

# PURBANCHAL UNIVERSITY

2024

B. E. Computer/ECA/Electrical/Biomedical/Second Semester/Final  
Time: 03:00 hrs. Full Marks: 60 / Pass Marks: 24

## BSH2003: Chemistry (New Course)

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

**Attempt ALL questions.**

### Group A

$4 \times 2 = 8$

#### **Very short question:**

1. Define acid buffer and basic buffer with suitable examples.
2. What are diastereomers? Give examples.
3. What are paints and enamels?
4. Define following terms: (i) double salts (ii) EAN

### Group B

$7 \times 4 = 28$

#### **Short question:**

5. Write short notes on: (a) Acid rain and (b) Global warming
6. What are tetrahedral complexes? Discuss it.
7. What would be the pH of mixture obtained by dissolving 0.2 g NaOH in 100 mL of HCl with pH=4.
8. Derive the relation for Ostwald's Dilution Law with its limitation.
9. State Saytzeff's rule with examples.
10. Write differences between enantiomers and meso compounds.
11. What are rubbers? Discuss examples of any two rubbers with their applications.

OR,

Explain the sources and effects of water pollutants.

### Group C

$3 \times 8 = 24$

#### **Long question:**

12. What are elimination reactions? Differentiate between E1 and E2 reactions giving examples.

1+7

**Contd. ...**

(2)

OR,

Write safety measures in Petroleum refineries and LPG bottling plant.

- 13(a) Differentiate between electrolytic and Galvanic cell.  
(b) Calculate the emf of the following Daniel cell at 25°C



Given,  $E_{\frac{Zn^{++}}{Zn}}^0 = -0.76V$  and  $E_{\frac{Cu^{++}}{Cu}}^0 = +0.34V$

14. What are transition elements? Explain the characteristics of Transition elements with reference to:

- (a) Variable oxidation states  
(b) Complex formation

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**UNIT TEST CHEMISTRY      FULL MARKS :20**

1. Define buffer. Derive Henderson equation to calculate the pH of the buffer consisting of a weak acid and its salt.
2. What is meant by buffer solution? How does a solution containing a mixture of benzoic acid and sodium benzoate maintain its constant pH value even on the addition of small amount of strong acid? Explain. State and explain Ostwald's dilution law.
3. What is meant by standard hydrogen electrode? Calculate the emf of the following cell at 25°C.



Given,

$$E^{\circ} \text{Mg}^{++}/\text{Mg} = -2.37\text{V}$$

$$E^{\circ} \text{Ag}^{+}/\text{Ag} = +0.8\text{V}$$

4. What do you mean by standard and non-standard electrode potential? Describe the method to determine standard electrode potential of copper when it is constructed as anode.
5. Differentiate between electrolytic cell and galvanic cell. Give the function of salt bridge. Calculate the emf of the cell.



$$\text{Given, } E^{\circ} \text{Ag}/\text{Ag}^{+} = -0.80\text{V}, E^{\circ} \text{zn}/\text{zn}^{++} = 0.76\text{V},$$

Also write the cell reaction showing anode and cathodic reaction.



*Candidates are required to give their answers in their own words as far as practicable. All questions carry equal marks. The marks allotted for each sub-question is specified along its side.*

**Group: A**

**VERY SHORT QUESTIONS:** (3x2=6)

1. Define strong and weak electrolyte.
2. What is meant by d-d transition?
3. Show your familiarity with TNT.

**Group: B**

**SHORT QUESTIONS** (4X4=16)

4. Calculate the emf of the electrode couple of  $E^\circ_{Sn/Sn+2} = -1.4V$  and  $E^\circ_{Fe^{+2}/Fe^{+3}}$ . Where the concentration of  $Sn^{+2}$ ,  $Fe^{+2}$  and  $Fe^{+3}$  is 0.2M, 0.1M, and 1M respectively.
5. What is meant by buffer capacity? Derive Henderson's equation of acidic buffer solution.
6. What is Grignard's reagent? How can it be prepared? Write down the reaction between ethyl magnesium bromide and water.
7. Calculate the weight in gram of  $NH_4Cl$  required to prepare buffer solution having  $pH$  9.35 in 200 cc of 0.2 M ammonia solution. ( $P_{Kb} = 4.74$ )

