DEVI AHILYA VISHWAVIDYALAYA, INDORE

M. Sc. CHEMISTRY PRACTICALS (SEMESTER – I)

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

Inorganic Chemistry

Qualitative & Quantitative Analysis		12
Chromatography		06
Preparation		06
Record		04
Viva Voce		05
	Total :	33

Qualitative Analysis :

(a) Analysis of Less common metal ions : W, Mo, Se, Ti, Zr, Ce, V, etc. (Two metal ion in cationic / anionic forms).

(b) Analysis of Insoluble residue : Oxides, sulphates & halides.

Quantitative Analysis : Separation & estimation of two metal ions viz., Cu – Zn, Fe – Mg, Ni – Zn, etc. involving volumetric & gravimetric methods.

Chromatography: Separation, identification & determination of cations & anions by Paper Chromatography.

Preparations : Preparation of selected inorganic complexes, their analysis, test & characterization by spectral techniques (may be).

(1) $VO(acac)_2$.

(2) $Ni(acac)_2$.

(3) $[Co(NH_3)_6]Cl_3$.

(4) $NH_4[Cr(NH_3)_2(SCN)_4]$ … Reinecke's salt.

(5) Prussian Blue ; Turnbull's Blue.

(6) Oxalate complexes of Chromium (III) & Copper (II).

Organic Chemistry

Qualitative Analysis	12
Organic Synthesis	12
Record	04
Viva-Voce	05
Total :	33

Qualitative Analysis : Separation, purification & identification of compounds of ternary mixture (solid or solid + liquid) using TLC & columns chromatography, chemical tests. IR spectra to be used for functional group identification.

Organic Synthesis :
Acetylation, Nitration, Halogenation, Oxidation, Reduction, Polymerization.

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

Error Analysis & Statistical Data Analysis
Errors, types of errors, minimization of errors distribution curves precision, accuracy & combination; statistical treatment for error analysis, student's t-test, null hypothesis, rejection criteria. F & Q – test; linear regression analysis, curve fitting. Calibration of volumetric apparatus : Burette, pipette & standard flask.

Adsorption : To study surface tension – concentration relationship for solutions (Gibb's equation).

Phase Equilibria :

(i) Determination of congruent composition & temperature of a binary system (e.g., diphenylamine – benzophenone system).

(ii) Determination of glass transition temperature of given salt (e.g., $CaCl_2$) conductometrically.

(iii) To construct the phase diagram for three component system (e.g., chloroform – acetic acid – water).

Section – B

Chemical Kinetics :

(i) Determination of the effect of (a) Change of temperature (b) Change of concentration of reactant & catalyst & (c) Ionic strength of the media on the velocity constant of hydrolysis of an ester / ionic reaction.

(ii) Determination of the velocity constant of hydrolysis of an ester / ionic reaction in micellar media.

(iii) Determination of the velocity constant for the oxidation of iodide ions by hydrogen peroxide. Study the kinetics as an iodine clock reaction.

(iv) Flowing clock reactions (Ref : Experiments in Physical Chemistry by Showmaker).

(v) Determination of the primary salt effect on the kinetics of ionic reaction & testing of the Bronsted relationship (iodide ion is oxidized by persulphate ion).

Solution:

(i) Determination of molecular weight of non – volatile & electrolyte / electrolyte by cryoscopic method & to determine the activity coefficient of an electrolyte.

(ii) Determination of the degree of dissociation of weak electrolyte & to study the deviation from ideal behavior that occurs with a strong electrolyte.

Books Suggested

1. Vogel's Textbook of Quantitative Analysis, revised, J. Bassett, R.C. Denney, G.H. Jeffery and J. Mendham, ELBS.
2. Synthesis and Characterization of Inorganic Compounds, W.L. Jolly. Prentice Hall.
3. Experiments and Techniques in Organic Chemistry, D.P. Pasto, C. Johnson and M. Miller, Prentice Hall.
4. Macroscale and Microscale Organic Experiments, K.L. Williamson, D.C. Health.
5. Systematic Qualitative Organic Analysis, H. Middleton, Adward Arnold.
6. Handbook of Organic Analysis-qualitative and Quantitative. H. Clark, Adward Arnold.
7. Vogel's Textbook of Practical Organic Chemistry, A.R. Tatchell, John Wiley.
8. Practical Physical Chemistry, A.M. James and F.E. Prichard, Longman.
9. Findley's Practical Physical chemistry, B.P. Levitt, Longman.
10. Experimental Physical Chemistry, R.C. Das and B. Behera, Tata McGraw Hill.