CH 387 : CHEMICAL ENGINEERING DRAWING (SESSIONAL)

L – T – P
0 – 0 – 3

Sessional : 50 marks.
Total Practicals : 42 Hrs.

Fastenings and other simple parts such as Bolts, Nuts, Rivets, Rivetted joints, Screw Threads, Locking Devices, Couplings.

Assembly and detailed drawing of simple machine parts such as stuffing box, glands, pipe fittings – such as gate valves, glove valves, plugcock, relief valves etc.

Constructional details and free hand sketching of various Chemical Engg.

Equipments such as valves, pipe fitting, pumps, reaction vessels, evaporator body, distillation columns, jacketed vessels, heat exchangers etc.

NOTE : Half of the sessional marks (25) will be based on the class work including attendance and the other half (25) will be based on an examination held internally at the end of the session.

CH 386: Chemical Process Industries

L – P – T
3 – 3 – 1

Time : 3 hrs
Theory :100
Sessional: 50
Practical :50

1. Acids – Sulphuric Acid, Hydrochloric Acid, Nitric Acid
2. Chloro alkali industries – Soda ash, Caustic soda, Chlorine and common salt.
3. Cement – Types, Portland cement and special types of cement
4. Fertilizer – Nitrogen, phosphatic, potassium fertilizer
5. Paper – production and processing of pulp, production of different types of paper
6. Fats and Oils – Fats and oils of vegetable and animal origin,processing, fatty acids and fatty alcohol production, hydrogenation, essential oils, soap and detergents
7. Fermentation – process , production of some special products
8. Polymers – Basics, functionality, classification, methods of production, manufacturing of some common polymers like polyethylene, polystyrene, PVC,, polyester, p-f, u-f, m-f resin, Rayon, epoxy resinand rubber

Practical-

1. Oil analysis –
   Iodine value, Saponification value, Fatty acid determination
2. Soap analysis
   Moisture content and free fatty acid determination
3. Cement analysis

Books-

1. Outlines of Chemical Technology by Dryden
2. Chemical Process Industries by Shreve
3. Chemical Technology by Pandey
4. Text book of Polymer Science by Guwarekar

CH 384: FUNDAMENTALS OF CHEMICAL ENGINEERING

Theory : 100 marks
Sessional: 50 marks
Title: 3 hrs

L – T – P
3 – 1 – 0

Professional and General Aspects of Chemical Engineering. Conversion of units, Numerical calculation and estimation, Scientific Notation, Significant Figures, and Precision**,** statistical analysis of data, Dimensional Homogeneity and Dimensionless Quantities, fitting of non-linear data, ccomputational techniques. Analysis of the Degrees of Freedom in Steady-State Processes, Dimensionless analysis.

Processes and process variables- mass and volume, mole and molecular weight, choosing a basis, flow rate , chemical composition, density and specific gravity, concentration, pressure temperature

Ideal and real gases, equation of states, compressibility charts,

Basic concepts, humidification and dehumidification operations ,psychrometric chart, air conditioning,

Texts

1. K V Narayanan and B Lakshmikutty, Stoichiometry and Process Calculations, , PHI
2. David M. Himmelblau, James B. Riggs, Basic Principles and Calculations in Chemical Engineering, 8th Ed., Prentice Hall of India.

References

3. O.A.Hougen, K. M. Watson and R. A. Ragatz,"Chemical Process Principles", Vol-I,CBS Publishers and Distributors, New Delhi,
4. R. M. Felder and R. W.Rousseau, Elementary principles of chemical processes, 3rd Ed., Wiley,

CH 385: Material Science & Corrosion Engineering

L – T – P
3 – 1 – 0

Time : 3 Hrs
Theory : 100 marks
Sessional : 50 marks

1. ATOMIC BONDING: Class of engineering materials - engineering requirement of materials - selection of materials - level of structure - structure of atoms and molecules - bonding in solids - types of bonds and their energies.

2. STRUCTURE AND IMPERFECTIONS IN MATERIALS: Crystal structure: Crystal geometry, structure of solids, methods of determining structures. Imperfections in crystals - types of imperfection. Point imperfection, diffusion in solids - Fick's law, self diffusion.

3. PROPERTIES AND CORROSION OF MATERIAL: Electrical and magnetic properties of materials- Chemical, thermal and technological properties of materials - corrosion, theories of corrosion - control and prevention of corrosion.

4. METALS: Engineering materials - ferrous metals - Iron and steel, Iron-carbon equilibrium diagram. Non ferrous metals and alloys - Aluminium, copper, zinc, lead, nickel and their alloys with special reference to the application in chemical industries.

5. NON METALS: Inorganic materials : Ceramics, glass and refractories – organic materials : wood, plastics and rubber with special reference to the application in chemical industries.

6. **NANO MATERIALS:** Introduction and their applications

TEXT BOOKS:

1. Montana, Corrosion engineering, McGraw Hill
2. V Raghavan, Materials Science and Engineering, 5th ed, Prentice Hall India
3.Lawrence H.Van Vlack, "Elements of Material Science and Engineering",1971.
4. S.K. Hajra Choudhury, "Material Science and Processes",1st Edn.,1977.India Book Distribution Co.,Calcutta.

REFERENCE:

1. Manas Chanda, "Science of Engineering Materials", Vol. 1st Edn.,1979,McMillan. Co.,India Ltd.
2. A K Bhargava, Engineering Materials-Polymers, ceramics and composites,Prentice Hall India