Dr.B.R.AMBEDKAR UNIVERSITY, SRIKAKULAM
(CBCS UG Proposed Syllabus)
Subject: Industrial Chemistry
w.e.f 2020-21
II B.Sc. INDUSTRIAL CHEMISTRY, SEMESTER- IV,
PAPER –IV: CHEMICAL PROCESS INDUSTRIES -2

Total hours of teaching 60hrs @ 4 hrs per week

UNIT-I **12hours**

Fuels: Calorific value, Classification of fuels, Properties of fuels, Coal industries in India, Solid Fuels: Proximate analysis of coal, Ultimate analysis of coal, High temperature of and low temperature of coal, Distillation of coal tar, Destructive distillation of wood. Gaseous Fuels: Natural gas, Synthesis gas, water gas, carbureted water gas, producer gas, Oil gas, Liquefied Petroleum gas, Bio-gas, Analysis of gases. Liquid Fuels: Occurrence and mining, Origin, Composition and distillation of petroleum, Refineries in India, Flash point, Knocking, Octane number, Cetane number, Cracking, Chemical treatment for reforming a fuel, Synthetic fuel from coal, fuel fired devices, Devices for fuel combustion.

UNIT – II 12hours

Petrochemicals: Industrial preparation of methanol, rectified spirit, methylated sprit, absolute alcohol, isopropanol, ethylene glycol, acetone, phenol, formaldehyde, ethyl acetate.

Industrial gases: Hydrogen: Electrolytic method, steam iron method, hydrogen from synthesis gas, shift conversion, industrial uses of Hydrogen. Manufacture of Oxygen and Nitrogen: Lindes process, Claudes process industrial uses of oxygen and nitrogen. Carbon dioxide manufacture, Solid carbon dioxide, industrial uses of carbon dioxide, Acetylene manufacture, Industrial applications of acetylene.

UNIT III 12hours

Ammonia and Nitric Acid: Process and Physico- chemical principles involved in the manufacture of ammonia and nitric acid, Manufacture of nitric acid by Birkland and Eyde Process and Ostwald process, Nitrogen fixation in nature, artificial fixation of nitrogen.

UNIT – IV 12hours

Insecticides: Classification, Inorganic insecticides, plant insecticides, Organic insecticides: DDT, methoxychlor, BHC, aldrin, dialdrin, malthion, parathion. Rodenticide: fungicides: Bordeaux mixture, carbamates, baygon, zenib, Herbicides, 2,4-D, Synthetic insecticides.

UNIT –V 12hours

Fermentation: Conditions favorable for fermentation, characteristics of enzymes, Manufacture of power alcohol from molasses and starchy materials, Alcoholic beverages.

Sugar Industry: Manufacture of cane sugar, Manufacture of sucrose from beet root, estimation of sugar.

Books for Reference:

Text Books: Industrial Chemistry by B.K.Sharma, Geol. Publishing House 2. Engineering Chemistry by P.C. Jain. Reference Books: 1. A text book of Engineering Chemistry by S.S. Dara, S.Chand & Co.

II B. Sc INDUSTRIAL CHEMISTRY SEMESTRE- IV,
Paper–IV: PRACTICAL SYLLABUS
PAPER-IV: CHEMICAL PROCESS INDUSTRIES

Total hours of laboratory Exercises 30 hrs @ 2 per week

1. Proximate analysis of coal.
2. Flash point determination.
3. Determination of Viscosity of Lubricants & Viscosity index, effect of temperature and viscosity.
4. Determination of softening point of coal tar.
5. Determination of cloud point and pour point of lubricants.
6. Analysis of single fertilizers.
7. Abbe's Refractometer

Practical examination pattern : practical 40marks,Recors +viva=10mark

II B. Sc – SEMESTER- IV, INDUSTRIAL CHEMISTRY MODEL PAPER

PAPER- IV – Chemical Process Industries

Time: 3 hours

maximum marks: 75

SECTION -A

Answer any five questions 5 X 5 =25

1. Write a short note on producer gas?
2. Explain the following terms 1. Octane number 2. Cetane number
3. Write a short note on artificial fixation of Nitrogen?
4. Explain the industrial preparation of phenol?
5. Write the testing of sugars?
6. What are the characteristics of Enzymes?
7. Write about Rodenticides?
8. Write about artificial fixation of Nitrogen?

