

DEVI AHILYA VISHWAVIDYALAYA, INDORE

M. Sc. CHEMISTRY PRACTICALS (SEMESTER – IV)

Practical examination shall be conducted separately for each branch : (Duration : 6-8 hrs in each branch).

Inorganic Chemistry

Preparation / Ion – Exchange Chromatography	12
Spectrophotometric / Flame Photometric Determinations	12
Record	04
Viva Voce	<u>05</u>
Total :	33

Preparation :

1. Synthesis of metal acetylacetonate
2. Metal complex of DMSO
3. Determination of Cr (III) complex
4. $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$
5. Trans - $[\text{Co}(\text{NH}_3)_5(\text{NO}_2)_2]\text{Cl}$
6. Synthesis of metal – ethylene diamine complex.

Ion Exchange Chromatography

- (a) Capacity of cation / anion exchange resin.
(b) Separation of cobalt & nickel on anion exchange resin & their estimation volumetrically.

Spectrophotometric Determinations / Spectroscopic identification of recorded spectra like IR, NMR, ESR & Mass

- Manganese / Chromium in steel sample
- Nickel by extractive spectrophotometric method
- Flouride / Nitrite / Phosphate

Flame Photometric Determinations

- A. Sodium & Potassium when present together.
B. Lithium / Calcium / Barium / Strontium.

Q. Sharma

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Organic Chemistry

Synthesis of Organic compounds	10
Spectrophotometric Estimations or Isolation	10
Identification of Organic compounds (Spectral data)	04
Record	04
Viva Voce	<u>05</u>
Total :	33

Organic Synthesis (may involve multi – steps) :

1. Friedel Crafts reaction.
2. Beckmann's reaction.
3. Synthesis of symmetrical tribromobenzene from aniline.
4. Enzymatic reduction of ethylacetoacetate using Baker's yeast to yield enantiomeric excess of S-ethyl-3-hydroxybutanoate & determine its optical density.
5. Biosynthesis of ethanol from sucrose.
6. Preparation of soap from fat with isolation of glycerol.

Spectroscopic Estimations :

- (1) Amino acids
- (2) Proteins
- (3) Carbohydrates
- (4) Aspirin
- (5) Caffeine

Isolations :

1. Casein from milk
2. Lycopine from tomato
3. Piperine from black pepper
4. Caffeine from tea leaves
5. Lactose from Milk
6. Preparation of Rose water using steam distillation

Identification of Organic compounds by the analysis of their spectral data (UV, IR, & MS).

Handwritten signatures and dates:
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Physical Chemistry

Any one Experiment / Exercise from Section – A	12
Any one Experiment / Exercise from Section – B	13
Record	04
Viva Voce	05
Total :	34

Section - A

Spectroscopy

1. Determination of pK_a of an indicator (e.g., methyl red) in (a) aqueous & (b) micellar media.
2. Determination of stoichiometry & stability constant of Ferric isothiocyanate ion complex in solution.
3. Determination of rate constant of alkaline bleaching of Malachite green & effect of ionic strength on the rate of reaction.

Polarography / Electronics

1. Identification & estimation of metal ions such as Cd²⁺, Pb²⁺, Zn²⁺ & Ni²⁺ etc. Polarographically.
2. Study of a metal ligand complex polarographically (using Lingane's method).
3. Determination of the V – I characteristics of a given diode in :
 - (a) Forward based mode / function.
 - (b) Reverse based mode / function.

Section – B

Chemical Kinetics

1. Determination of rate constant & formation of an intermediate complex in the reaction of Ce (IV) & Hypophosphorous acid at ambient temperature.
2. Determination of energy & enthalpy of activation in the reaction of KMnO₄ & benzyl alcohol in acid medium.
3. Determination of energy of activation & entropy of activation from a single kinetic run.
4. Kinetics of an enzyme catalyzed reaction.

Thermodynamics

1. Determination of partial molar volume of solute (e.g., KCl) & solvent in a binary mixture.
2. Determination of the temperature dependence of the solubility of a compound in two solvents having similar intramolecular interactions (benzoic acid in water & in DMSO water mixture & calculate the partial molar heat of solution.

Books Suggested

1. Inorganic Experiments, J. Derek Woolings, VCH.
2. Microscale Inorganic Chemistry, Z. Szafran, R.M. Pike and M.M. Singh, Wiley.
3. Practical Inorganic Chemistry, G. Marr and B. W. Rockett, Van Nostrand.
4. The systematic Identification of Organic Compounds, R.L. Shriner and D.Y. Curtin.