SUMMER-2024	
Exam Seat No.:	
Academic Year:2023-2024	Semester: IV
Class: SY	Program: B.Tech
Branch Code: CHE	Pattern:2022
Name of Course: Mechanical Operations	Course Code: CHE222013
Max. Marks: 60	Duration: 2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 2 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Question No. 1 Attempt following Question

1a)	Explain Principal, Construction and working of Jaw crusher. Dose toggles are essential in Jaw crusher? If yes state its importance.	(6)	CO1

Question No. 2 Attempt following Question

2a)	Explain Mechanism for Sedimentation with neat diagram	(6)	CO2

Question No. 3 Attempt following Question

3a)	Describe the fluidization velocity in Spouted bed systems using neat sketch.	(8)	CO3

OR

3b)	Write a short note on screw conveyors with its advantages and disadvantage	(8)	CO3

3c)	Explain conveyors? Types of conveyors and its applications in chemical industries.	(8)	CO3

OR

3d)	Describe in detail elements of chain and flight conveyor systems and write the detail working process.	(8)	CO3

Question No. 4 Attempt following Question

4a)	A disk turbine with six flat blades is installed centrally in a vertical baffled tank 2m in diameter. The turbine is 0.67m in diameter and is positioned 0.67m above the bottom of the tank. The turbine blades are 134 mm wide. The tank is filled to a depth of 2m with an aqueous solution of 50% NaOH at 65 degree Celsius, which has a viscosity of 12 Centipoise and density of 1,500 kg/m3. The turbine impeller truns at 90 rpm. What power will be required? Take (KT = 5.75)	(8)	CO4

OR

4b)   What is mixing and Agitation? Explain the necessity of Agitation in chemical industries.   (8)   CO4

4c)   Explain Static mixer and Sigma Mixer with neat diagram.   (8)   CO4

OR

4d)   What is significance of baffles in mixing tank. Differentiate between Axial flow impeller and radial   (8)   CO4
flow impeller.

Question No. 5 Attempt following Question

5a)   State factors to be considered while selecting filtration equipment.   (8)   CO5

OR

5b)   A rotary filter at 0.05 Hz, filters 0.0085 m^3/s. Operating under the same vacuum and neglecting the   (8)   CO5
resistance of the filter cloth, at what speed must the filter be operated to give a filtration rate of
0.019 m^3/s?

5c)   List the name any three filter media and explain the factors to be consider while selecting the filter   (8)   CO5
media.

OR

5d)   Explain Plate and Frame Filter press with neat diagram.   (8)   CO5

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