Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2025

Sixth Semester

Agricultural Engineering

AI3005 - Food Process Equipment and Design

Regulations - 2021

Duration : 3 Hrs ***Maximum : 100 Marks***

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

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	What are the factors considered in selection of food processing equipment?	L1	1	2
2.	Define the term 'design engineering' in food processing.	L1	1	2
3.	List any two common materials used for constructing process equipment.	L1	2	2
4.	What is the purpose of pressure vessel design?	L1	2	2
5.	Find the differences between shell and tube heat exchangers and plate heat exchangers.	L1	3	2
6.	What is the use of heat exchanger in food industries?	L1	3	2
7.	Define conveying system and give one example.	L1	4	2
8.	What are the key considerations in dryer design?	L1	4	2
9.	Recall the functions of CAD in designing food process equipment.	L1	5	2
10.	How can energy optimization be achieved through CAD tools?	L1	5	2

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

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	Explain the term process equipment design and the steps involved in designing food processing equipment.	L2	1	8
		ii	Summarize the importance of design engineering in the selection of food processing equipment.	L2	1	8
			Or			
	b	i	Interpret the factors influencing the selection of food processing equipment.	L2	1	8
		ii	Illustrate the principles used in designing pulpers and filters.	L2	1	8

12.	a	i	Develop the general design procedure for developing a pressure vessel used in food processing.	L3	2	8
		ii	Apply design steps to select suitable materials for high-temperature vessels.	L3	2	8
			Or			
	b	i	Apply the use of design codes in equipment design.	L3	2	8
		ii	Solve for wall thickness of a cylindrical pressure vessel under given pressure and diameter.	L3	2	8
13.	a	i	Demonstrate heat transfer concepts to calculate the area required in a tubular heat exchanger to heat water.	L2	3	8
		ii	Illustrate with a diagram the construction of a plate heat exchanger.	L2	3	8
			Or			
	b	i	Explain the differences in working principles of shell and tube vs plate-type heat exchangers.	L2	3	8
		ii	Summarize these principles to suggest a suitable design for pasteurizing milk.	L2	3	8
14.	a	i	Examine the concept of conveying systems and their classification in food industries.	L4	4	8
		ii	Dissect the structure of a screw conveyor and analyze the function of each component.	L4	4	8
			Or			
	b	i	Inspect the design considerations of a bucket elevator used in grain handling.	L4	4	8
		ii	Analyze the key design factors of a dryer used specifically for spice processing.	L4	4	8
15.	a	i	Assess the performance of an existing drying system and suggest how CAD software can improve its design.	L5	5	8
		ii	Evaluate the effectiveness of CAD tools in improving equipment hygiene and maintenance.	L5	5	8
			Or			
	b	i	Evaluate the effectiveness of a CAD-designed cold storage unit with respect to energy usage.	L5	5	8
		ii	Justify the use of CAD tools in improving hygiene and maintenance in food equipment design.	L5	5	8