



**Jyoti Nivas College Autonomous**  
**Hosur Road, Bangalore 560095**  
**Department of Chemistry**  
**Practical syllabus for B.Sc. semester I**  
**Chemistry I: Foundation of Chemistry I**

**CREDITS: 2**

**NO. OF HOURS PER WEEK: 3**

**Course Code: 24ICH1P**

**Course Objectives**

This course aims to impart to the student, knowledge of:

**I. Developing Proficiency in Analytical Techniques:**

To Equip with practical skills to perform accurate and precise volumetric analyses using various titrimetric methods.

**II. Understanding Calibration Procedures:**

To Provide knowledge on the calibration of laboratory glassware to ensure accurate measurements in analytical experiments.

**III. Enhancing Problem-Solving Abilities:**

To improve students' ability to analyze and interpret data from quantitative chemical analyses.

**IV. Application of Theoretical Concepts:**

To apply theoretical principles of chemistry in practical scenarios, reinforcing the understanding of chemical reactions and stoichiometry.

**V. Promoting Good Laboratory Practices:**

To encourage adherence to safety protocols, proper handling of chemicals, and maintaining accuracy in experimental procedures.

**Course Outcomes**

After completing this course, students will be able to:

**I. Develop Proficiency in Analytical Techniques:**

Equip with practical skills to perform accurate and precise volumetric analyses using various titrimetric methods.

**II. Understand Calibration Procedures:**

Provide knowledge on the calibration of laboratory glassware to ensure accurate measurements in analytical experiments.

**III. Enhance Problem-Solving Abilities:**

Improve ability to analyze and interpret data from quantitative chemical analyses.

**IV. Apply Theoretical Concepts:**

Apply theoretical principles of chemistry in practical scenarios, reinforcing the understanding of chemical reactions and stoichiometry.

**V. Promote Good Laboratory Practices:**

Encourage adherence to safety protocols, proper handling of chemicals, and maintaining accuracy in experimental procedures.

**Experiments**

1. Calibration of glass wares: (i) Pipette, (ii) Burette, (iii) Volumetric flask.
2. Estimation of potassium permanganate using standard sodium oxalate solution.
3. Estimation of ferrous ammonium sulphate using standard potassium dichromate solution with diphenylamine as an internal indicator.
4. Estimation of sodium thiosulphate using standard potassium dichromate solution.
5. Estimation of zinc in the solution using standard EDTA solution.
6. Standardisation of EDTA solution and the estimation of total hardness of a sample of water.

7. Determination of percentage of iron in haematite using standard potassium dichromate solution with diphenylamine as an internal indicator.
8. Estimation of carbonate and bicarbonate in a given mixture.
9. Estimation of ferrous and ferric iron in a given mixture using standard potassium permanganate solution.
10. Determination of percentage of available chlorine in a sample of bleaching powder.

**References: Recommended Books**

1. Vogel's text book of Quantitative Chemical Analysis, 5th Edition, J. Bassett, G. H. Jeffery and J. Mendham, and R. C. Denny, Longman Scientific and Technical (1999).
2. Practical Inorganic Chemistry, G. Marr and B. W. Rockett, Von Nostrand Reinhold Co., London (1972).
3. An advanced course in practical chemistry, A. Ghoshal, B. Mahapatra and A. Kr. Nad, New central book agency, Calcutta, 2000.

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**JYOTI NIVAS COLLEGE AUTONOMOUS, BANGALORE- 560095**

**I B.Sc., I Semester, 24ICH1T**

**Chemistry I**

**Foundation of Chemistry I**

**End Semester Question Paper Format for Theory**

Maximum Marks: **80**

Time: **3 Hrs**

The question paper shall have **Sections A, B and C**. **Section A** shall consist of **9** questions of **2** marks each of which the student answers **5** questions. **Section B** shall consist of **9** questions of **10** (can be split as **5+5** or **6+4**) marks each of which the student answers **6** questions. **Section C (Thought provoking)** shall consist of **1** question of **10 M** (can be split as **2+2+4+2** or **2+2+2+2+2**) which the student answers. Give due weightage to all chapters. The question paper shall consist of questions drawn from the respective chapters such that the marks allotted to these chapters are in proportion to the number of teaching hours prescribed. **Paper setters are requested to avoid 2 marks questions in Section B and questions from review portions should not be asked.**

