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

Autonomous Institute Affiliated to VTU

January 2024 Semester End Main Examinations

Programme: B.E.   Semester: VII
Branch: Institutional Elective   Duration: 3 hrs.
Course Code: 19EI7OE2IA   Max Marks: 100
Course: Instrumentation for Food Processing and Agriculture

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

				CO	PO	Marks
			UNIT - I			
1	a)		"Flow charts differ from formula in that they provide an overview of the manufacturing process", illustrate this distinction with the aid of flow chart illustrating the manufacturing process of yogurt.	CO2	PO2	**06**
	b)		"Food spoilage is the main reason for food preservation", discuss the chemical and physical food spoilage factors.	CO2	PO2	**08**
	c)		Discuss the three levels of food processing	CO 1	PO1	**06**
			UNIT - II			
2	a)		Illustrate the operational mechanisms of spinning cone column distillation used in flavor extraction process. through a clear schematic and elaborate the practical application of this technique in one specific context.	CO2	PO2	**10**
	b)		Explore the interdisciplinary nature of flavour creation and development in the realm of food product innovation. Analyse the diverse roles played by various stakeholders in the development, formulation, and marketing of flavors for food products.	CO 1	PO1	**10**
			UNIT - III			
3	a)		Discuss the following ingredients in bakery industry and their impact on product quality i) Flour ii) Sugar iii) Salt iv) Water v) Fat	CO 1	PO1	**10**
	b)		What is dehydration and FPO specification for dehydrated fruits and vegetables. Illustrate dehydration of fruits and vegetables with an aid of flow sheet.	CO2	PO2	**10**

			OR			
4	a)		Draw the flow sheet for preparation of frozen fruits and vegetables	*CO2*	*PO2*	**05**
	b)		Discuss the following terms related to vegetables and fruits process industry i) Canning ii) Grading iii) Blanching iv) Freezing v) Filling and storing	*CO 1*	*PO1*	**10**
	c)		What are the proving and baking processes, and how do they play a crucial role in the bakery industry?	*CO 1*	*PO1*	**05**
			UNIT - IV			
5	a)		Highlight the factors essential for heat exchanger design, utilizing the design formula, and emphasize the importance of the Logarithmic Mean Temperature Difference (LMTD) in the design process.	*CO 1*	*PO1*	**07**
	b)		Outline the importance of milk standardization, providing insights into the principles through a schematic representation. Furthermore, examine how precision is elevated in milk standardization with the implementation of direct inline standardization, considering the components of the process control loop	*CO 1*	*PO1*	**08**
	c)		Calculate the floating velocity of fat globules under gravity inside milk of 3µm diameter, density of 980 kg/m³, density and viscosity of continuous phase of 1028 Kg/m³ and 1.42 X 10⁻³ Kg/m respectively. Also, calculate the flotation velocity of a fat globule of the same diameter at a radial position of 0.2 m in a centrifuge rotating at a speed of n = 5400 rpm. Contrast the sedimentation velocities to determine which method exhibits a higher sedimentation rate.	*CO2*	*PO2*	**05**
			UNIT - V			
6	a)		Describe how the following sensor technologies are utilized in precision farming: i) Airflow sensors ii) Aacoustic sensors iii) Mass flow sensors iv) Light detection and ranging (LIDAR) v) Electrochemical sensors	*CO2*	*PO1*	**10**
	b)		What is the role of decision support system (DSS) in managing farming using IoT, illustrate it with a suitable example.	*CO3*	*PO2*	**10**
			OR			

	7	a)	Discuss the following technologies employed in smart farming a) Crop monitoring b) Yield monitoring and forecasting c) Crop Pest and Disease Management d) Site-Specific Nutrient Management e) Soil Mapping and Plant Monitoring	CO2	PO2	**10**
		b)	Using the IoT framework applied to agriculture, discuss a solution architecture that encompasses four distinct layers.	CO3	PO1	**05**
		c)	What are relays and solenoid valves, and how are they employed in the context of advanced agricultural practices?	CO2	PO1	**05**

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