

PAPER CODE: CHE-1A

CH.S.D.ST.THERESA'S AUTONOMOUS COLLEGE FOR WOMEN:ELURU

I B.Sc.- I SEMESTER END EXAMINATION – OCTOBER 2016

CHEMISTRY PAPER I

INORGANIC AND PHYSICAL CHEMISTRY

Time: 3 hrs.

Max.Marks:50

SECTION –I

Answer any FIVE questions without omitting any Part.

5x8=40M

PART-A (INORGANIC CHEMISTRY)

1. With the help of labeled diagrams discuss the molecular structure of  $\text{SiH}_4$  and  $\text{Si}_2\text{H}_6$ .
2. Write any two preparation methods of  $\text{B}_2\text{H}_6$ .  
Discuss its structure with all the bonding details.
3. Give any two preparation methods for  $\text{H}_2\text{N-OH}$ . Write about one each of its oxidising and reducing properties.
4. How are the following compounds synthesised from Grignard Reagent  
a)  $\text{C}_2\text{H}_6$     b)  $\text{C}_2\text{H}_5\text{CN}$     c) TEL    d)  $\text{C}_2\text{H}_5\text{OH}$
5. What are interhalogen compounds.  
Discuss the structures of  $\text{ClF}_3$  and  $\text{BrF}_5$  with the help of marked diagrams.

PART-B (PHYSICAL CHEMISTRY)

6. From Vander Waal's equation of state derive equations to relate critical constants with Vanderwaal's constants.
7. State and explain law of rational indices.
8. Write about Stoichiometric point defects in  $\text{A}^+ \text{B}^-$  type of ionic compounds and their consequences.
9. What is CST. Bring out the solubility changes in water – trimethylamine system with the help of temperature – Composition diagram.
10. Discuss in detail the process of fractional distillation of ideal solutions with the help of a neat labeled diagram.

SECTION – II

Answer any FIVE questions.

5x2=10M

11. What is inorganic graphite. Give its molecular formula.
12. Mention any two uses of silicon resins.
13. How does basic character of metal Oxides vary down the group and across a period in the periodic table?

14. What are Grignard Reagents. Give an example.
15. State law of corresponding states.
16. Write any two differences between smectic and nematic liquid crystals.
17. What are azeotropes.
18. What is the value of 'compressibility factor' for an ideal gas.

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PAPER CODE: CHE-1B

CH.S.D.ST. THERESA'S AUTONOMOUS COLLEGE FOR WOMEN: ELURU.

I B.Sc. – II SEMESTER END EXAMINATION – MARCH 2016

CHEMISTRY PAPER I

(ORGANIC AND GENERAL CHEMISTRY)

Time: 3 hrs.

Max.Marks: 50

SECTION - I

Answer any FIVE questions without omitting any Part.

5x8=40

PART A – ORGANIC CHEMISTRY

1. Explain the following organic reactions with suitable examples?
  - a. Addition reactions
  - b) Substitution reactions
  - c. Elimination reactions.
2. Write any two preparation methods of alkenes?  
What is electrophilic addition reaction? Explain with two suitable examples.
3. Write any two preparation methods of acetylene.  
Explain the electrophilic addition reactions of  $X_2$ ,  $H_X$  and  $H_2O$  on acetylene?
4. What are cyclo alkanes? Write any two preparations and properties of cycloalkanes.
5. Explain about the orientation in benzene ring with suitable examples.

PART B – GENERAL CHEMISTRY

6. Draw the molecular orbital energy level diagrams of  $N_2$  and  $O_2$  molecules?
7. State and explain optical isomerism. Write the optical isomers of lactic acid and tartaric acid?
8. Explain D, L and R,S. Configurations with suitable examples?
9. Define adsorption. What are the different kinds of adsorption?  
Explain any three differences between physical adsorption and chemical adsorption.
10. Explain the following properties of Colloids:
  - a. Brownian movement
  - b. Tyndall effect
  - c. Coagulation

SECTION – II

Answer any FIVE questions:

5x2=10

11. What is hyper conjugation. Give one example?
12. Define Markownikoff's rule. Give one example?
13. What is conformation? Write the conformers of cyclohexane.
14. What are benzenoid compounds? Give one example.
15. What are bonding and anti bonding molecular Orbitals?

