVE REASON(a)ASPIRIN HELPS IN THE PREVENTION OF HEART ATTACK.
(b)DIABETIC PATIENTS ARE ADVISED TO TAKE ARTIFICIAL SWEETENER.

Q-3 WHICH FORCES ARE INVOLVED IN HOLDING THE DRUGS AT ACTIVE SITES OF ENZYMES?

Q-4 COMMENT ON THE STATEMENT “ALL MEDICINES ARE DRUGS BUT ALL DRUGS ARE NOT MEDICINES”.

Q-5 DIFFERENTIATE BETWEEN BACTERIOCIDAL AND BACTERIOSTATIC ANTIBODIES.

Q-6 WHAT IS MEANT BY BROAD SPECTRUM ANTIBIOTIC?

Q-7 WHAT ARE BIODEGRADABLE AND NON BIODEGRADABLE DETERGENTS?

Q-8 WHY IS ESSENTIAL TO TEST THE PATIENTS FOR ALLERGY TO PENICILLIN BEFORE IT IS ADMINISTERED?

Q-9 GIVE EXAMPLE OF:

ANTI HISTAMINE

ANTI OXIDANT

Q-10 NAME THE ARTIFICIAL SWEETENER, WHICH IS METHYL ESTER OF DIPEPTIDE.WHY IT CANNOT BE USED IN COOKING FOOD?

Q-11. WHICH FORCES ARE INVOLVED IN HOLDING THE DRUGS AT ACTIVE SITES OF ENZYMES?

Q-12. COMMENT ON THE STATEMENT “ALL MEDICINES ARE DRUGS BUT ALL DRUGS ARE NOT MEDICINES”.

Q-13.DIFFERENTIATE BETWEEN BACTERIOCIDAL AND BACTERIOSTATIC ANTIBODIES..

Q-14 WHAT IS MEANT BY BROAD SPECTRUM ANTIBIOTIC?

Q-15.WRITE TWO MAIN CATEGORIES OF FOOD ADDITIVES?

Q-16 WHAT ARE ANTAGONIST AND AND AGONIST DRUG?

Q-17 GIVE ONE EXAMPLE OF EACH:

(I)ANALGESIC(II)ANTISEPTIC(III)ANTIHISTAMINES

(IV)TRANQUILISERS

Q-18 DIFFERENTIATE BETWEEN ANTISEPTIC AND DISINFECTANT.

Q-19 GIVE AN EXAMPLE OF EACH:(I)ANTIBIOTIC (II)ANTIPYRETIC

(III)ANTIFERTILITY DRUG