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UNIT – 1 METALLURGY**Two marks****Book Back**

1. What is the difference between minerals and ores?
2. What are the various steps involved in extraction of pure metals from their ores?
3. Which type of ores can be concentrated by froth floatation method? Give two examples for such ores.
4. Give the uses of zinc.
5. Give the basic requirement for vapour phase refining

Book inside**1. What do you mean by cementation?****Long answers****Book Back**

1. Describe a method for refining nickel.
2. Explain zone refining process
3. Explain the principle of electrolytic refining with an example.
4. Give the limitations of Ellingham diagram.
5. Explain the electrometallurgy of aluminium. Or Hall - Herold Process

Book inside

1. Explain froth floatation method.
2. Explain about Magnetic separation
3. Explain about Van-Arkel method for refining zirconium/titanium:
4. Difference between calcination and roasting

See all the application of metals and Ellingham diagram

CHAPTER – 2 p BLOCK ELEMENTS I**Two marks****Book Back**

1. Describe briefly allotropism in p- block elements with specific reference to carbon.
2. Boron does not react directly with hydrogen. Suggest one method to prepare diborane from BF_3 .
3. What is catenation ? describe the catenation property of carbon
4. Write a note on Fisher tropesch synthesis.
5. AlCl_3 behaves like a lewis acid .Substantiate this statement
6. Write a short note on hydroboration
7. How will you identify presence of borate radical?

Book inside

1. What is burnt alum
2. Explain McAfee Process
3. What is inert pair effect
4. How will you prepare borax beads from borax

Long answers**Book Back**

1. Write the Anomalous properties of the first elements of p – block
2. Explain about structure of diborane

Book inside

1. Difference between graphite and diamond
2. How is inorganic benzene prepared?
3. How is potash alum prepared?
4. Explain about Types of Silicones and their preparation

See all the uses and preparation, chemical properties (action of heat)

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Unit – 3 p BLOCK ELEMENTS – II

Two marks

Book Back

1. Explain why fluorine always exhibit an oxidation state of -1 ?
2. What are inter halogen compounds? Give examples
3. Why fluorine is more reactive than other halogens?
4. Give a reason to support that sulphuric acid is a dehydrating agent.
5. Write the reason for the anomalous behaviour of Nitrogen. W
6. Write the molecular formula and structural formula for the following molecules
a) Nitric acid b) dinitrogen pentoxide
c) phosphoric acid d) phosphine

Book inside

1. What is Aquaregia?. Write down its use.
2. Write down tests for sulphate/sulphuric acid

Long answers Book Back

1. Complete the reaction
Book inside
1. Explain about Holmes signal
2. Prove that nitric acid is an oxidising agent & nitrating agent.
3. Write about the bleaching action of chlorine.
4. What are the Properties of inter halogen compounds
5. Explain the manufacture of chlorine by electrolytic method and Deacon's process
6. Explain about Manufacture of sulphuric acid by contact process

7. Show that sulphuric acid is an oxidising agent

8. How is nitric acid manufactured using Ostwald's process?

9. Explain the action of nitric acid on metals with one example.

See all the uses and structure

Unit – 4 TRANSITION AND INNER TRANSITION ELEMENTS

Two marks

Book Back

1. What are transition metals? Give four examples
2. What are inner transition elements?
3. Justify the position of lanthanoids and actinoids in periodic table
4. Explain why compounds of Cu^{+2} are coloured but those Zn^{+2} are colourless.
5. Describe the preparation of potassium dichromate
6. Which is more stable? Fe^{3+} or Fe^{2+} - explain.
7. What are interstitial compounds?
8. Calculate the number of unpaired electrons in Ti^{3+} , Mn^{2+} and calculate the spin only magnetic moment
9. Why do zirconium and Hafnium exhibit similar properties?

Book inside

1. What is Bayer's reagent and write down its use
2. Explain about Hume-Rothery rule to form a substitute alloy
3. What are the properties of interstitial compounds
4. What is Chromyl chloride test

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Long answers

Book Back

1. Explain the oxidation state of 4d series elements
2. Explain the variation in E_{M^{2+}/M^0} 3d series.
3. What is lanthanide contraction and what are the effects of lanthanide contraction?
4. Compare lanthanides and actinides
5. Describe the variable oxidation state of 3d series elements.