**Blue print of Question Paper**

Unit	Chapter Title	Hours of Teaching	Marks Allotted
I	Atomic Structure	14	29
	Periodic Table and Periodic Properties	(5+9)	(10+19)
II	Introduction to Analytical Methods	14	30
	Stoichiometry	(2+2+2+8)	(4++5+5+16)
	Oxidation Numbers		
	Gaseous State		
III	Volumetric Analysis	14	29
	Chromatography	(4+10)	(9+20)
IV	Basic Concepts in Organic Chemistry	14	30
	Hydrocarbons	(5+9)	(10+20)
<b>Total</b>		<b>56</b>	<b>Sec A: 9 x 2 = 18</b> <b>Sec B: 9 x 10 = 90</b> <b>Sec C: 1 x 10 = 10</b> <b>Total = 118</b>
<b>Max. Marks for students: 80 (A: 5 x 2=10 + B: 6 x 10 = 60 + C: 1 x 10 = 10)</b>			



JYOTI NIVAS COLLEGE AUTONOMOUS, BANGALORE- 560095

I B.Sc., I Semester, 24ICH1T

Chemistry I

Foundation of Chemistry I

Model Question Paper

Time: 3 Hrs.

Max. Marks: 80

Section A

Answer any five of the following questions.

(5 x 2 = 10)

1. Calculate ionization energy for one mole of hydrogen.
2. Discuss the trends of atomic radius in periodic table with reason.
3. What is the meaning of the following GHS symbols.



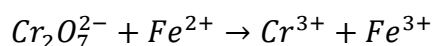
4. Define indeterminate errors and give the general form of the Gaussian bell-shaped curve.
5. Calculate the equivalent mass of sulphuric acid ( $M = 98.07$ ) and Calcium hydroxide ( $M = 74.09$ ).
6. Define the terms collision diameter and mean free path.
7. List out the types of complexometric titrations.
8. Write the principle of paper chromatography.
9. Give any two examples of indicators used for neutralization titration based on pH.

Section B

Answer any six of the following questions.

(6 x 10 = 60)

10. (a) Derive an expression for the radius of  $n^{\text{th}}$  orbit of hydrogen atom.  
(b) Draw the curves for black body radiations by plotting wavelength versus energy density at different temperatures. Explain its salient features. (5+5)
11. (a) Discuss the determination of electronegativity by Pauling's method.  
(b) Write a note on hydrides of chalcogens and comment on comparative study with respect to their reactivity. (5+5)
12. (a) Balance the following equation in an acid medium.



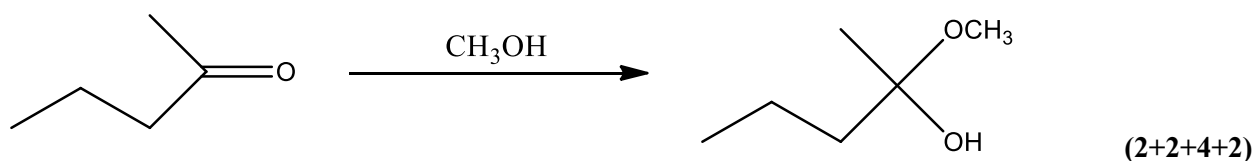
- (b) Derive the expression for critical temperature and pressure. (5+5)

13. (a) Explain Andrew's experiment.  
 (b) Give a detailed account of the experimental determination by the Cagniard de la Tour method for Tc and Pc. (5+5)
14. (a) What is anion exchanger? Explain with any two examples.  
 (b) What is the principle of column chromatography? Discuss the nature of the absorbents and important properties of liquid stationary phase. (5+5)
15. (a) Write the principle, advantages and applications of TLC.  
 (b) Draw the hyperconjugative structures of tertiary butyl carbocation. Why is it more stable than the isopropyl carbocation? (5+5)
16. (a) Carry out the conformational analysis of butane.  
 (b) Using the Sasche-Mohr theory, draw the puckered ring structures of cyclohexane and outline the transition from one chair form to the other. (5+5)
17. (a) State Markonikov's rule and give the mechanism of Markonikov's addition.  
 (b) Explain the conjugate addition of dienes, illustrating the concept of kinetic and thermodynamic control. (5+5)
18. (a) Discuss the chemistry of oxides, carbonates and halides of alkali metals with suitable equations wherever necessary.  
 (b) Compare the efficacy of the Wurtz reaction and Corey house synthesis. (5+5)

### Section C

**Answer the following question. It is compulsory to answer. (1 x 10 = 10)**

19. (a) Calculate the radius of first Bohr orbit of hydrogen atom.  
 (b) What is the molarity of a 1N solution of phosphoric acid?  
 (c) What is argentometric titration? Explain the Volhard and Fajan's methods of argentometric titration.  
 (d) Identify the type of organic reaction given below:



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