16. What is bond Order? Explain with one example.
17. What are Enantiomers and Diastereomers?
18. State Hardy-Schultz law.

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SUBJECT CODE: CHE-2A

CH.S.D.ST. THERESA'S AUTONOMOUS COLLEGE FOR WOMEN: ELURU  
II B.Sc. – III SEMESTER SUPPLEMENTARY EXAM. – OCTOBER 2017

CHEMISTRY PAPER III  
ORGANIC AND GENERAL CHEMISTRY

2014-17 Batch

Time: 3 hrs.

Max.Marks: 50

SECTION – I

Answer any FIVE questions without omitting any Part.

5x8=40M

Each question carries 8 marks.

PART A – ORGANIC CHEMISTRY

1. Describe the mechanism of  $SN^1$  and  $SN^2$  reactions.
2. Give the mechanisms of aldol condensation and perkin condensation.
3. a) Discuss any three methods of preparation of phenols.  
b) Write a note on Acidic nature of phenols.
4. a) Compare the Strengths of acetic acid and trichloro acetic acid.  
b) Explain the mechanism of esterification.
5. How is aceto acetic ester prepared? Mention any two synthetic applications.

PART B – GENERAL CHEMISTRY

6. Define Symmetry operation and explain planes of symmetry with examples.
7. Explain complexometric titration and redox titration.
8. What are indicators? Explain the theories of Acid-base Indicators.
9. What is column chromatography? How silicagel and alumina acts as stationary phase.
10. How errors are classified? Explain.

SECTION – II

Answer any FIVE of the following:

5x2=10M

Each question carries 2 marks.

11. What is Kolbe Reaction.
12. Write the cannizaro reaction
13. How is isopropyl alcohol synthesized from Grignard reagent?
14. Give the preparation of malonic ester.

15. What is standard deviation.
16. Define coprecipitation and post precipitation.
17. What is Identity element.
18. Write any two applications of HPLC.

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PAPER CODE: CHE-2A

CH.S.D.ST.THERESA'S AUTONOMOUS COLLEGE FOR WOMEN:ELURU

II B.Sc. – III SEMESTER END EXAMINATION – OCTOBER 2016

CHEMISTRY PAPER III

SPECTROSCOPY AND ORGANIC CHEMISTRY

Time: 3 hrs.

Max.Marks:50

SECTION - I

Answer any FIVE questions without omitting any part.

PART-A (SPECTROSCOPY)

5x8=40M

1. Explain the following
  - i) Double beam spectrophotometer
  - ii) Beer – Lambert's law.
2. Illustrate the following.
  - i) Chromophore ii) auxochrome.
3. Write down the characteristic absorption bands of Carbonyls and aromatic compounds.
4. Explain the following
  - a) Equivalent and non equivalent protons.
  - b) Spin-Spin coupling.
5. Write down the number of signals and chemical shift values of 1,1,2-Tri chloro ethane and acetophenone.

PART-B(ORGANIC CHEMISTRY)

6. Explain  $SN^1$  and  $SN^2$  reaction mechanism with suitable examples.
7.
  - a) How is phenol prepared from diazonium salt and Cumene.
  - b) Give the mechanism of Reimer-Tiemann reaction.
8. Give any two methods of preparation of aldehydes and how they react with  $NaHSO_3$ , and 2,4-DNPH?
9.
  - a) Compare the strengths of acetic acid and trichloro acetic acid.
  - b) Explain the mechanism of esterification.
10. How is acetoacetic acid prepared? How are succinic acid and 4-methyl uracil prepared from it?

SECTION – II

Answer any FIVE questions.

5x2=10M

11. What is molar absorptivity?
12. Give various types of molecular spectra.
13. Define chemical shift with an example.

14. Mention different regions in IR radiation.
15. Write the formulae of any four halides.
16. Give the reaction of phenol with bromine water.
17. What is aldol condensation?
18. What is Kolbe reaction?

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## SEMESTER IV

PAPER CODE: CHE-2B

CH.S.D.ST. THERESA'S AUTONOMOUS COLLEGE FOR WOMEN: ELURU.

II B.Sc. – IV SEMESTER END EXAMINATION – MARCH 2016

CHEMISTRY PAPER II

INORGANIC AND PHYSICAL CHEMISTRY

Time: 3 hrs.

