

R.N.G.PATEL INSTITUTE OF TECHNOLOGY-RNGPIT
(An Autonomous Institute U/s UGC Act 1956)

B.Tech. SEMESTER-III, SEMESTER END EXAMINATION – WINTER 2025

SUBJECT CODE: 1CH304

DATE: 23-12-2025

SUBJECT NAME: MECHANICAL OPERATIONS

TIME: 11:00 AM to 01:30 PM

TOTAL MARKS: 70

Instructions

1. It is **compulsory** for students to write **Enrolment No. /Seat No.** on the question paper.
2. Write answers of **Section A** and **Section B** in **separate answer books**.
3. Attempt all questions from both **Section A** and **Section B**.
4. Each section carries **35 marks**, with a total of **70 marks** for the examination.
5. The figures to the right of each question indicate full marks, make suitable assumptions with justification.
6. BL - Cognitive Level (As per Revised Bloom's Taxonomy) (R-Remember, U-Understanding, A –Application, N –Analyze, E – Evaluate, C -Create), CO - Course Outcomes.

SECTION A

		Marks	BL	CO
Q.1	(a) Define following terms: 1. Screening, 2. Mesh number and 3. Blinding of screen	03	R	1
	(b) Differentiate between ideal screen and actual screen.	04	U	1
Q.2	(a) What is size reduction? Write the principle of size reduction.	03	R	2
	(b) Discuss various laws of size reduction in detail.	04	U	2
	(c) Classify the size reduction equipment and explain construction and working of jaw crusher with a neat sketch.	07	N	2
OR				
Q.2	(a) Write the principle of hammer mill and draw the sketch of hammer mill with proper labeling.	03	R	2
	(b) Explain open and closed-circuit operation for size reduction of solid.	04	U	2
	(c) Classify the size reduction equipment and explain construction and working of ball mill with a neat sketch.	07	N	2
Q.3	(a) What is fluidization? Describe the condition for fluidization.	03	R	3
	(b) Discuss about storage bins and silos.	04	U	3
	(c) Explain various types of fluidization with neat sketch.	07	U	3

OR

Q.3	(a) What is conveying? state its main purposes.	03	R	3
	(b) Discuss about mechanical and pneumatic conveying system.	04	U	3
	(c) Explain screw conveyor with working principle and neat figure.	07	U	3

SECTION B

		Marks	BL	CO
Q.4	(a) Define filtration and discuss about types of filtrations.	03	R	4
	(b) Classify filtration equipment based on their mode of operation and Enlist factors affecting the rate of filtration.	04	N	4
Q.5	(a) Write short note on sedimentation.	03	R	5
	(b) Define terminal setting velocity and explain batch setting test.	04	R	5
	(c) Explain centrifugal sedimentation with a diagram.	07	U	5
OR				
Q.5	(a) Write short note about free settling and hindered settling.	03	R	5
	(b) Define sorting classifier and explain any one method in details	04	R	5
	(c) Explain the working principle of the sink and float separation technique.	07	U	5
Q.6	(a) Define agitation and state its industrial importance.	03	R	6
	(b) Describe homogeneous and heterogeneous mixtures.	04	U	6
	(c) Classify the different types of mixers used in process industries and Explain construction and working of a ribbon blender mixer.	07	N	6
OR				
Q.6	(a) Describe the purpose of agitation and mixing.	03	R	6
	(b) Discuss about axial flow and radial flow impellers.	04	U	6
	(c) Analyze the concept of turbine impeller and its various types.	07	N	6