Book inside

1. Explain about preparation of potassium permanganate
2. Potassium permanganate is a strong oxidising agent. Explain
3. Potassium dichromate is powerful reducing agent .Explain

Unit – 5 COORDINATION CHEMISTRY

Two marks

Book Back

1. $[\text{CuCl}_4]^{2-}$ exists while $[\text{CuI}_4]^{2-}$ does not exist why?
2. Give an example of coordination compound used in medicine and two examples of biologically important coordination compounds.
3. In an octahedral crystal field, draw the figure to show splitting of d orbitals.
4. Give one test to differentiate $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{SO}_4$ and $[\text{Co}(\text{NH}_3)_3\text{SO}_4]\text{Cl}$

5. What is linkage isomerism?

Explain with an example

6. What are hydrate isomers? Explain with an example.

7. What is crystal field stabilization energy (CFSE) ?

8. What are the limitations of VB theory?

Book inside

1. What are the Limitations of Werner's theory?
2. Define Coordination sphere
Define Coordination polyhedron
3. In a tetrahedral crystal field, draw the figure to show splitting of d orbitals
4. What is spectrochemical series
5. Explain the difference between a weak field ligand and strong field ligand

Long answers

Book Back

1. Based on VB theory explain why $[\text{Cr}(\text{NH}_3)_6]$ is paramagnetic, while $[\text{Ni}(\text{CN})_4]$ is diamagnetic.
2. Explain optical isomerism in coordination compounds with an example.
3. Give the difference between double salts and coordination compounds.
4. Write the postulates of Werner's theory.
5. Discuss briefly the nature of bonding in metal carbonyls.

Book inside

1. Explain about Coordination isomers
2. What are the Main assumptions of Valence bond theory (VBT)

Using VB Theory find the geometry , hybridization of the respective complex

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Unit – 6 SOLID STATE

Two marks

Book Back

1. Give any three characteristics of ionic crystals.
2. Define unit cell.
3. What is meant by the term “coordination number”? What is the coordination number of atoms in a bcc structure?

Book inside

1. Define isotropy and anisotropy
2. Explain about impurity defect

Long answers

Book Back

1. Differentiate crystalline solids and amorphous solids
2. Distinguish between hexagonal close packing and cubic close packing
3. Distinguish tetrahedral and octahedral voids.
4. Explain Schottky defect
5. Write short note on metal excess and metal deficiency defect with an example
6. Calculate the percentage efficiency of packing in case of body centered cubic crystal
7. Write a note on Frenkel defect.

Book inside

1. Determine packing efficiency simple cubic unit cell

2. Determine packing efficiency Face centered cubic unit cell or cubic closed packing

See all density based problems

Unit – 7 CHEMICAL KINETICS

Two marks

Book Back

1. Define average rate and instantaneous rate.
2. Define rate law and rate constant.
3. Write Arrhenius equation and explains the terms involved.

Book inside

1. Define activation energy

Long answers

Book Back

1. Derive integrated rate law for a zero order reaction $A \rightarrow \text{product}$
2. What is an elementary reaction? Give the differences between order and molecularity of a reaction.
3. Describe the graphical representation of first order reaction.
4. Explain the effect of catalyst on reaction rate with an example.
5. Explain briefly the collision theory of bimolecular reactions.
6. Explain pseudo first order reaction with an example.

Book inside

1. Differences between rate and rate constant of a reaction

Study all the effects on reaction rate and problems based on finding whether it is first order or not

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Unit – 8 IONIC EQUILIBRIUM

Short answers

1. Define solubility product
2. What is common ion effect? Give example
3. What are the Limitations of Arrhenius Concept?
4. Why ionic product of water increases with increases in temperature
5. Derive the relation between pH and pOH.
6. Define buffer index
7. The salt of strong acid and strong base does not undergoes hydrolysis .Explain
8. What do mean ionic product of water?

Long answers

1. Derive Oswald's dilution law
2. Discuss the Lowery – Bronsted concept of acids and bases
3. Derive an expression for the hydrolysis constant and degree of hydrolysis of salt of strong acid and weak base
4. Explain the buffer action of acidic buffer with an example
5. Explain the buffer action of basic buffer with an example
6. Derive Henderson equation
7. Derive an expression for the hydrolysis constant and degree of hydrolysis of salt of strong base and weak acid
8. Derive an expression for the hydrolysis constant and degree of hydrolysis of salt of weak base and weak acid

Problems based on Ostwald, Henderson, pH , dissociation constant , degree of hydrolysis of salt

Unit – 9 ELECTROCHEMISTRY

Short answers

1. Define equivalent conductance
2. What is molar conductance? Give its unit.
3. State Kohlraush's law.
4. State Faraday's law of electrolysis
5. Define-electro chemical equivalent
6. What is equivalent conductance? Give its unit
7. What is cell constant? Give its unit
8. Why does conductivity of a solution decrease on dilution of the solution?
9. Derive the relationship between Gibb's free energy change and the cell potential

Long answers

1. Derive Henderson equation
2. Explain the function of H₂ – O₂ fuel cell.
3. Explain Factors affecting electrolytic conductance
4. State and explain the Kohlraush's law
5. Derive an expression for Nernst equation
6. How is e. m. f of a half cell determined?
7. Explain about Standard hydrogen electrode (SHE) and how it is used to find the unknown electrode potential
8. Write about Electrochemical mechanism of corrosion or rusting

Cells and batteries - Cathode and anode reaction

Problems based on Kohlraush law, Nernst equation.

