IMAYAM ARTS AND SCIENCE COLLEGE

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DEPARTMENT OF CHEMISTRY

Subject : GENERAL CHEMISTRY-IV

Subject Codes : 16SCCCH4

***Unit-1***

**2-Marks**

1. Write any two alloys of copper and write its uses ?

i) Brass ,Cu=60-80% ,Zn=20-40%

Uses: Domenstic Utensils,Condenser tubes,Sheets

ii) Aluminium bronze,Cu=90% Al=10%

Uses: Utensils,coins,Frames,Statues,Jewellary

2. What is meant by d-block elements?

The d-block element may thus be defined as elements having partly filled d-sub shell in their elementary form or chemically significant oxidation states.the d-block elements are also called transition elements

3. Write any two characteristics of d-block elements?

* Atomic radius decreases with increasing atomic number
* Atomic number increases the nuclear charge increases
* Ionic radii

The ionic radius decreases slowly with increase in atomic number in the transition series as shown below,

Sc2+ Ti2+ V2+ Cr2+

95 91 88 74

4. What are the minerals of Molybdenum?

Ans: Molybdenite-MoS2

Wulfenite - PbMoO4

Molybdite -MoO3

Molybdite is the principle source of the elements.

5. What are the various type of platinum?

* + Spongy platinum
  + Platinum black
  + Platinized asbestor
  + Colloidal platinum

6. State Arrhenius concept?

In 1867 Arrhenius proposed the theory of electrolytic dissosiation.According to this theory ,in aqueous solution hydrogen containing compounds produce H+ ions is termed as acid and hydroxy group containing compound are produce hydroxy ion is termed as base .

Ex: In acid , Hcl(aq) H+(aq)+ cl-(aq)

In base, NaOH(aq) Na+(aq)+ OH-(aq).

7. State Lowry bronsted concept?

In 1923 proposed the new theory for acid and bases.According to this theory, An acid is any hydrogen contains substance (a molecules ,a cation ,a anion)that can donate a proton.

Ex:Hcl

A base is a substance that can accept a protonfrom any other substance is called as base. In short, an acid is a proton donor and an base is a proton acceptor.

Hcl +H2O H3O+ + Cl-

8. State Lewis concept.

An acid is a electron pair acceptor and an base is a electron pair donor. A base should have a long pair of electrons which in making a coordinate, covalent bond with the acid when an acid combines with base.

Ex: F

BF 3 +: NH3  F - B -NH3 +

9. What is amalgam?

Mercury dissolves heavy in all the metals forming alloys which are called amalgam.

Amalgam are the solutions in mercury of the compounds of metal and mercury.

***Unit - II***

1. What are the Organo metalic compound ,Give any four examples?

Ans: An organic compound in which a metal is directly linked to a carbon is kown as organo metalic compounds.

Examples: Organo megnisium compound

Organo zinc compound , Organo copper compound , Organo lead compound

1. Write the proporties of Organo megnesium compounds?

Ans: Reaction with active H2 :

I

CH3 MgI+ OH-H CH4+Mg

OH

OR

CH3 MgI+ R-OH CH4+Mg

I

1. **Write the properties of Organo Lithium compounds?**

Ans: Action with water:

C4H9Li + H2O \_\_\_ C4H10+LiOH

n\_ butene

2CH3Li +AuBr 2\_\_\_\_\_\_ (CH3)2Au +2Li Br

di\_methyl gold

1. **Write the preperation of Organo zinc metallic compound ?**

Ans: RI +Zn \_CO2\_\_\_ R- Zn - I

2R- Zn - I \_\_Co2\_\_R2Zn+ Zn I2

Tri- alkyl aluminium On reaction with zinc chloride also gives disalkyl chloride

2R3Al + Zn Cl2 \_\_\_\_\_ R2Zn +R2Al Cl

1. **Write the uses of organo lead compound ?**

It is used for raising the octane number of petool .

One part of TEL per thousand parts of petool is used along with a small amount of ethylene bromide to present lead form being deposited in the cylinder lead.

It is sufficiently volatile and therefore can be removed with the exhaust gases.