**GROUP: C**

**LONG QUESTIONS** (1X8=8)

8. What do you mean by SN reactions? Explain the reaction mechanism for hydrolysis of tertiary alkyl halide by aqueous sodium hydroxide. (2+6)



**KANTIPUR**  
CITY COLLEGE SINCE 2000  
Affiliated to Purbanchal University

Pre-Board/ BE Computer/ Semester: II / Chemistry

**Full Marks: 60 / Pass Marks: 24 Time: 3 hrs**

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**GROUP:A**

**Very short questions (2x4=8)**

1. State Ostwald's dilution law. Write down the limitation of Ostwald's dilution law.
2. Zinc is not considered as transition element. Give the reason.
3. Cis isomer is less stable than trans isomer. Why?
4. Write two differences between low and high explosive.

**Short questions (4x7=28)**

5. What are the major causes of soil pollution? Write any two consequences of soil pollution.
6. What is meant by buffer capacity? Derive Henderson's equation of acidic buffer solution.
7. Write down the postulates of valence bond theory.
8. What is meant by optical isomers? Write down the possible isomers of lactic acid. Differentiate between enantiomers and diastereomers.
9. What is paint? Write down the characteristics of good paints.
10. What is meant by condensation polymer? Explain with examples. What are the characteristics of vulcanized rubber?
11. Calculate the weight in gram of  $\text{NH}_4\text{Cl}$  required to prepare buffer solution having  $\text{pH} 9.35$  in 20 cc of 0.2 M ammonia solution. ( $\text{P}^{K_b} = 4.74$ )

OR

Write a short note on global warming.

**Long questions(3x8=24)**

12. Derive Nernst's equation. Calculate the emf of the electrode couple of  $E^{\circ}_{\text{Cu}/\text{Cu}^{+2}} = -0.34\text{V}$  and  $E^{\circ}_{\text{Zn}^{+2}/\text{Zn}} = -0.76\text{V}$ . Where the concentration of  $\text{Zn}^{+2}$ ,  $\text{Cu}^{+2}$  is 0.1M, and 1M respectively.

13. Why do transition elements form complex compounds? Why does the presence of unpaired electrons make a substance paramagnetic in nature? Explain it with magnetic moment measurement. (4+4)

14. What do you mean by SN reactions? Explain the reaction mechanism for hydrolysis of primary alkyl halide by aqueous sodium hydroxide. (2+6)

OR

Write down the classification of polymers on the basis of structure. give the preparation and application of silicones and FRP.

# PURBANCHAL UNIVERSITY

2023

B. E. Computer/ECA/Electrical/Biomedical/Second Semester/Final  
Time: 03:00 hrs. Full Marks: 60 /Pass Marks: 24

**BSH2003: Chemistry (New Course)**

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

**Attempt ALL questions.**

## Group A

$4 \times 2 = 8$

### **Very short question:**

1. Define equilibrium constant and degree of ionization.
2. Write any four major differences between double salt and complex salt?
3. Differentiate between racemic mixture and meso compound.
4. Write the preparation and uses of TNT (trinitrotoluene).

## Group B

$7 \times 4 = 28$

### **Short question:**

5. Write the sources and effects of water pollutants. 4
6. Define basic buffer and derive the Henderson's equation for basic buffer. 4
7. Explain the geometry and magnetic properties of  $[Zn(NH_3)_4]^{2+}$  on the basis of VBT. 4
8. What are geometrical isomers? "cis-isomer is less stable than trans-isomer". Give reason. What is enantiomer? 1+2+1
9. How can you obtain different alcohols from Grignard's reagent? 4
10. What are Homopolymer and Hetero polymers? Explain with examples. 4
11. Calculate the pH of mixture solution containing 50 ml of 0.4M acetic acid and 150 ml of 0.2M sodium acetate and also calculate the  $H^+$  ion concentration in the mixture solution. 4

**OR,**

(2)

What do you mean by environmental effects of air pollutants? 4  
Write short notes on Global Warming.