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Unit – 10 SURFACE CHEMISTRY**Short answers**

1. What are active centers?
2. What are promoters? Give example
3. What is catalytic poison? Give example
4. What is Tyndall's effect?
5. What is electrophoresis?
6. What is emulsion? What are emulsifying agents?
7. Explain the following with examples.
(i).Positive catalysis ii) negative catalysis iii) Autocatalysis
8. How is delta formed?
9. What is tanning?
10. Difference between lyophilic and lyophobic colloids
11. What is meant by Helmholtz double layer?
12. What is the difference between a sol and a gel?
13. Define gold number
14. Explain the homogeneous and Heterogeneous catalysis with example.

Long answers

1. Write briefly the adsorption theory of heterogeneous catalysis?
2. Explain intermediate compound theory of homogeneous catalysis
3. Write briefly about the preparation of colloids by chemical methods or condensation methods
4. Write the general characteristics of catalytic reactions
5. What is electro – osmosis? Explain (or) How can you determine the charge of dispersed medium in colloidal solution.
6. What is electrophoresis? Explain. (or) How can you determine the charge of sol particle (dispersed phase) in colloidal solution

7. How can colloidal solution be purified by dialysis and electrodialysis ?
8. Give the differences between physical adsorption and chemical adsorption
9. How are colloids prepared by using (i) mechanical dispersion method, (ii) electro dispersion method?
10. What is adsorption isotherm? Explain about Freundlich adsorption isotherm.
11. Discuss the factors affecting adsorption
12. How will you identify the types of emulsion
13. Explain about protective action of colloid
14. Explain about phase transfer catalysis.

Unit – 11 HYDROXY COMPOUNDS AND ETHERS**Short answers**

1. How phenolphthalein is prepared?
2. How ethylene glycol is converted into dioxan?
3. Give tests for phenol
4. Explain Dow's process?
5. How will you prepare ethylene glycol from ethylene?
6. How will you convert ethyl alcohol in to diethyl ether?
7. How will you convert 2-methyl 2-propanol into 2-methyl propene?
8. Give a brief account on coupling reaction of phenol with benzene diazonium chloride
9. How phenol is identified by dye test? Give equation
10. How is acrolein formed? (OR) What happens when glycerol react KHSO_4 ?
11. How is nitro glycerin prepared from Glycerol

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12. Starting from phenol how would you obtain picric acid?

13. How is tertiary butyl alcohol converted to isobutylene

14. How are 1-propanol and 2-propanal distinguished by oxidation method

15. How will you prepare glycerol or saponification reaction

16. How will you prepare nitroglycerine from glycerol (or) nitration reaction of glycerol

17. Schotten-Baumann reaction , Riemeier Tiemann Reaction.

Long answers

1. Give any two methods of preparation of anisole.

2. How does diethyl ether react with the following reagents? (i) O_2 /long contact (ii) dil. H_2SO_4 (iii) PCl_5

3. Give any three methods of preparing diethyl ether.

4. Distinguish aliphatic ether (diethyl ether) and aromatic ether (anisole).

5. How does diethyl ether react with PCl_5 , one equivalent of HI and excess of HI.

6. Write the mechanism of acid catalysed dehydration of ethanol to give ethene

7. Explain Kolbe's reaction

8. Explain Swern oxidation

9. How will you differentiate primary, secondary and tertiary alcohols by Victor's Meyer test

10. How will you differentiate primary, secondary and tertiary alcohols by Lucas test

11. Describe Saytzeff's rule

See all the naming reaction , Study the preparation , chemical properties of phenol , Glycerol . ethylene glycol

See all the uses

Unit – 12 - CARBONYL COMPOUNDS

Short answers

1. What is Urotropine? Give its use (Or) How does formaldehyde react with ammonia?

2. What is Rosenmund's reduction?

3. Give the IUPAC name for the following. (a) crotonaldehyde (b) methyl n-propyl ketone (c) phenyl acetaldehyde

4. Give the tests for aldehydes

5. Write briefly on Clemmensen reduction

6. What happens when benzaldehyde heated with NaOH

7. Explain the halo form reaction?

8. How is acetophenone prepared by Friedel -Craft's reaction?

9. State Popoff's rule 10. How is benzophenone prepared by Friedel Craft's reaction

Carboxylic acid

11. Write a note on HVZ reaction.

12. What is transesterification

13. Account for reducing nature of formic acid.

14. Write two tests to identify carboxylic acid.

15. Mention the uses of benzoic acid.

16. Compare the strength of mono, di and trichloro acetic acid.

17. Mention the uses of formic acid.

18. Prove that amide shows Amphoteric character

Long answers

1. Explain the mechanism of aldol condensation of acetaldehyde

2. Explain the mechanism of Cannizzaro reaction.

3. Write notes on Stephen's reaction & Perkin's reaction

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4. Write notes on Clemmenson's reduction and **Knoevenagel** reaction
5. Write a note on Benzoin reaction
6. Illustrate the reducing properties of acetaldehyde with examples
7. Write the difference between acetaldehyde and acetone
8. Write the difference between acetaldehyde and benzaldehyde

