0944 -DIPLOMA IN INFORMATION TECHNOLOGY & ENGINEERING
SEMESTER -I
094414 - APPLIED CHEMISTRY-I

RATIONALE

The role of Chemistry and chemical products in every branch of engineering is expanding greatly. Now a days various products of chemical industries are playing important role in the field of engineering with increasing number of such products each successive years. The strength of materials, the chemical composition of substances, their behaviour when subjected to different treatment and environment, and the laws of heat and dynamic energy have entered in almost every activity of modern life. Chemistry is considered as one of the core subjects for diploma students in engineering and technology for developing in them scientific temper and appreciation of chemical properties of materials, which they have to handle in their professional career. Effort should be made to teach this subject through demonstration and with the active involvement of students.

DETAILED CONTENTS

1. Language of Chemistry

1.1 Definition of symbol, formula, valency and chemical equation.

1.2 Writing of the chemical formula of a simple chemical compound. Calculation of percentage composition of a chemical compound

1.3 Essentials of a chemical equation, balancing of a chemical equation by Hit and Trial method

2. Chemical Bonding

2.1 Electronic concept of valency

2.2 Elementary account of electrovalent, covalent and coordinate bond formation on the basis of the electronic concept of valency with the help of suitable examples to each

3. Water

3.1 Hard and soft water, types of hardness and its causes, disadvantages of hardness of water (i) in industrial use (ii) in boilers for steam generation.

3.2 Methods to remove hardness of water (i) Clark's Process (ii) Permutit Process (iii) Soda Lime process (iv) Ion-Exchange process. Simple numerical problems related to soda lime process.

3.3 Definition of degree of hardness of water and the systems to express the degree of hardness of water. Simple numerical problems related to finding the degree of hardness on different scales.

3.4 Qualities of water used for drinking purposes, treatment of river water to make it fit for town supply

4. Solutions

4.1 Concept of homogenous solution, brief introduction of the terms (i) Ionization (ii) Acidity (iii) Basicity (iv) equivalent weight and gram equivalent weight with suitable examples

4.2 Strength of a solution (i) Normality (ii) Molarity (iii) Molarity as applied in relation to

a solution.

4.3 Simple numerical problems related to volumetric analysis

4.4 Definition of pH, and different industrial applications of pH

5. Electrolysis

5.1 Definition of the terms: Electrolytes, Non-electrolytes conductors and nonconductors with suitable examples

5.2 Faraday's Laws of Electrolysis

5.3 Simple numerical problems based upon the laws of electrolysis

5.4 Different industrial applications of 'Electrolysis'

5.5 Elementary account of (i) lead acid battery and (ii) Ni-Cd battery with special reference to their reaction mechanisms.

LIST OF PRACTICALS

1. Volumetric analysis and study of apparatus used therein. Simple problems on volumetric analysis equation
2. Preparation of standard solution of oxalic acid or potassium dichromate
3. Determine the strength of a given solution of sodium hydroxide with the help of a standard solution of oxalic acid
4. Determine the strength of solution of HCl with the help of a solution of NaOH and an intermediate solution of standard oxalic acid
5. Find the amount of chlorides in mg per liter in a sample of H_2O with the help of a solution of $AgNO_3$
6. Determine the degree of temporary hardness of water by O' Hehner's method
7. Estimate the amount of Cu in a sample of $CuSO_4$ using a standard solution of $Na_2S_2O_3$
8. Estimation of amount of iron in hematite ore volumetrically
9. Estimation of total alkalinity of water volumetrically
10. Determine conductance, pH of water sample using conductance bridge and pH meter

RECOMMENDED BOOKS

1. Chemistry in Engineering by J.C. Kuriacose and J. Rajaram; Tata McGraw-Hill Publishing Company Limited, New Delhi

2. Engineering Chemistry by Dr. S. Rabindra and Prof. B.K. Mishra ; Kumar and Kumar Publishers (P) Ltd. Bangalore -40

3. "A Text Book of Applied Chemistry-I" by SS Kumar; Tata McGraw Hill, Delhi

4. "A Text Book of Applied Chemistry-I" by Sharma and Others; Technical Bureau of India, Jalandhar

5. Engineering Chemistry by Jain PC and Jain M

6. Chemistry of Engineering by Aggarwal CV

7. Chemistry for Environmental Engineers by Swayer and McCarty, McGraw Hill, Delhi

8. Progressive Applied Chemistry –I and II by Dr. G.H. Hugar; Eagle Prakashan, Jalandhar