Group C

$3 \times 8 = 24$

**Short question:**

12. What is standard electrode potential? How can you measure the standard electrode potential of Copper? Calculate the cell potential at 25°C; Zn (s) / Zn<sup>++</sup>(aq, 0.3M) // Cu<sup>++</sup>(aq, 0.1M) / Cu (s). 1+3+4

Given  $E^{\circ}_{Zn^{++}/Zn} = -0.76V$  and  $E^{\circ}_{Cu^{++}/Cu} +0.34V$

13. What are the transition elements? Why are they called so? Explain the colour formation tendency of transition elements. 2+1+5
14. What is meant by rearrangement reaction? Write the mechanism of E<sub>1</sub> and E<sub>2</sub> reaction with suitable examples. 2+6

**OR,**

What is synthetic rubber? Give the preparation and uses of Buna-S and Buna-N rubber. 2+3+3

**PURBANCHAL UNIVERSITY**

**2022**

B.E. (Computer/E. & C./ Electrical)/Second Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

**BEG104SH: Chemistry (New Course)**

*Candidates are required to give their answers in their own words as far as practicable.*

*The figures in the margin indicate full marks.*

*All questions carry equal marks. The marks allotted for each sub-question is specified along its side.*

**Answer FIVE questions, selecting at least TWO questions from Group A and ONE each from Group B and C.**

**Group A**

- 1(a) Derive Schrodinger's wave equation. Write the significance of  $\Psi$  and  $\Psi^2$ . 8+2
- (b) Construct the Galvanic cells and differentiate between electrolytic and Galvanic cell. 4+2
- 2(a) Derive Ostwald's dilution law and point out its limitations. 6+2
- (b) At  $25^\circ\text{C}$ , the dissociation constant of Ammonium hydroxide is  $1.8 \times 10^{-5}$  for 1.5 molar solution. Calculate, (a) Degree of ionization. (b) Percentage ionization (c) Molar concentration of  $[\text{OH}^-]$  ion and pH of the solution. 2+2+2+2
- 3(a) What do you mean by metallic bond? Draw the crystal structure of NaCl. 4+4
- (b) How can you explain the formation of metallic bond on the basis of electron sea model? Write its properties. 6+2
4. Write short notes on any TWO 8+8
- (a) Aufbau's principle.
- (b) Stability of Noble gas.
- (c) Corrosion of Metals and its preventions.

(2)  
Group B

- 5(a) What are transition elements? Give the name and electronic configuration of 3-d series. Why are Zn, Cd Hg and their divalent cations are not considered as transition elements? 2+4+2
- (b) Explain the characteristic of transition element with reference to 4+4
- (i) Magnetic Property.
  - (ii) Outer and inner complex.
6. What are the postulates of valence bond theory? How does VBT explain the formation of tetrahedral and square planar complexes with suitable examples of each. 6+5+5
7. Write short notes on any TWO: 8+8
- (a) Electronic interpretation of coordination.
  - (b) Werner's coordination theory
  - (c) Colour formation in complexes.

Group C

- 8(a) Write Addition reaction. Suggest Markonikov's rules and peroxide effect. 4+4+4
- (b) Write E<sub>1</sub> and E<sub>2</sub> reaction.
9. Write the criteria for the compound to exhibit optical isomerism. Also explain the optical isomerism showing enantiomers and diasteriorners. 4
10. Write short notes any TWO: 6+10
- (a) Synthetic uses of Grignard reagent.
  - (b) Chemistry of Bakelite and PVC.
  - (c) Explosive

**PURBANCHAL UNIVERSITY  
2021**

B.E. (Computer/E. & C./ Electrical)/Second Semester/Final  
Time: 03:00 hrs.