Max.Marks: 50

### SECTION - I

Answer any FIVE questions without omitting any part.

5x8=40

#### PART – A (INORGANIC CHEMISTRY)

1. a. Write about variable Oxidation states of d-block elements of 3d series. 5  
b. How do Lanthanides are separated by using ion exchange method. 3
2. a. What is lanthanide contraction? Write any two consequences of lanthanide contraction. 3+2  
b. How do Lanthanides are separated by using ion exchange method. 3
3. a. Write the drawbacks of free electron theory. 2  
b. Describe valence bond theory of metallic bond 4  
c. How valence bond theory explains the metallic properties(any two) 2
4. Write the structures of  $\text{Ni}(\text{Co})_4$  and  $\text{Fe}(\text{Co})_5$ .  
Show that they follow EAN rule. 4+4
5. a. Give the general electronic configuration of d-block and f-block elements.2  
b. Write any two differences between d-block and f-block elements. 2  
c. Explain the structure of ferrocene 4

#### PART – B (PHYSICAL CHEMISTRY)

6. Define phase rule and apply phase rule to pb-Ag. System. 2+6
7. a) Explain high quantum efficiency in the photochemical formation of Hcl. 6  
b) Define fluorescence. 2
8. a. Define osmotic pressure. 2  
b. Derive a relation between osmotic pressure and relative lowering of vapour pressure. 6
9. a. Explain Tyndal effect. 4  
b. Write brief note on Hardy-Schulze law 4
10. a. What are adsorption isotherms. 2  
b. Give langmuir adsorption isotherm. 6

### SECTION II

Answer any FIVE questions.

5x2=10

11. Write electronic configurations of Cu & Cr.
12. Short note on position of actinides in the periodic table.
13. Define EAN rule
14. Give the classification of metal carbonyls.
15. Draw and label the phase diagram of water system.
16. Write Grothul –Draper law
17. What is Vant Hoff factor
18. Define Raoult's law.

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PAPER CODE: CHE-2B

CH.S.D.ST. THERESA'S AUTONOMOUS COLLEGE FOR WOMEN: ELURU.  
II B.Sc. – IV SEMESTER SUPPLEMENTARY EXAMINATION – MARCH 2016

CHEMISTRY PAPER II  
INORGANIC AND PHYSICAL CHEMISTRY  
(for 2011-14 Batch)

Time: 3 hrs.

Max.Marks: 60

SECTION – I

Answer any FIVE questions without omitting any Part.

5x10=50

PART A – INORGANIC CHEMISTRY

- 1 a) What are d-block elements?
- b) Explain the colour and oxidation states of d-block elements.
  
2. What are carbonyls? Explain the structures of Nickel tetra carbonyl and Iron Penta carbonyl.
  
- 3 a) What are lanthanides?
- b) What is lanthanide contraction? Discuss the consequences of lanthanide contraction.
  
4. Explain the valency bond theory of bonding in metals. On basing the V.B.theory explain the conductivity of metals.
  
5. Explain the following
  - a) Separation of Lanthanides by ion exchange method
  - b) Complex formation of d-block elements.

PART B – PHYSICAL CHEMISTRY

6. Define the Phase rule and explain its application to the water system.
7. Explain osmosis and osmotic pressure. How is the Osmotic pressure determined by Berkely and Hartley's method.
- 8 a) State the two important laws of Photo chemistry and explain them.
- b) Explain  $H_2 - Br_2$  reaction has low quantum yield.
- 9 a) Write the optical and Kinetic properties of colloids.
- b) Give any two applications of colloids.
10. What is adsorption? Describe Langmuir's adsorption isotherm.

SECTION – II

Answer any FIVE of the following:

5x2=10

11. Define EAN. Give an example.
12. Write the postulates of free electron theory.
13. Write the general electronic configuration of d-block elements.
14. What are metallocces? Give an example

15. Define gold number.
16. What is Eutectic point.
17. What are gels? Give two examples.
18. State Raoult's law. Write the limitations.

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SUBJECT CODE: CHE-3A

CH.S.D.ST. THERESA'S AUTONOMOUS COLLEGE FOR WOMEN: ELURU

III B.Sc. – V SEMESTER END EXAMINATION - OCTOBER 2017

CHEMISTRY PAPER V

INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY

Time: 3 hrs.

