Total number of printed pages: 02 **Programme (PG)/2nd Semester/PFET201**

2024

Emerging Food Processing Technologies-I: Beverages and Dairy

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

*Answer **ANY FIVE** questions.*

1.	a)	Briefly elaborate on the four major properties of starter culture microorganisms. Explain different ways membrane fouling can occur using schematic diagrams.	5 + 6
	b)	Compare freezing vs. lyophilization of starter culture. How does chymosin catalyze milk coagulation during cheese manufacturing – Explain with a schematic diagram.	3 + 6
2.	a)	Write short notes on **any five** of the following. (i) Premiumization, (ii) Functionality, (iii) Pitting in fruit juice processing, (iv) Ale beer, (v) Must, (vi) Mustiness in tea	5 × 2
	b)	Elaborate on cryoprotectants used to protect starter culture cells during frozen / lyophilized storage. List two major differences between squash and cordial. are the main locations of enzymes in milk? List major types of tea.	6 + 2 + 2
3.	a)	Explain cryoconcentration of fruit juice using an appropriately labeled schematic diagram. If a tubular heat exchanger having diameter "d" and length "l" is used in cryoprotection of juice, what is the area of its heat-exchanging surface?	6 + 2
	b)	Draw a schematic diagram of a spray drying unit, label it appropriately, and elaborate operational details of the process. Briefly discuss "hops" in beer.	8 + 4
4.	a)	Elaborate on withering (use a schematic diagram of a continuous line), maceration and fermentation of tea leaves.	12
	b)	What is "instant" tea? Briefly state how it is processed. In case of instant tea, what is BMF grade tea? What is the final moisture content in instant tea?	2 + 4 + 1 + 1
5.	a)	Explain, with schematic diagrams, principles of forward and reverse osmosis. How does pulsed electric field (PEF) work against microorganisms? Describe PEF pasteurization of beer using an appropriately labelled schematic diagram of the processing unit.	5 + 4 + 7
	b)	Elaborate on malolactic fermentation in wine using the reaction scheme for the biochemical process.	4
6.	a)	Explain each of the following principle of reduction of membrane fouling with an example – (i) modification in membrane processing conditions, and (ii) modification in membrane surface help reduce membrane fouling?	4 + 5

	b)	List four major effects of γ-irradiation of fruit juice on quality of the beverage. Elaborate on "malting" in beer processing. What is the major difference between milk coagulation in cheese and that in yogurt?	4 + 5 + 2
7.	a)	What is homogenization of milk? List two major advantages and two disadvantages of membrane processing of fruit juice. State two major advantages of processing of fruit juice concentrate.	2 + 4 + 2
	b)	Explain the working principle of (i) a gravity separator, and (ii) a floater-sinker line for cleaning harvested coffee beans. What is the symbol mandated on the label of an irradiated food?	6 + 1
	c)	What is "cold plasma", and what is its major disadvantage in food processing? Explain the working principle of LED treatment as non-thermal food preservation technology.	3 + 2