Full Marks: 80 / Pass Marks: 32

**BEG104SH: Chemistry (New Course)**

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

**Answer FIVE questions, selecting at least TWO questions from Group A and ONE each from Group B and C.**

**Group A**

- 1(a) What are quantum numbers? Give the significances of the four quantum numbers. What are the four quantum numbers of 19<sup>th</sup> electron of chromium (at.no 24) 2+4+2
- (b) Explain the rule which gives the sequence of filling the orbital. Give sequence of filling of orbital for Chromium. Explain the reasons for the extra stability of half filled and completely filled sub shell. 4+2+2
- 2(a) Define a buffer solution. Explain with an example why p<sup>H</sup> of a buffer solution does not change significantly on addition of acid or bases. Calculate the p<sup>H</sup> of buffer solution made by mixing 100 ml of 0.1M acetic acid with 200 ml of 0.2 M sodium acetate. (p<sup>Ka</sup> for acetic acid = 4.74) 1+5+4
- (b) Construct electrovalent and Golvanic cell. 3+3
3. Define electrovalent bond. How electrovalent bonds differ from metallic bond? Write the properties of electrovalent compounds and metals. 2+4+5+5
4. Write short notes on any TWO 8+8
- (a) Crystal lattic
- (b) Ostwald's dilution law
- (c) Stability of Nobel gas

(2)

Group B

5. What are co-ordination compounds? How does Valence Bond theory explain the formation of  $[Fe(CN)_6]^{4-}$  and  $[COF_6]^{3-}$  ions? Also predict its geometry and magnetic behavior with reasons. Give the differences between low spin complexes and high spin complexes.

2+5+5+4

- 6(a) What are d-block elements? Which of the d- block elements are not considered as typical transition elements and why? Explain why the paramagnetism in transition elements first increases gets to maximum value near the middle of the series and then decreases.

2+2+4

- (b) Explain the following features of transition elements. 4+4

- (i) Werner's theory
- (ii) Formation of complex

7. Write short notes on any TWO: 8+8

- (a) Characteristic of transition element
- (b) Effective atomic number and its application.
- (c) Double salt and Complex salt

Group C

- 8(a) How does elimination reaction differ from substitution reaction? Explain the mechanism and orientation of E1 and E2 reaction.

9. What is Grignard reagent? By using Grignard's reagent how will you obtain 4+6+6

- (i) Primary secondary & tertiary alcohol.
- (ii) Alkane.
- (iii) Carboxylic acid

9

4

10. Write short notes on any TWO: 3

- (a) Markownikoff's rule and Kharasch's effect
- (b) Preparation, properties and uses of Teflon and Nylon6,6
- (c) Explosives

8+8

**PURBANCHAL UNIVERSITY**

**2019**

B.E. (Computer/E. & C./ Electrical)/Second Semester/Final  
Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

**BEG104SH: Chemistry (New Course)**

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

**Answer FIVE questions, selecting at least TWO questions from Group A and ONE each from Group B and C.**

**Group A**

- 1(a) Derive de-Droglie equation for a particle of mass  $m$  moving with a velocity 'c'. 8
- (b) Derive the time independent form of three dimensional schrodinger's wave equation. 8
2. Define and derive Ostwald's dilution law for ionization of a weak electrolyte. Calculate the PH of a buffer consisting 0.3 M  $\text{CH}_3\text{COOH}$  and 0.5 M  $\text{CH}_3\text{COON}_a$ . 6+4
- (b) Calculate the emf of the galvanic cell made by coupling two half cells viz,  $\text{Cr}/\text{Cr}^{+3}$  (0.5M) and  $\text{Fe}/\text{Fe}^{+2}$  (0.2M). Given that  $E^\circ_{\text{Cr}/\text{Cr}^{+3}} = 0.75\text{V}$  and  $E^\circ_{\text{Fe}^{+2}/\text{Fe}} = 0.44\text{V}$  also write the cell reaction. 4+2
- 3(a) Explain the metallic Bond under the basis of electron sea model. also write the properties of electrovalent compound 8+4=12
- (b) Draw the crystal structure of NaCl. 4
4. Write short notes on any TWO: 8+8
- (a) Buffer solution.  
(b) Aufbau principle.  
(c) Quantum number

