

0944 -DIPLOMA IN INFORMATION TECHNOLOGY & ENGINEERING
SEMESTER -I
094424 APPLIED CHEMISTRY-II

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 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. Metallurgy

- 1.1 A brief introduction of the terms: Metallurgy (types), mineral, ore, gangue or matrix, flux, slag, concentration (methods of concentrating the ores), roasting calcination and refining as applied in relation to various metallurgical operations
- 1.2 Metallurgy of (i) Aluminium (ii) Iron with their physical and chemical properties
- 1.3 Definition of an alloy, purposes of alloying, composition, properties and uses of alloys brass, bronze, monel metal, magnalium, duralumin, alnico and invar

2. Fuels

- 2.1 Definition of a 'Fuel', characteristics of a good fuel and classification of fuels with suitable examples
- 2.2 Definition of Calorific value of a fuel and determination of calorific value of a liquid fuel with the help of Bomb calorimeter. Simple numerical problems based upon Bomb - calorimeter method of finding the Calorific values
- 2.3 Brief description of 'Proximate' and 'Ultimate' analysis of a fuel. Importance of conducting the proximate and ultimate analysis of a fuel
- 2.4 Qualities of a good fuel and merits of gaseous fuels over those of other varieties of fuels
- 2.5 Manufacture, composition, properties and uses of (i) Water gas (ii) Oil gas (iii) Biogas

3 Corrosion

- 3.1 Meaning of the term 'corrosion' and its definition

3.2 Theories of corrosion i.e. (i) direct chemical action theory and (ii) electro chemical theory

3.3 Prevention of corrosion by

1. (a) Alloying
(b) Providing metallic coatings
2. Cathodic protections:
(a) Sacrificial
(b) Impressed voltage method

4 Lubricants

- 4.1 Definition of (i) lubricant (ii) lubrication
- 4.2 Classification of lubricants
- 4.3 Principles of lubrication
 - (i) fluid film lubrication
 - (ii) boundary lubrication
 - (iii) extreme pressure lubrication
- 4.4 Characteristics of a lubricant such as viscosity, viscosity index, volatility oiliness, acidity, emulsification, flash point and fire point and pour point.

5 Cement and Glass

- 5.1 Manufacture of Portland Cement
- 5.2 Manufacture of ordinary glass and lead glass

6. Classification and Nomenclature of Organic Compounds

Classification of Organic Compounds, functional group, Homologous Series, Nomenclature, Physical and Chemical properties, and industrial use of Organic Compounds, IUPAC system of nomenclature of Carboxylic acid, Alcohols, Phenols, Aldehydes, Ketones and Amines.

LIST OF PRACTICALS

1. Gravimetric analysis and study of apparatus used there in
2. To determine the percentage composition of a mixture consisting of a volatile and a nonvolatile substances
3. Determine the viscosity of a given oil with the help of "Redwood viscometer"
4. Determine the flash point of the given oil with the help of Abel's Flash Point Apparatus
5. Estimate the amount of moisture in the given sample of coal

6. Estimate the amount of ash in the given sample of coal
7. Electroplate the given strip of Cu with Ni
8. Confirmation test of alcohol, aldehydes, carboxylic acid, amine
9. Determination of copper in the given brass solution, or sample of blue vitriol volumetrically
10. Detection of metal iron in the rust (solution of rust in concentrated HCL may be given).

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