***Unit-3***

1. **What is epoxide? Give its uses?**

The epoxides are named by numbering the alkyl the two carbon to which to oxygen is attached the prefix ''epoxy'' denotes this functional group.

CH2 -CH2 CH3 - CH - CH2

O O

Ethylene oxide propylene oxide

17. Write any two chemical proporties Alcohol?

Ans: Reaction with SoCl2:

C2H5 OH +SoCl2 \_\_\_\_\_\_\_\_ C2H5Cl + So2 +Hcl.

\* React with Pcl5 and Pcl3:

C2H5OH + Pcl5 \_\_\_\_\_C2H5 Cl + poCl3 +HCl

C2H5OH+ Pcl3 \_\_\_\_\_\_ C2H5Cl + H3Po3

1. **Preperation of glycol?**

Ans: CH2 - Br Na2Co3 CH2 OH

CH2 - Br H2O CH2OH

1,2 dibromo ethylene Glycol

CH2NH2  2NHO2 CH2OH

CH2NH2 --------- CH2OH

Diammine Glycol

1. **Uses of Glycerol ?**

Ans: Use in soap industry

Used in candle industry

Used as organic synthesis

1. **Any two preperation if phenol?**

Dows process:

C6H5 Cl +H2O \_SiO2\_\_ C6H5OH +HCl Diazonium chloride:

C6H5Cl + H2O\_\_\_\_\_\_ C6H5OH+N2 +HCl

1. **Preperation of Meta di hydroxy benzene ?**

Ans: It is prepared by fusion of 1,3 benzene di sulphonic acid

\_\_\_fuse\_\_\_\_\_ \_\_HCl\_\_ +

NaCl

1. **Properties of Catechol?**

React with Lead acetate solution: It gives a white precipitate it condenses with thalic anhydride in the presence of conc.H2SO4 to form alizarin.

23. **Uses of ether?**

\*Diethyl etheris used as refregent as an anaesthetic.

\*As a medium for the preparation of grignard reagent.

\*As a solvent for the extraction of organic compounds,mixed with ethanol as substitute for petrol.

24. **What is crown ether?**

The macrocyclic polyethers resemble crowns and therefore called crown ethers.

Synthesis:

25. **Write two application of crown ether?**

\*It is the large ring polyethers.cyclic polymers of ethylene glycol(OCH2CH2n).

\*It is denoted as x-crown-y-x is total corban atom.y is a number of 0xygen atom.

\*Chealating agent form complex with postive ions.

***Unit – IV***

***2Marks***

1. Define closed system

A system which can exchange energy but not matter with its surroundings is called closed system.

1. Define open system.

A system which can exchange both matter and energy with its system is called an open system.

1. Define isolated system

A system which can exchange neither energy nor matter with its surroundings is called an isolated system

1. Cyclic process

When a system after completing a series of changes returns to its original state and it is said to have completed a cyclic. Such process is known as a cyclic process.

1. Reversible process

Reversible process is a process which is carried out infinitesimally slowly so that the driving force is only inifinitesimally greater than the opposing force.

1. Irreversible process

An irreversible process is a process which does not take place infinitesimally slowly.

1. Isothermal process

A process is said to be isothermal if the temperature remain constant during the process.

1. Adiabatic process

A process is said to be adiabatic if no heat enters or leaves the system during any step of the process.

1. State and path function

State functions are variableswhich are determined only by the initial and final states of the system and not by the path followed during the change from initial and final state.

Ex : internal energy, enthalpy, entropy, free energy, work function.

Path functions are quantities that depends on the path followed during a change.

Ex: heat absorbed, work done.

1. Concept of heat and work

Heat is defined as a quantity that flows across the system and its surroundings. Work defined as any quantity of the system during the change its state.

***Unit - V***

***2 Marks***

1. Rate of reaction

The rate of a chemical reaction is defined as the change in concentration of any of the reactants in unit time.

1. Rate law

Rate law is directly proportional to the concentration of the reactant as well as product.

rate ᾳ [A] [B]

1. Rate constant

It is defined as the change in contration of reactant or product per unit time in a reaction in which al, the reactants are at unit concentration.

1. Order of the reaction

It is defined as the sum of the powers of the concentration terms that occur in the rate equation.

