

application of radioactivity and radioactive tracers.

UNIT-V

Atomic Structure - Dual nature of electron, De Broglie equation, Davission and Germer experiment, Heisenberg uncertainty principle, Schrodinger wave equation, significance of ψ and ψ^2 , probability distribution curves, shapes of s, p and d - orbitals, Zeeman and Stark effects.

Physical Properties and Molecular Structure - Physical properties of liquids, vapour pressure, measurement of vapour pressure, heat of vaporization, Trouton's rule.

Surface tension, measurement of surface tension. Viscosity and its measurement, effect of temperature on the surface tension and viscosity. use of these properties in determination of chemical constitution.

Books Recommended:

1. Principles of Physical Chemistry: B. R. Puri and L. R. Sharma.
2. A Text Book of Physical Chemistry: A. S. Negi and S. C. Anand.
3. Physical Chemistry, Pt. I & II : C. .M. Gupta, J. K. Saxena and M. C. Purohit.
4. Physical Chemistry (Hindi Ed.): Suresh Ameta , R.C.Khandelwal, R. Ameta and J. Vardia, Himanshu Pub.
5. Computers and Applications to Chemistry, Ramesh Kumari, Narosa Publishing House Pvt. Ltd.

FIRST YEAR CHEMISTRY

PRACTICALS 2007-2008

TIME: 5 Hrs.(one day)

M.M. 75

Distribution of Marks

Marks

Exercises-

1. Semi-micro Analysis of Inorganic mixture containing five radicals (excluding Na^+ and K^+).
20
2. (i) Detection of extra elements (N, S, and halogen) if any and functional groups in given simple organic compounds.
10
(ii) Purification of the given organic compounds by crystallisation (charcoal) sublimation and determination of its m.p.
10

OR

Determination of mixed melting points using urea-cinnamic acid mixtures of given compositions.

3. ONE physical Chemistry experiment
15
4. Viva- Voce
10
5. Records
10

Total

List of Experiments:

1. **Semi-micro Analysis of Inorganic mixture:** The mixture shall contain **Five** radicals at least two (two cations & two anions) soluble in water or in HCl. Two cations of the same group except II A & II B may be given. Not more than one interfering radical may be given. Interfering radical may not be given with typical anion combinations.

2. (i) Detection of extra elements (N,S, and halogen) if any and functional group in given simple organic compounds. (one organic compound from the following list be given for identification).

Carboxylic acids, Phenols, Alcohols, Carbohydrates, Aldehydes, Ketones, Nitro

Compounds, Amino compounds, Anilides, Amides, Esters, Thioamide,

Hydrocarbons, Halogen containing compounds

(ii) Crystallization:

Concept of induction of crystallization

Phthalic acid from hot water (using fluted filter paper and stemless funnel)

Acetanilide from boiling water

Naphthalene from ethanol

Benzoic acid from water

Crystallization and decolourisation of impure naphthalene (100 g of naphthalene mixed with 0.3 of Congo Red using 1 g decolourising carbon) from ethanol.

Simple Sublimation : Camphor, Naphthalene, Phthalic acid and Succinic acid.

Mixed Melting Point determination

Urea- Cinnamic acid mixture of various compositions (1:4, 1:1, 4:1)

3. **Physical Chemistry Experiments-** Any one of the following experiments may be given in the examination.

Distribution Law

(i) To study the distribution of iodine between water and CCl_4 .

(ii) To study the distribution of benzoic acid between benzene and water.

(iii) To study the distribution of acetic acid between benzene and water

Colloids:

To prepare arsenious sulphide sol and compare the precipitating power of mono-, bi- and trivalent anions.

- (i) To determine the percentage composition of a given mixture (non interacting systems) by viscosity method.
- (ii) To determine the percentage composition of a given binary mixture by surface tension method
- (iii) To determine the parachor value of $-CH_2-$ group.
- (iv) To determine the rheochor value of $-CH_2-$ group.

Transition Temperature

- (i) Determination of the transition temperature of the given substance by thermometric/ dilatometric method (e.g.: $MnCl_2 \cdot 4H_2O$, $SrBr_2 \cdot 2H_2O$)

Thermochemistry

- (i) To determine the solubility of benzoic acid at different temperatures and to determine ΔH of the dissolution process
- (ii) To determine the enthalpy of neutralisation of a weak acid/ weak base versus strong base/ strong acid and determine the enthalpy of ionisation of the weak acid/weak base
- (iii) To determine the enthalpy of solution of solid calcium chloride and calculate the lattice energy of calcium chloride from its enthalpy data using Born- Haber cycle.

1. Practical Chemistry - Giri, Bajpai and Pandey, S. Chand & Co. Ltd. New Delhi
2. Laboratory Manual in Organic Chemistry, R.K. Bansal, Willey Eastern
3. Experimental Organic Chemistry Vol.I & II, P.R. Singh, D.S. Gupta & K.S. Bajpai, Tata McGraw Hill.
4. Experiments in Physical Chemistry- J.C. Ghose, Bharti Bhawan
5. Experiments in General Chemistry, N.R. Rao & U.C. Agarwal, Eastern Press
6. Practical Chemistry- Suresh Ameta & P.B. Punjabi, Himanshu Publication.