U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E. **Semester: VII**

Branch: Chemical Engineering **Duration: 3 hrs.**

Course Code: 22CH7PELC1 **Max Marks: 100**

Course: Food Engineering

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	*CO*	*PO*	Marks
1	a)		Explain in detail the Global and Indian scenario of food demand.	*CO1*	*PO7*	**10**
	b)		Explain different types of pumps used in food industries.	*CO1*	*PO7*	**10**
			OR			
2	a)		Explain the different unit operations in food processing	*CO2*	*PO7*	**06**
	b)		Explain the importance of water activity in food processing	*CO2*	*PO7*	**04**
	c)		A 3 cm inside diameter pipe is being used to pump liquid food into a buffer tank. The tank is 1.5 m diameter and 3 m high. The density of the liquid is 1040 kg/m^3 & viscosity is 1600×10^{-6} Pa s. i. Determine the minimum time to fill the tank with this liquid food if it is flowing under laminar conditions in the pipe? ii. Determine the maximum time to fill the tank if the flow in the pipe is turbulent?	*CO2*	*PO7*	**10**
			UNIT - II			
3	a)		Explain the cause of food deterioration and their effects on food quality.	*CO3*	*PO6*	**10**
	b)		Describe the role of 'AGMARK' in maintaining the standards of food.	*CO3*	*PO6*	**10**
			OR			
4	a)		Which is the regulatory body that ensures the safety and quality of food in India? Explain its significance.	*CO3*	*PO6*	**10**
	b)		Why are intentional adulterants added to food? Discuss in detail with examples and explain how to mitigate the same.	*CO3*	*PO6*	**10**
			UNIT - III			
5	a)		Discuss kinetics of microbial death and thermal death time.	*CO4*	*PO12*	**10**
	b)		Explain continuous High Temperature Short-Time (HTST) pasteurization system with all its components.	*CO4*	*PO12*	**05**

		c)	The following data were obtained from a thermal resistance experiment conducted on a spore suspension at 112°C. Determine the D value of the microorganism. Time (min): 0 | 4 | 8 | 12 Number of survivors: 1.0×10^6 | 1.1×10^5 | 1.2×10^4 | 1.2×10^3	*CO 4*	*PO 12*	**05**
			OR			
	6	a)	Discuss with a neat sketch the construction and working principle of scraped surface freezer and blast freezer.	*CO2*	*PO7*	**10**
		b)	A spherical food product is being frozen in an air-blast freezer. The initial product temperature is 10°C and the cold air – 10°C. The product has a 100mm diameter with density of 1000 kg/m^3, the initial freezing temperature is –1.25°C, the thermal conductivity of the frozen product is 1.2 W/(m K), and the latent heat of fusion is 250 kJ/kg. Predict the freezing time using Planck's Equation.	*CO2*	*PO7*	**10**
			UNIT - IV			
	7	a)	What is cold sterilization?	*CO4*	*PO12*	**04**
		b)	Explain the construction and working principle of twin-screw extruders with a neat sketch.	*CO4*	*PO12*	**08**
		c)	Explain high pressure processing applications in food industry.	*CO4*	*PO12*	**08**
			OR			
	8	a)	Explain the basic principles of extrusion.	*CO3*	*PO6*	**06**
		b)	Discuss about the microwave and ohmic heating used in food industry	*CO2*	*PO7*	**08**
		c)	Explain with a neat sketch the permeability of the packing material	*CO2*	*PO7*	**06**
			UNIT - V			
	9	a)	What are food additives? Discuss different types of additives used in food industries.	*CO3*	*PO6*	**10**
		b)	Explain the functions of packaging foods and classify food packaging	*CO2*	*PO7*	**10**
			OR			
	10	a)	Explain the need for passive and active packaging in food industries	*CO2*	*PO7*	**10**
		b)	Discuss with examples the importance of anti-caking agents, leavening agents and non-nutritive sweeteners in food industries.	*CO2*	*PO7*	**10**

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