Max.Marks: 50

SECTION – I

Answer any FIVE questions without omitting any part. 5x8=40M

PART A – INORGANIC CHEMISTRY

1. a) Discuss Werners theory in detail. 6M  
b) What is EAN? Give it's importance. 2M
2. What is isomerism? Discuss the geometrical isomerism in complexes with co-ordination number four and six. 2+3+3M
3. a) What is Chelate effect? Write the factors which influence The Stability of Chelate. 2+3M  
b) Write any three factors of nature of metal which influence The stability of complexes. 3M

PART B – ORGANIC CHEMISTRY

4. a) Write any three preparation methods of Nitroalkane 5M  
b) Write Nef reaction with suitable example. 3M
5. a) Write the preparation methods of Nitroalkanes 5M  
b) Write mannich reaction with suitable example. 3M
6. Explain the structures of five membered Heterocyclic compounds.8M

PART C – PHYSICAL CHEMISTRY

7. Derive an expression for the rate constant of second order reaction. 6M  
Write its characteristics. 2M
8. Define first order reaction. Derive an expression for the rate constant of first order reaction. Give two examples. 2+4+2M
9. Discuss the photo chemistry of  $H_2 - Cl_2$  reaction.

SECTION II

Answer any FIVE of the following. Each question carries 2 marks. 5x2=10M

10. Write the formation of  $[Ni(CO)_4]$  complex by valencebond theory.
11. What is Lability?
12. Give the expression for Gouy's magnetic susceptability method.
13. Write the basic character of aliphatic amines?

14. Write any two preparation methods of Aniline?
15. Why Pyridine is more basic than Pyrrole?
16. Explain Pseudo unimolecular reaction.
17. Write any two factors that influence the rate of a reaction.
18. What is fluorescence? Give example.

SUBJECT CODE: CHE-3A

CH.S.D.ST. THERESA'S AUTONOMOUS COLLEGE FOR WOMEN: ELURU

III B.Sc. – V SEMESTER SUPPLEMENTARY EXAM.- OCTOBER 2017

CHEMISTRY PAPER III

INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY

For 2014-17 batch

Time: 3 hrs.

Max.Marks: 50

SECTION – I

Answer any FIVE questions without omitting any part.

5x8=40M

PART A – INORGANIC CHEMISTRY

1. a) Write the postulates of Werner Theory of Coordination Compounds.  
b) What are inner orbital complexes? Explain the formation of inner orbital Complex with an example.
2. What is crystal field Splitting? Discuss the Crystal field splitting of d-orbitals in octahedral complexes.
3. a) Explain the geometrical isomerism of complexes with coordination number 4.  
b) What is Super conductivity? Write the applications of Super conductors.
4. a) Discuss the Paramagnetic character of Complexes.  
b) Explain the determination of magnetic susceptibility by Gouy's method.

PART B – ORGANIC CHEMISTRY

5. Write any one method of preparation and three chemical properties of aliphatic primary amines.
6. Write a note on
  - a) Paul Knorr synthesis
  - b) Chichibabin reaction.
  - c) Two electrophilic substitution reactions of Pyrrole.

PART C – PHYSICAL CHEMISTRY

7. What is rate of a reaction? Derive an expression for the rate constant of First order reaction.
8. Explain heat capacity at constant volume and at constant pressure and derive their relationship( $C_p - C_v = R$ ).
9. Write a detailed note on enzyme Catalysis.
10. What is order of a reaction? Write any two methods to determine the order of a reaction.

SECTION – II

Answer any FIVE of the following:

5x2=10M

11. What is Chelate? Give an example.
12. Define EAN.
13. Write Ionisation isomerism with an example.

14. How do you distinguish cyanides from isocyanides.
15. What are nitrocompounds? Give their classification.
16. What is zero order reaction. Give an example.
17. What is Joule Thomson effect.
18. Write a brief note on Kirchoff's equation.



SUBJECT CODE: CHE-4A

CH.S.D.ST. THERESA'S AUTONOMOUS COLLEGE FOR WOMEN: ELURU

III B.Sc. – V SEMESTER END EXAMINATION - OCTOBER 2017

CHEMISTRY PAPER VI

INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY

Time: 3 hrs.

