



**K. K. Wagh Institute of Engineering Education & Research, Nashik**  
(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year: 2025-2026	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.

**Marks CO**

**Question No. 1**

- 1a) What is Mesh No. ? Explain Differential and Cumulative Analysis? (6) CO1

**Question No. 2**

- 2a) Write a short note on cyclone separator with industrial applications. (6) CO2

**Question No. 3**

- 3a) What is minimum fluidization and explain with detailed diagram. (8) CO3

**OR**

- 3b) What is minimum Fluidization and explain with detailed diagram. (8) CO3

- 3c) Explain the Circulating Fluidization with a neat schematic diagram. (8) CO3

**OR**

- 3d) Write the differences between Pneumatic and Screw conveyors. (8) CO3

**Question No. 4**

- 4a) Explain Ribbon Blender mixer with neat diagram. Write its applications. (8) CO4

**OR**

- 4b) What is mixing and Agitation? State Purposes of Agitation operation. (8) CO4

- 4c) A soil containing 14% moisture was mixed in large muller mixer with 10 weight percent of a tracer consisting of dextrose and picric acid. After 3 min. of mixing, 12 random samples were taken from the mix. and analysed for tracer material. The measured conc. in the sample were, in weight percent tracer, 10.24, 9.30, 7.94, 10.24, 11.08, 10.03, 11.91, 9.72, 9.20, 10.76, 10.97, 10.55. Calculate the mixing Index. (8) CO4

**OR**

- 4d) 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 (8) CO4

at 65 degree Celsius, which has a viscosity of 12cP and density of 1,500 kg/m<sup>3</sup>. The turbine impeller turns at 90 rpm. What power will be required? Take (KT = 5.75)

**Question No. 5**

5a) What is Filtration? Define filter aid, give name of filter aid and state method of using it. (8) CO5

**OR**

5b) Give two examples of Filter media Enlist the characteristics of Filter media. (8) CO5

5c) Explain Plate and Frame filter press with neat diagram. (8) CO5

**OR**

5d) What is Filtration operation? Explain with diagram also explain two types of filtration. (8) CO5

**..... End of question paper.....**