**Contd. ...**

(2)

### Group B

- Group B**

5. Define transition elements. Why are they called so? Give the electronic configuration of 3d series. Explain the characteristic properties of transition element with regard to. 2+2+4+8  
(a) Oxidation state (b) Catalytic properties  
(c) Colour (d) Complex formation

6. Differentiate between double salt and complex salt. State the postulates of valence bond theory for the formation of co-ordination compound. Write the IUPAC name of the following. 4+8+4  
(a)  $[\text{Fe}(\text{H}_2\text{O})_6]\text{SO}_4$  (b)  $\text{K}_4[\text{Fe}(\text{CN})_6]$   
(c)  $[\text{Pt}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}_2$  (d)  $\text{Na}_3[\text{Al}(\text{C}_2\text{O}_4)_3]$  8+8

Write short notes on any TWO:

(a) Werner's theory.  
(b) Application of complex compound.  
(c) Valence bond theory.

**Group C**

(a) What do you mean by stereoisomerism? What do you mean by optical activity of a compound? What are the necessary conditions for a compound to show optical isomerism? Illustrate your answer with examples. 2+2+6  
(b) What do you mean by nacemic mixture? How can it be separated by biochemical method? 2+4  
(c) Explain the mechanism of  $E_1$  and  $E_2$  reaction with suitable examples. 8  
(d) State and explain Markovnikov's rule and peroxide effect with suitable examples. 8

Write short notes on any TWO: 8+8

(a) Explosives  
(b) Copolymer and homopolymer  
(c) Grignards reagent



**PURBANCHAL UNIVERSITY**

**2018**

B.E. (Computer/E. & C./ Electrical)/Second Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

**BEG104SH: Chemistry (New Course)**

Candidates are required to give their answers in their own words as far as practicable.

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All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

**Answer FIVE questions, selecting at least TWO questions from Group A and ONE each from Group B and C.**

**Group A**

1(a) Derive an expression to find schrodinger wave equation. What are the significance of  $\Psi$  and  $\Psi^2$  in schrodinger wave equation. 8+2

(b) What do you understand by dual character of electron? Derive de-Broglie equation. 2+4

2(a) What is buffer solution? Derive Henderson's equation for basic buffer. Calculate  $P^H$  of a mixture of 10ml of 0.1 M ammonium chloride solution and same volume of 0.2M ammonia solution ( $p^{kb}$  for ammonia solution = 4.74) 2+2+4

(b) How does galvanic cell generate electricity? Construct a cell with following cell reaction. Write its notation and calculate standard emf of the cell. 2+1+1+4



(1M)

1(M)

Given, standard reduction potential of Al and Zn are -1.66V and 0.76V respectively.

3(a) Discuss the electrovalent bond with its characters. Draw the crystal structure of  $\text{NaCl}$ . 8

(b) Explain "electron sea theory" of metallic bond. Explain any two properties of metals on the basis of electron sea theory". 8

4 Write short notes on any TWO: 8+8

(a) Quantum number

(b) Corrosion of metal

(c) Ostwald's dilution law.

(2)

Group B

5. What are d-block elements? In what way are the electronic configurations of d-block elements different from those of s-block elements? How do the following properties vary in 3d series of transition elements?  $2+4+2.5\times4=16$

- (a) Magnetic property
- (b) Colour formation
- (c) Variable oxidation state
- (d) Covalent radii

- 6(a) What are the postulates of Werner's theory? Calculate the EAN of the central metal ions in the following complexes.  $6+2$



- (b) State the postulates of valence bond theory for the formation of coordination compounds. Explain why octahedral complexes of  $\text{Ni}^{2+}$  ion are outer octahedral complex.  $6+2$

7. Write short notes on any TWO:  $8+8$

- (a) Ligands and its classification
- (b) Characteristics and properties of transition metal
- (c) Applications of 3d transition elements.

