Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech (Fifth Semester - Regular) Examinations, November 2025

23BCHPC35001– Chemical Process Technology

(Chemical Engineering)

Time: 3 hrs Maximum: 60 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions

		CO #	Blooms Level
a.	Name the catalyst used in DCDA process for sulphuric acid manufacture Process. Why Platinum catalyst is not preferred?	CO1	K1
b.	Write down the reactions occurred at cathode and anode for a mercury cell used for the production of NaOH.	CO2	K2
c.	Differentiate between poly vinyl chloride (PVC) and polyvinyl acetate (PVA).	CO3	K1
d.	Mention the steps involved in starch manufacture from maize.	CO4	K2
e.	State the difference between black liquor and white liquor in the pulp industry.	CO5	K1

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions

		Marks	CO #	Blooms Level
2. a.	Explain the industrial manufacture of soda ash using the Solvay process. Discuss the flow diagram with major unit operations, highlighting the chemical reactions, raw materials used, and by-products formed during the process.	6	CO1	K2
b.	Illustrate and explain the symbols used for distillation units and solid-drying equipment, and comment on their significance in process design documentation.	4	CO1	K3
	(OR)			
c.	Explain in detail the industrial manufacture of sulphuric acid by the Contact Process. With the help of a neat and labelled flow sheet, describe the sequence of operations, the chemical reactions occurring in each step, and the process conditions maintained for optimum yield and purity.	6	CO2	K3
d.	Illustrate and explain the symbols commonly employed for extraction units and fluid-handling equipment such as pumps, compressors, and valves.	4	CO2	K4
3.a.	Describe in detail the mechanical and solvent extraction methods used in the production of vegetable oils. Support your answer with a neat and labelled flow diagram, and explain the subsequent purification or refining operations necessary to obtain edible-grade oils of high quality.	6	CO2	K3
b.	Explain the hydrogenation process of oils. and elaborate on how hydrogenation improves the stability, texture, and shelf life of edible oils.	4	CO3	K4
	(OR)			
c.	Explain in detail the continuous process for the manufacture of fatty acids, soaps, and glycerine. Describe the sequence of operations involved in the process with the help of a neat and labelled flow chart, and discuss the main equipment and process conditions used in modern continuous plants.	6	CO3	K3
d.	Analyse the processes of fat splitting and saponification.	4	CO2	K4

	Explain the chemical reactions involved in each case.			
4.a.	Describe the step-by-step operations involved, including juice extraction, clarification, evaporation, crystallization, and centrifugation, and discuss the function of each stage in obtaining refined sugar.	6	CO3	K3
b.	Explain how massecuite is processed during these stages and how blackstrap molasses is separated from the final massecuite.	4	CO4	K3
	(OR)			
c.	Describe the sulphate process for the manufacture of wood pulp with the help of a neat flows Sheet. Explain the main stages such as digestion, washing, screening, and bleaching, and discuss the chemical reactions that occur during the cooking process. Also, highlight the advantages of the sulphate process over other pulping methods.	6	CO4	K4
d.	Differentiate between black liquor and white liquor used in the pulp and paper industry.	4	CO4	K2
5.a.	With the help of a neat and labelled flow diagram, describe the step-by-step process involved in starch production.	6	CO5	K2
b.	Discuss the purpose of each stage and the quality parameters of the final product.	4	CO5	K3
	(OR)			
c.	Describe the role of each constituent, such as formers, fluxes, and stabilizers, in determining the properties of the final glass product.	6	CO4	K2
d.	With the help of a neat and labelled flow diagram, explain the unit operations such as mixing, melting, fining, forming, annealing, and finishing.	4	CO5	K3
6.a.	Explain the chemical structure and properties of cellulose and describe its production process. Additionally, outline the manufacturing steps of Nylon-6,6, mentioning the raw materials, reactions, and process conditions involved.	6	CO6	K4
b.	Describe the different types of polymer structures such as linear, branched, and cross-linked polymers.	4	CO6	K3
	(OR)			
c.	Discuss in details with a neat flow sheet the production of polyethylene by low pressure Ziegler's process. mention its properties and uses.	6	CO6	K3
d.	Classify the Polymer On the basis of functionality or degree of polymerization.	4	CO6	K2

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