1. Molecularity of the reaction

The molecularity of the reaction is defined as the minimum number of molecules or atoms of the reactants necessary for the reaction to take place.

1. Zero order reaction

Zero order reaction is one in which the rate of the chemical reaction is entirely independent of the concentration of the reactants.

1. First order reaction

It is defined as one in which the rate of the chemical reaction is depends on one concentration terms only.

1. Second order reaction

It is defined as one in which the rate of the chemical reaction is depends on two concentration terms or square root of the concentration.

1. Temperature coefficient

It is the ration of rate constant for a reaction at two different temperature at (t + 10)0C be kt+100 the two temperature are generally taken as 350C and 250C.

1. Activation energy

The minimum energy is necessary to permit a reaction to occur is called activation energy.

***Unit-1***

**5-marks**

1. Explain Arrhenius ,Lowry Bronsted and Lewis concepts of acid and bases with its suitable examples?

2. How is Thorium extracted from its Ore?

3. Extraction of Molybdenum?

4. Extraction of Platinum?

5. What is Amalgam?Write its types and uses?

6. Write Galvanization?

7. Experimental evidence of Mercurous ion Hg22+ ?

***Unit-II***

1. Explain the preparation properties and uses of Orgono lead compounds
2. Explain the preperation properties and uses of Organo Lithium compounds?
3. Explain the preperation properties and uses of Organo megnisium compounds
4. Explain the preperation properties and uses of Organo zinc metalic compounds?
5. Synthetic uses of Griganard reagent?

***Unit-III***

1. What are crown ethers? Explain its structure and applications?
2. Write any four methods of preperation of Alcohols?
3. Preperation properties uses of Glycol ?
4. Preperation properties uses of Glycerols?
5. Write short notes on Epoxides?
6. Discuss the preparation, pproperties of dihydroxy phenol.

***Unit IV***

1. Define first law of thermodynamics,
2. Discuss the internal energy ,enthalpy and heat capacity?
3. Explain intergral and differential heats of solution and dilution?
4. Difference between reversible and irreversible process?
5. Explain state and path function?
6. Work of expansion at constant pressure and at constant volume?
7. Derive kichorff equation
8. Discuss the bond dissociation energy and its application

***Unit V***

1. What are the difference between order and molecularity of a reaction?
2. ARRT Theory.Explain?
3. Write short notes on collision theory?

4. Explain the transition state theory?

5. Discuss the determination of rate constant of a reaction by volumetry.

6. Discuss the determination of rate constant by polarimetry.

***Unit I***

***10Marks***

1. Write general characteristics of d-blockelements?

2. List out alloys of copper its properties and uses?

3. Explain briefly of f- block elements?

4. Extraction of thorium

5. Discuss the acid and bases concepts.

6. Extraction of platinum

***Unit II***

1. Explain the preparation, properties and uses of organomegnesium
2. Explain the preparation, properties of organolead compounds?
3. Explain the preparation,properties and uses of organolithium
4. Explain the properties, preparation of organozinc compounds?

***Unit III***

1. How are phenol classified give suitable explain.

2. Discuss the methods of preparation, properties and use of phenol?

3. Write the preparation, properties and uses of dihydric alcohol?

4. Write the prepararion, properties and uses of glycol?

5. Discuss the preparation , properties and uses of glycerol?

6. Explain briefly aromatic electrophilic substitution.

7. Explain the theory of orientation and reactivity in aromatic compounds?

8. Write short notes an ether?

***Unit IV***

1. Derive kirchoff''s equation?

2. Derive the equation for workdone for expansion of real gases under isothermal and adiabatic condition?

3. Discuss Relationship between Cp and Cv

4. Relationship between enthalpy reaction of constant volume (qp) and constant pressure (qv)?

5. Explain the bond energy. How it is calculated.

***Unit V***

1. Explain ARRT theory?

2. Derivation of first order rate constant

3. Discuss characteristics of order of reaction.

4. Explain the Half life period of zero ,first ,second order reaction with exmples?

5. Derive the concept of activation energy, energy barrier.

6. Derive the arrhenius equation?

7. Explain lindemann's theory of unimolecular reaction?

8. Explain the methods of determining of the order of reaction.