Group C

- 8(a) Write the mechanism of unimolecular elimination reaction. How does it differ from bimolecular elimination reaction?  $6+2$

- (b) Why does haloalkane favour  $S_N$  reaction? Explain why there is only inversion product in  $S_N2$  reaction and both inversion and retention products in  $S_N1$  path.  $2+3+3$

- 9(a) Distinguish between enantiomers and diastereomers. Show all optical isomers of (i) 3 Bromo 2-butanol and (ii) Tartaric acid. Also show optically inactive meso form of tartaric acid. Explain why 3 Bromo 2 butanol does not exist in meso form.  $2+4+1+3$

- (b) Write down the synthetic uses of Grignard's reagent.  $6$

10. Write short notes on any TWO:  $8+8$

- (a) Rearrangement reaction
- (b) TNT and TNG
- (a) Addition polymer and condensed polymer



# PURBANCHAL UNIVERSITY

2017

B.E. (Computer/E. & C./ Electrical)/Second Semester/Final  
Time: 03:00 hrs.

Full Marks: 80 / Pass Marks: 32

**BEG104SH: Chemistry (New Course)**

Candidates are required to give their answers in their own words as far as practicable.

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All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

**Answer FIVE questions, selecting at least TWO questions from Group A and ONE each from Group B and C.**

## Group A

- 1(a) What is buffer capacity and Buffer range? Explain the mechanism of buffer action with a suitable example. 2+2+6
- (b) What is meant by galvanic cell? Calculate emf of a daniell cell  $Zn/Zn^{++}(0.1M) // Cu^{+2}(0.001M)/Cu$ . Given,  $E^\circ Zn/Zn^{+2}=0.76V$ ,  $E^\circ Cu^{+2}/Cu=+0.34V$ . 6
- 2(a) What do you mean by metallic bond? Explain the electron gas model of metallic bonding. How does this model explain the following properties of metals; (i) Luster and Reflectivity (ii) heat conductivity and (iii) ductility and malleability? 2+4+6
- (b) Define the terms unit cell, lattice pints and crystal lattice. 4
- 3(a) Derive Schrodinger's wave equation. 10
- (b) Write short note on Aufbau principle. 6
4. Write short notes on any TWO: 8+8
- Electrochemical theory of corrosion.
  - Ionic compounds and their properties
  - Types of quantum number

## Group B

5. What are primary and secondary valences of metal? Explain the structure of  $K_4 [Fe(CN)_6]$  and  $[Co(NH_3)_6] Cl_3$  on the basis of werner' s co-ordination theory. 6+4

(2)

- (b) Write the postulate of VBT and explain its limitation. 3+3
6. What are transition element? Explain the following with suitable reasons. 4++4+4+4
- (a) Colour formation by complex
  - (b) Magnetic behavior of complex
  - (c) Variable oxidation states of complex.
7. Write short notes on any TWO: 8+8
- (a) Electronic interpretation of co-ordination.
  - (b) Origin of diamagnetism and paramagnetism.
  - (c) Ligands.

**Group C**

8. Describe the mechanism involved in the reaction between a tertiary alkyl halide and aqueous caustic potash. How does  $S_N2$  reaction differ from  $S_N1$  reaction? 10+6
9. What are conditions necessary to exhibit geometrical and optical isomerism? Explain the isomers of tartaric acid and 2, 3-dichloropentane. 6+10
10. Write short notes on any TWO: 8+8
- (a) Chemistry of Grignard's reagent
  - (b) Explosive
  - (c) Addition reaction.

# PUNECHAL UNIVERSITY

## 2016

Ex. (Computer/Electrical)/ Second Semester /Final  
Date: 03/09/16  
Full Marks: 80 /Pass Marks: 32

Subject: Chemistry (New Course)

*Answers are required to give their answers in their own words as far as practicable.*

*The figures in the margin indicate full marks.*

*All questions carry equal marks. The marks allotted for each sub-question is specified along its side.*

**Answer FIVE questions, selecting at least TWO questions from Group A and ONE from Group B and C.**

### Group A

Q) What is electrode potential? How does it originate? Explain the process of determining the standard electrode potential of zinc. 6+2

