


Name:			
Enrolment No:			
<b>UPES</b> <b>End Semester Examination, May 2024</b>			
<b>Course:</b> Chemical Technology <b>Program:</b> B. Tech (Chemical) <b>Course Code:</b> CHCE2028		<b>Semester:</b> II <b>Time</b> : 03 hrs. <b>Max. Marks:</b> 100	
<b>Instructions:</b> (a) This is a closed book exam. Possessing a mobile phone and any other communication devices during the exam is strictly prohibited.			
<b>SECTION A (5Q x 4M = 20 Marks)</b>			
S. No.	Statement of the question	Marks	CO
Q 1	State four major products of a fermentation industry with any two uses of each product.	4	CO1
Q 2	Describe the classification of Indian paper industry based on “ <i>CARE Rating, Feb, 2018</i> ”.	4	CO2
Q 3	With the help of a schematic diagram, explain the working of a rotary filter and provide one application <i>w.r.t.</i> to a product of chemical industry.	4	CO2
Q 4	Discuss the operation of a prilling tower. What is its use for?	4	CO2
Q 5	Show the labelled diagram of a (a) spray drier (b) wet scrubber	4	CO1
<b>SECTION B (4Q x 10M = 40 Marks)</b>			
Q 6	Describe in detail about the (a) unit operations and (c) processes involved in the production of soda ash ( $\text{Na}_2\text{CO}_3$ ) by Solvay process.	10	CO2
Q 7	Illustrate the impact on the downstream refining processes (such as atmospheric distillation, cracking, reforming, and hydro-treating) and its finished product (such as naphtha, gasoline and diesel etc.) due to the presence of high concentration of (a) naphthene, (b) aromatics and (c) nitrogen content, in the crude oil sample.	10	CO3
	<b>OR</b>		
	Illustrate the role and importance of the following unit operation/process: (i) Atmospheric distillation unit, (ii) Catalytic Cracking unit, and (iii) Reforming unit, (iv) Hydro-treating unit, with a suitable example and reasoning <i>w.r.t.</i> Indian petroleum refinery and petrochemicals.	10	CO3
Q 8	(a) With the help of a flow diagram, analyze the unit operations (with inlet feed stream and outlet stream) involved in production of ethyl alcohol, (b) explain the role of each unit operations	5 + 5	CO3

Q 9	In the production of sulfuric acid, explain the content of the inlet stream and outlet stream of the gas filter unit, the two-stage catalytic converter, and the dilution process.	10	CO2
<b>SECTION-C (2Q x 20M = 40 Marks)</b>			
Q 10	Using a flow diagram, outline the detailed description about the unit operations and processes involved in the production of ammonia by Haber-Bosch process.	20	CO4
Q 11	<p>Explain the details of the unit processes and operations involved in Sulfate pulping process using a flow diagram.</p> <p style="text-align: center;"><b>OR</b></p> <p>Describe in detail about the unit operations/processes involved in the chemical recovery of Kraft process.</p>	20	CO4