Max.Marks: 50

SECTION - I

Answer any FIVE of the following questions without omitting any part. 5x8=40

Each question carries 8 marks.

PART A – INORGANIC CHEMISTRY

1. Write a note on a)  $SN^2$  reaction  
b) applications of trans effect.
2. Discuss the biological importance of calcium and Zinc.
3. What are metalloporphyrins? Discuss about Haemoglobin and its functions.

PART B – ORGANIC CHEMISTRY

4. Write draw backs of open chain and Describe the ring structure for Glucose.
5. What are Carbohydrates? Write any five Chemical properties of D-Glucose.
6. a) Write the classification of amino acids.  
b) Write any two preparation methods of amino acids.

PART C – PHYSICAL CHEMISTRY

7. a) Define  $C_p$  and  $C_v$  b) Prove that  $C_p - C_v = R$
8. Explain Kirchoff's equation and its different forms.
9. Derive an equation for the efficiency of heat engine using Carnot cycle

SECTION – II

Answer any FIVE of the following:

5x2=10M

10. What is KURNAKOV's test?
11. Write a note on Chlorophyll.
12. Write the importance of cobalt in biological system.
13. Write the Osazone Formation?
14. What is Ruff degradation?
15. What is Zwitter ion.

16. What is Enthalpy.
17. Define extensive properties with example.
18. What is entropy.

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PAPER CODE: CHE-3A

CH.S.D.ST.THERESA'S AUTONOMOUS COLLEGE FOR WOMEN:ELURU

III B.Sc. – V SEMESTER END EXAMINATION – OCTOBER 2016

CHEMISTRY PAPER III

INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY

Time: 3 hrs.

Max.Marks:50

SECTION – I

Answer any FIVE questions without omitting any Part.

5x8=40M

PART –A (INORGANIC CHEMISTRY)

1. Discuss the geometry of  $\text{Ni}(\text{CO})_4$  and  $[\text{Fe}(\text{CN})_6]^{4-}$  on the basis of valence bond Theory. 8M
2. a) What are low Spin and high Spin octahedral complexes using CFSE concept. Explain with an example each. 6M  
b) Write a short note on applications of Superconductors. 2M
3. How do you classify the substances based on their magnetic properties and describe experimental determination of magnetic susceptibility by Gouy method 3M 5M
4. Explain the geometrical isomerism and Optical isomerism of complexes with co-ordination numbers 4 and 6. 4+4=8M

PART – B (ORGANIC CHEMISTRY)

5. Discuss the aromaticity of Pyrrole and Pyridine. 4+4=8M
6. a) How do you prepare primary amines by Gabriel Synthesis and Hoffmann's method. 4M  
b) Describe the separation of Primary, Secondary and tertiary amines by Hinsberg method. 4M

PART – C (PHYSICAL CHEMISTRY)

7. a) Derive an expression for the rate constant of a first order reaction. 4M  
b) Describe the factors influencing the rate of a reaction. 4M
8. a) What is order of a reaction and how is it determined experimentally? 4M  
b) Write a short note on enzyme catalysis 4M
9. a) Define activation energy of a reaction. Calculate the activation energy of a first order reaction whose temperature coefficient is 2 obtained by studying the reaction at  $25^\circ\text{C}$  and  $35^\circ\text{C}$ .

- b) Write a short note on Joule-Thomson effect 4M
10. Define and explain heat capacities at constant volume and at constant pressure and derive their relationship. 4+4=8M

P.T.O.

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### SECTION – II

Answer any FIVE of the following. Each question carries 2 marks.  $5 \times 2 = 10M$

1. What is effective atomic number? Calculate the EAN of copper in  $[\text{Cu}(\text{NH}_3)_4]^{2+}$   
1+1
2. What is Meissner effect? 2M
3. What is meant by Coordination isomerism? Give an example. 1+1
4. Write about Nef reaction. 2
5. Explain Acidic nature of Pyrrole. 2
6. Define molecularity. 2
7. What is state Function? Give an example. 2
8. What is Homogeneous Catalysis? Give an example. 1+1

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PAPER CODE: CHE-4A

CH.S.D.ST.THERESA'S AUTONOMOUS COLLEGE FOR WOMEN:ELURU

III B.Sc. – V SEMESTER END EXAMINATION – OCTOBER 2016

CHEMISTRY PAPER IV  
CHEMISTRY AND INDUSTRY

Time: 3 hrs.