Q) Calculate the percentage ionization of 0.1M acetic acid in (a) water and (b) 0.2M sodium acetate. Also calculate the concentration of H<sup>+</sup> ion and pH of such solutions. Ka of acetic acid is  $1.8 \times 10^{-5}$ . 8

Q) What do you mean by metallic bond? Explain the electron gas model of metallic bonding. How does this model explain conductivity and malleability properties of metal? 2+8

Q) Explain electrovalency with examples. Write the Characteristics of electrovalent compounds. 2+4

Q) Derive time independent Schrodinger's wave equation. Write significances of ψ<sub>1</sub> and ψ<sub>2</sub>; 10

Q) Write short note on Pauli's exclusion principle. 6

Q) Write short notes on any TWO:

(a) Mechanism of buffer action

(b) Nernst's equation

(c) Aufbau Principle

(2)

**Group B**

5.

Mention the differences between inner orbital and outer orbital complexes. How does VBT explain the formation of  $[\text{Co}(\text{NH}_3)_6]^{2+}$   $[\text{CoF}_6]^{4-}$ . 6+10

6.

Define d-block elements. Explain the following with suitable reasons; (a)  $\text{Fe}^{3+}$  is more paramagnetic than  $\text{Fe}^{2+}$  (b)  $\text{TiO}_2$  is white but  $\text{TiCl}_3$  is violet (c)  $\text{Cu}^+$  salt are colorless but  $\text{Cu}^{2+}$  salts are colored. 4+12

Write short notes on any TWO: 8+8

(a) Werner's co-ordination theory.

~~(b)~~ Ligands

~~(c)~~ Diamagnetism and paramagnetism.

**Group C**

8.

Define carbonium ion and carboanion. Why is carbonium ion formed at intermediate in  $\text{S}_{\text{N}}1$  mechanism and what are the possible configurations of the products of  $\text{S}_{\text{N}}1$  mechanism. 6+10

9.(a) Explain optical isomerism and geometrical isomerism with example. 8

(b) State and explain Markonikov's addition reaction with suitable example. What do you mean by peroxide effect? 8

10. Write short notes on any TWO: 8

(a) Elimination reaction

~~(b)~~ Properties of Grignard's Reagent

(c) Synthetic fiber

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(2)

**Group B**

- What is the postulate of the VBT and formation of octahedral complexes  $[Co(NH_3)_6]^{+}$ ,  $[CoF_6]^{3-}$ ? Why is Zn, Cd and Hg not included in d-elements? Write following properties of transition metal.
- (a) Differentiate between simple salt and complex salt. What is main postulates of Werner's theory?
- (b) Describe the formation octahedral and tetrahedral complexes of the basis of valence bond theory.
- (c) What are transition metals? Write the general electronic configurations of transition metals.
- (i) Variable oxidation states  
(ii) Magnetic properties  
(iii) Formation of colored compounds  
(a) Write short notes on any TWO:

- What do you mean by addition and elimination reactions?
- Explain the mechanism of  $E_1$  and  $E_2$  reaction.
- What are enantiomer and diastereomers? Explain the optical isomerism shown by tartaric acid and mention conditions for what are enantiomer and diastereomers?

- (a) Magnetic properties of transition metal  
(b) Classification of ligands  
(c) Werner's theory of co-ordination compound  
What are short notes any TWO:
- (i) Colour formation  
(ii) Formation of complex compound  
What are short notes any TWO:

- (a) Werner's theory of co-ordination compound  
(b) Classification of ligands  
(c) Magnetic properties of transition metal

**Group C**

- What do you mean by addition and elimination reactions?
- Explain the mechanism of  $E_1$  and  $E_2$  reaction.
- What are enantiomer and diastereomers? Explain the optical isomerism shown by tartaric acid and mention conditions for what are enantiomer and diastereomers?
- (a) How optical isomerism differs from geometrical isomers?  
(b) What is Grignard reagent? Write the important synthe applications of Grignard reagent.  
(c) High and low explosives

- Write short notes any TWO:
- (a) Markonikoff's rule and its mechanism  
(b) Grignard's reagent  
(c) Polymerization

- Write short notes any TWO:
- (a) Optical isomerism  
(b) Markonikoff's rule and its mechanism  
(c) Polymerization

- Write short notes any TWO:
- (a) What are enantiomer and diastereomers? Explain the optical isomerism shown by tartaric acid and mention conditions for what are enantiomer and diastereomers?