SECTION -B

Answer all questions 5 X 10 = 50

9. Describe the distillation of coal tar?
   OR
   Explain Occurrence, Mining and Composition of Crude Petroleum?
10. Explain the industrial preparation of 1. Ethanol 2. Ethyl Acetate? OR
    Explain the Manufacturing of Oxygen by Linde's process
11. Explain the physic-chemical principles involved in the manufacture of HNO_3 by Ostwald's process?
    OR
    Explain the physic-chemical principles involved in the manufacture of HNO_3 BY Eyde process?
12. Explain about Organic Insecticides?
    OR
    Explain the following terms 1. Rodenticides 2. Herbicides 3. Fungicides?
13. Explain the manufacture of power alcohol from molasses? OR
    Explain the manufacture of sugar from sugar cane?

Dr. B.R. AMBEDKAR UNIVERSITY
II B. Sc – INDUSTRIAL CHEMISTRY SYLLABUS
SEMESTER- IV , Paper V

Paper V: INTRODUCTION TO CHEMICAL ENGINEERING

Total hours of teaching 60hrs @ 3hrs per week

UNIT – I **12h**

Flow of fluids:-introduction-nature of fluids-viscosity-flow field-flow of fluid past a solid surface-conservation of mass-conservation of energy-reynolds experiment-friction losses in laminar flow through a circular pipe-Hagen-poisseuille equation- friction losses in turbulent flow –Fanning equation-pressure drop in a flow through porous media-fluidization-cavitation-water hammer-pumping of fluids.

UNIT – II **12h**

Measuring devises: density and specific gravity-viscosity-pH-pressure-flowmeters-liquid levels.

UNIT – III: Mass transfer operation I **12h**

Diffusion transfer operations:-absorption-vapour-liquid equilibrium-relative volatility-distillation-liquid-liquid extraction-extraction schemes-industrial liquid-liquid contactors-selection of liquid-liquid contactors-humidification-dehumidification.

UNIT – IV : Mass transfer operations II **12h**

Drying- industrial dryers- crystallization-crystallization equipments-adsorption-adsorption equipment.

UNIT – V **12h**

Pollution and its abatement: Air pollution- Land pollution- Water pollution

REFERENCE BOOkS: Introduction to Chemical Engineering, by Goshal and Sanyl Datta, McGraw-Hills Company

PAPER V: INTRODUCTIION TO CHEMICAL ENGINEERING: PRACTICALS

1. Specific gravity of liquids
2. Viscosity of liquids
3. pH meter
4. Distillation
5. Crystallization
6. Adsorption

Text Book: College Industrial Chemistry Practicals by Patel, Turakhia, Puniyani, Himalaya Publishing House, Mumbai

II B. Sc – INDUSTRIAL CHEMISTRY SYLLABUS SEMESTER- IV
Paper V MODEL PAPER

Paper V: INTRODUCTION TO CHEMICAL ENGINEERING

Time: 3 hours Maximum Marks: 75

PART - A

Answer any Five questions **5 X 5 = 25**

1. Explain Newton ion ad Non-Newton ion fluids?
2. Discuss about Reynolds/s experiments?
3. Write about adsorption?
4. Discuss about green house effect?
5. Write about pumps?
6. What is water hammer? Define Viscosity?
7. Explain about diffusion?
8. Explain about pyrolysis?

PART - B

Answer All questions **5 X 10 = 50**

9. Derive Hagen-poiseulle Equation?OR
10. Derive Fanning Equation?
11. Explain any two Distillation Equipments? OR
12. What is meant by Extraction? Explain Any two Equipments?
13. What is meant by Drying? Explain any drying equipment? OR
14. Define crystallisation ? Explain any crystalliser?
15. Write about Rotameters? OR
16. Write about Orifice meter?
17. Write about Air Pollution? OR
18. Write about Sewage Water Treatment?