Carboxylic acids

1. Account for the reducing nature of Formic acid
2. Explain (i) Kolbe's electrolytic reaction and (ii) trans – esterification reaction.
3. How benzoic acid reacts with (i) Conc. HNO_3 /Conc. H_2SO_4 (ii) $\text{Cl}_2/\text{FeCl}_3$ (iii) PCl_5
4. Explain the reactions of CH_3CONH_2 with (i) P_2O_5 (ii) Br_2/NaOH and (iii) Hydrolysis by an acid.

Chemical properties , preparation of Benzaldehyde , benzoic acid , acetamide

Unit-13 ORGANIC NITROGEN COMPOUNDS

Short answers

All naming reaction

1. Schotten Baumann reaction
2. Hoffmann's hypobromite (or) bromamide reaction.
3. Gabriel phthalimide synthesis.
4. Carbylamines reaction.
5. Coupling reactions
6. Mustard oil reaction.
7. Formation of Schiff's base.
8. Diazotization.
9. Gattermann's reaction.
10. Sand Meyer's reaction
11. Gomberg's reaction

12. How will you convert acetamide to methyl amine? Give equation
13. Bantz – schiemann reaction
14. Thrope nitrile condensation
15. Levine and hauser's acetylation OR cyanomethylation reaction.
16. How will you prepare chloropicrin?
17. What is Libermann's nitroso test

Long answers

1. Distinguish between primary, secondary and tertiary amines
 2. Write a note on the reduction nitrobenzene under different conditions.
 3. How does nitrous acid react with primary, secondary, and tertiary amines
 4. Write a note on following conversion. i) chlorobenzene \rightarrow aniline ii) Aniline \rightarrow Schiff's base iii) Benzene diazonium chloride \rightarrow biphenyl
 5. How are the following conversions carried out? (i) Nitrobenzene to phenyl hydroxylamine (ii) Aniline to phenyl isocyanide (iii) Benzene diazonium chloride to biphenyl.
 6. How are the following conversions carried out? (i) Nitroethane to Methyl amine (ii) Methyl amine to Methyl isocyanide (iii) Benzene diazonium chloride to Biphenyl.
 7. How are (i) phenol, (ii) Chlorobenzene, (iii) Biphenyl prepared - by using benzene diazonium chloride?
- Chemical properties , preparation , uses of aniline , benzene diazonium chloride**

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Unit – 14 BIOMOLECULES

Short answers

1. Give the differences between primary and secondary structure of proteins
2. Give any three difference between DNA and RNA
3. Give two difference between Hormones and vitamins
4. Write a note on denaturation of proteins
5. Define an iso electric point
6. What is Zwitter ion? Give its structure
7. Name the four bases present in DNA. Which one of these not present in RNA?

Long answers

1. Elucidate the structure of fructose
2. Prove the structure of glucose
3. How are carbohydrates classified?
4. What is a peptide bond? Illustrate the formation of a peptide bond in glycyl alanine.
5. Give the biological important of Lipids
6. Explain about the structure of proteins.
7. What are the biological importance of proteins?
8. Distinguish between glucose and fructose.

Vitamins deficiency diseases, function, structure of cellulose , starch , purine , pyrimidine bases.

Unit – 15 CHEMISTRY IN EVERYDAY LIFE

Short answers

1. What are **anaesthetics**? What are the types Give one example
2. In what way antipyretics are important. Give an example
3. What are antibiotics? Give an example
4. In what way antacids are important?
5. What are artificial sweetening agents? Give two examples.
6. Write a note on Buna-S rubber.
7. How is nylon-66 prepared? Give its uses
8. What are anti-oxidants? Give two examples
9. What is a food preservative? Give an example
10. What are anti fertility drugs? Give examples.
11. What are bio degradable polymers? Give examples.
12. How will you prepare PHBV? Give its uses
13. Define TFM.

Long answers

1. How do antiseptics differ from disinfectants?
2. Explain the mechanism of cleansing action of soaps and detergents
3. How is terylene prepared
4. Explain the preparation of bakelite and give its use.
5. Explain how Free radical polymerisation occurs ?

Study all polymers preparation, drugs

(To study All Book Back Questions)

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