- Illustrate substitution reaction. Describe  $SN_2$  and  $SN_1$  reaction.
- the basis of mechanism and kinetics.
- (a) How optical isomerism differs from geometrical isomers?  
(b) What is Grignard reagent? Write the important synthetic applications of Grignard reagent.  
(c) High and low explosives
10. Write short notes on any TWO:

- Write short notes any TWO:
- (a) What are enantiomer and diastereomers? Explain the optical isomerism shown by tartaric acid and mention conditions for what are enantiomer and diastereomers?

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**Group B**

(2)

5. Differentiate between inner orbital and outer orbital octahedral complexes? How would you use VBT to explain the formation of inner and outer orbital complexes? Give one example for each.
6. What are transition elements? Why are they called so? Explain the following with suitable reasons:
- (i)  $\text{Mn}^{(II)}$  ion shows maximum magnetic character among the bivalent ions of first transition series.
- (ii)  $\text{Cu}^{(I)}$  is diamagnetic while  $\text{Cu}^{(II)}$  is paramagnetic.
- (iii)  $\text{Ni}^{(II)}$  is generally colored.
7. Write short notes on any TWO:
- (a) EAN rule and its applications
- (b) Werner's co-ordination theory
- (c) application of co-ordination compounds
8. What do you mean by rearrangement and elimination reactions? Explain the mechanism of  $\text{B}_1$  and  $\text{B}_2$  reaction.
9. What are enantiomers and diastereomers? Explain the conditions necessary for showing optical isomerism. Discuss the isomerism needed for showing optical isomers? Explain the conditions what are enantiomers and diastereomers? How will you prepare diasteroisomers with suitable examples.
10. Write short notes on any TWO:
- (a) Explosives
- (b) Cis-trans Isomerism
- (c) Properties of Grignard reagent

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**Group C**

5. Differentiate between inner orbital and outer orbital octahedral complexes? How would you use VBT to explain the formation of inner and outer orbital complexes? Give one example for each.
6. What are transition elements? Why are they called so? Explain the following with suitable reasons:
- (i)  $\text{Mn}^{(II)}$  ion shows variable oxidation state because it has d<sub>5</sub> configuration.
- (ii) Transition metal complexes are usually colored because they show variable oxidation state.
7. Write short notes on any TWO:
- (a) EAN rule and its applications
- (b) Werner's co-ordination theory
- (c) application of co-ordination compounds
8. What do you mean by rearrangement and elimination reactions? Explain the mechanism of  $\text{B}_1$  and  $\text{B}_2$  reaction.
9. What are enantiomers and diastereomers? Explain the conditions necessary for showing optical isomerism. Discuss the isomerism needed for showing optical isomers? Explain the conditions what are enantiomers and diastereomers? How will you prepare diasteroisomers with suitable examples?
10. Write short notes on any TWO:
- (a) Explosives
- (b) Cis-trans Isomerism
- (c) Properties of Grignard reagent

**Group D**

- (a)  $\text{H}_2\text{O}$  is a polar molecule. Explain why?
- (b) Redox reactions between  $\text{Cl}_2$  and  $\text{O}_2$ .
- (c) Ozone is a diatomic gas.

**Group E**

28. What are Bidentates and Nucleophiles? Explain the mechanism of substitutions and kinetics of  $\text{E}_1$  and  $\text{E}_2$  reactions.
29. What are stereoisomers? Differentiate between enantiomers and diastereoisomers with suitable examples.
30. What are short notes on any TWO:
- (a) Explosives
- (b) Market tickover rule and Peroxide effect
- (c) Polymerization