Max.Marks:50

SECTION – I

Answer any FIVE of the following questions without omitting any Part.

Each question carries 8 marks.

5x8=40M

1. State Beer-Lambert's Law. Explain the quantitative analysis of Chromium in Potassium dichromate spectrophotometrically.
2. Discuss various types of electronic transitions with relation to their order of energy.
3. Explain the following
  - a. Chromophore
  - b) Auxochrome
  - c) Bathochromic shift
4. Discuss various types of stretching and bending vibrations in IR spectroscopy.
5. Write selection rules for pure rotational Raman spectroscopy.
6. Explain the following properties.
  - a. Chemical shift
  - b. Spin-spin coupling
  - c. Coupling constant.
7. Draw the NMR spectrum of Ethyl bromide and Acetophenone.
8. What is Mass spectroscopy? Give the mass spectrum of Ethyl benzene and n-butyl amine.
9. Compare the Raman spectra and IR spectra and mention the advantages.
10. Interpret UV, IR, NMR and Mass spectral data of Phenyl acetylene.

SECTION – II

Answer any FIVE of the following:

Each question carries 2 marks

5x2=10

11. Write about Single beam and double beam spectrophotometers.
12. Write the application of UV spectroscopy.
13. Explain the Mass spectrum of Acetophenone.
14. What is Finger print region? What is its significance.
15. What is the concept of Polarisability.
16. What are equivalent protons and non-equivalent protons? Give examples.
17. What is Hook's Law.
18. Why TMS used as reference compound in NMR spectroscopy.

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PAPER CODE: CHE-3B

CH.S.D.ST. THERESA'S AUTONOMOUS COLLEGE FOR WOMEN: ELURU.

III B.Sc. – VI SEMESTER END EXAMINATION – MARCH 2016

CHEMISTRY PAPER III

INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY

Time: 3 hrs.

Max.Marks: 50

SECTION – I

Answer any FIVE questions with out omitting any Part. 5x8=40

PART A – INORGANIC CHEMISTRY

- 1 a) Write notes on thermodynamic and kinetic stability of metal complexes. 3
- b) Discuss any five factors effecting the stability of metal complexes. 5
2. Discuss the substitution reactions in Octahedral complexes with emphasis on types of intermediates formed during  $S_N1$  and  $S_N2$  reactions. 8
3. Discuss the role of  $Cu^{2+}$  and  $Cl^-$  ions in the biological Systems. 8
- 4 a) Write about the functions of chlorophyll in photo synthesis. 2
- b) State and explain HSAB principle along with its applications. 6

PART B – ORGANIC CHEMISTRY

5. a) Discuss the open Chain structure of Glucose. 5
- b) Write short notes on mutarotation. 3
6. a) How do you prepare  $\alpha$  -amino acids by malonic ester synthesis and strecker's synthesis . 5
- b) Write a note on Zwitter ion. 3

PART C – PHYSICAL CHEMISTRY

7. State and explain Carnot's theorem. 8
8. Define number average molecular weight and explain the osmotic pressure method for the determination of molecular weight of a given polymer. 8
9. Define transport number and write its determination method. 8
- 10.a) What is equivalent conductance and how do you measure it? 6
- b) Write short notes on asymmetric effect. 2

SECTION – II

Answer any FIVE questions. 5x2=10

11. Write short notes on Chelate effect.
12. Explain trans effect in brief.
13. Write any four functions of haemoglobin.
14. How do you convert aldopentose to aldohexose?

15. Explain the formation of Lactams from gamma and delta amino acids.
16. Write the different statements of II Law of Thermodynamics.
17. How do you prepare PVC and write its applications.
18. For a cell,  $\text{Mg(s)} + 2\text{Ag}^+(0.0001\text{M}) \rightarrow \text{Mg}^{2+}(10.130\text{M}) + 2\text{Ag(s)}$  Calculate its  $E_{\text{cell}}$  if  $E^{\circ}_{\text{cell}} = 3.17\text{V}$ .

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