

B.Tech-3rd(Chem Engg)
Chemical Process Technology

Full Marks : 50

Time : 2.5 hours

Answer all questions.

*The figures in the right-hand margin
indicate marks.*

Symbols carry usual meaning.

Any supplementary materials to be provided.

1. Answer all questions:

2 × 5

(a) What are the different chemicals recovered from Kraft pulp process ?

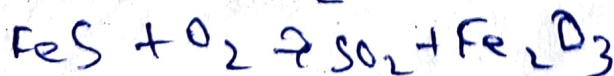
white, black, green liquor

(b) What do you mean by hydrogenation of oil ?

converting saturated to unsaturated
eg:- $\text{CH}_3 - \text{CH} = \text{CH} - \text{C}(\text{OH}) - \text{CH}_2 - \text{CH}_3 \rightarrow \text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$

(c) List the various chemical reactions taking place in lead chamber process for the manufacture of sulfuric acid.

Burner



(Turn Over)

(2)

- (d) What are the products from crude petroleum after distillation? *Gas: Methane, Propane, Butane - Petrol & diesel Naphtha.*
- (e) What is Vulcanization of rubber and what is the importance of this process? *Addition of sulfur to rubber is called vulcanization. Imp. → makes rubber hard.*
2. (a) What is inversion of sugar? Explain manufacturing of sugar with process flow diagram. 4
- (b) What are the different products and by-products recovered from black liquor? What is the function of Causticizing tank also write down the reaction occurred in it? 4

Or

- (a) What are the different units engaged for the recovery of chemicals from the black liquor? Describe briefly about the functional role of boiler. 4
- (b) What are the products and by-products of sugar industry? Also write down the differences between White liquor, Black liquor and green liquor. 4

(3)

3. (a) Write down the Fat Splitting reaction and Saponification reaction. Also write down the role of Hydrolyzer unit in the manufacturing process of Soap. 4
- (b) What is the difference between soft soap and hard soap? Why Ion exchanger unit is used in the manufacturing process of glycerin? 4

Or

- (a) Describe briefly about the various role of Digester, Expeller, Extractor and Flash film evaporator in the Vegetable oil extraction process. 4
- (b) What do you mean by hydrogenation of oil? Also write down several chemical reactions for the preparation of the catalyst. 4
4. (a) Discuss in detail the electrolytic process for chlorine-caustic soda production with a neat flow sheet. Also discuss the major engineering problems associated with their production. 4

- (b) Discuss in detail the production of hydrochloric acid with a neat flow sheet. Also discuss the major engineering problems associated with their production. 4

Or

- (a) Discuss the production of sulfuric acid by Lead Chamber Process with a neat flow sheet. Also discuss the major engineering problems. 4
- (b) Discuss the production of sulfuric acid by DCDA process with a neat flow sheet. Also discuss the major engineering problems. 4
5. (a) Write down the manufacturing process of phenol formaldehyde with a neat flow sheet. 4
- (b) Write down about the differences between Thermoplastic and Thermosetting polymer. 4

Or

- (a) Write down the classification of polymers on the basis of physical structure, origin of source, molecular forces and mode of polymerization. 4
- (b) Write down the various steps involved in the vulcanization process and also describe it. Why vulcanization of rubber is performed? 4
6. (a) What is the need of a fertilizer also discuss about the fertilizer ratio? 4
- (b) Write down the manufacturing process of urea. 4

Or

- (a) What are the major engineering problems associated with the manufacturing process of ammonia and how to solve those issues? 4
- (b) What are the differences between Straight and mixed fertilizer? What are the benefits of utilization of a fertilizer? 4