

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)
B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY
2025
Fourth Semester
Chemical Engineering
PC3352 - Mechanical Operations
Regulations - 2021

Duration : 3 Hrs

Maximum : 100 Marks

PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

Q.No	Questions	BLT	CO	Marks
1.	Define "dynamic analysis" in particle size measurement.	L2	1	2
2.	Mention one advanced particle size analysis technique.	L2	1	2
3.	What is the difference between crushers and grinders in terms of their applications?	L1	2	2
4.	What is the concept of nano-particle fabrication in size reduction?	L1	2	2
5.	What is the purpose of using hydrocyclones in particle separation?	L2	3	2
6.	How do electrostatic and magnetic separators differ in separating particles?	L2	3	2
7.	What is the role of filter media in the filtration process?	L1	4	2
8.	How does the cake formation process affect filtration efficiency?	L2	4	2
9.	What are the primary considerations when selecting a conveyor for transporting solids?	L1	5	2
10.	What factors affect the efficiency of powder mixing?	L1	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No	Questions	BLT	CO	Marks
11.	a Explain the various techniques for particle size analysis. Compare light scattering, image analysis, and dynamic analysis in terms of their working principles, advantages, and limitations.	L2	1	16
	Or			
	b Describe the working principle of screening equipment used for particle separation. Discuss the various factors affecting the screen efficiency and the difference between ideal and actual screens.	L2	1	16
12.	a Provide a detailed explanation of the various methods of size enlargement, including granulation, briquetting, pelletization, and flocculation. Discuss their industrial applications and factors that influence their efficiency.	L4	2	16
	Or			
	b Describe the classification of size reduction equipment and provide an overview of crushers, grinders, and disintegrators.	L4	2	16

Discuss the power requirements for different types of grinding equipment.

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| 13. | a | Discuss the principles and applications of gravity settling, sedimentation, and thickening for particle separation. Provide a comparison between different methods, including their industrial uses. | L3 | 3 | 16 |
| | | Or | | | |
| | b | Discuss the role of flotation, jigging, and heavy media separation in mineral processing. Explain their principles and applications in separating different types of particles. | L3 | 3 | 16 |
| 14. | a | Explain the theory of filtration, including the role of filter cake and filter media in the filtration process. Discuss the difference between compressible and incompressible filter cakes and their effect on filtration efficiency. | L5 | 4 | 16 |
| | | Or | | | |
| | b | Discuss the various types of filtration equipment used in industries. Compare batch and continuous filtration systems, highlighting their design, operation, and efficiency. Explain the importance of selecting appropriate filter aids. | L5 | 4 | 16 |
| 15. | a | Explain the processes involved in the storage and transportation of bulk solids. Discuss the design, operation, and performance characteristics of bunkers, silos, bins, hoppers, and conveyors. | L2 | 5 | 16 |
| | | Or | | | |
| | b | Discuss the importance of mixing in mechanical operations. Explain how agitators are used for liquid mixing and the role of power requirement calculations in selecting suitable mixers for different applications. | L2 | 5 | 16 |