Course Code:19AG0710 **R19**

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY::PUTTUR
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QUESTION BANK (DESCRIPTIVE)

Subject with Code : Dairy and Food Engineering (19AG0710) **Course & Branch**:B.Tech –AGE

Year & Sem: III-B.Tech & II-Sem **Regulation:** R19

UNIT-I

DETERIORATION IN FOOD PRODUCT AND THEIR CONTROLS; DAIRY DEVELOPMENT IN INDIA; UNIT OPERATIONS OF VARIOUS DAIRY AND FOOD PROCESSING SYSTEMS

1.	**a.**	Define Food Spilage, Detorioration and Food Preservation	[L1][CO1]	**[4M]**
	b.	List out the causes of Food spoilage	[L1][CO1]	**[2M]**
	c.	Define Distilation, Crystallization and Filtration	[L1][CO2]	**[6M]**
2.	**a.**	What is NDDB? When this act was established in India.	[L1][CO1]	**[3M]**
	b.	Give the classification of food with respect to spoilage along with examples.	[L4][CO1]	**[4M]**
	c	List out the Physical, chemical and biological methods of food preservation	[L1][CO1]	**[5M]**
3.		Define milk and write about the importance of milk in national scenario.	[L1][CO1]	**[12M]**
4.	**a.**	What are the important properties of milk, which affect the processing	[L1][CO2]	**[5M]**
	b.	Explain the factors which are affecting composition of milk	[L2][CO2]	**[7M]**
5.	**a.**	Write short notes on density and specific gravity of milk. Also explain the determination of specific gravity by Lactometer	[L2][CO2]	**[8M]**
	b.	If the Lactometer reading becomes 31.0 at 66°F, what is the corrected specific gravity of milk?	[L3][CO2]	**[4M]**
6.	**a.**	How the density and viscosity of milk affect the milk processing operations?	[L1][CO2]	**[4M]**
	b.	Differentiate between boiling point and freezing point of milk	[L4][CO2]	**[4M]**
	c.	Write about Total solids and total SNF. What is the amount of total solids and SNF with a milk having 3% fat and density of milk is 1016 kg/m³ (@20°C).	[L3][CO2]	**[4M]**
7.	**a.**	Discuss about colour, flavor and refractive index of milk.	[L2][CO2]	**[8M]**
	b.	Define overrun with related expressions.	[L1][CO2]	**[4M]**
8	**a.**	Define and Explain the sampling for food testing	[L2][CO2]	**[6M]**
	b.	Explain the effect pH and water content on growth of microorganisms	[L2][CO2]	**[6M]**
9.	**a.**	Write about the colostrum	[L1][CO2]	**[6M]**
	b.	What are the changes occurred during boiling of milk	[L1][CO2]	**[6M]**
10.		Duscuss specific heat, thermal conductivity, pH, acidity, surface tension and expansion of milk	[L2][CO2]	**[12M]**

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UNIT-II

MILK RECEIVING, PROCESS FLOW CHARTS, PASTEURIZATION, STERILIZATION OF MILK AND THERMAL PROCESSING

1.	**a.**	What are the methods for measuring bulk milk?	[L1][CO3]	**[4M]**
	b.	What are the important considerations during unloading of bulk milk tanks?	[L1][CO3]	**[4M]**
	c.	Explain the milk silos and refrigerated storage tank.	[L2][CO3]	**[4M]**
2.	**a.**	Draw the process flow chart for preparation of pasteurized milk and sterilised milk (In-bottle sterilization)	[L2][CO3]	**[8M]**
	b.	Draw the process flow chart for preparation flavoured milk	[L2][CO3]	**[4M]**
3.	**a.**	Draw the process flow chart for preparation of ice cream and cheddar cheese	[L2][CO3]	**[8M]**
	b.	Draw the process flow chart for preparation of evaporated milk	[L2][CO3]	**[4M]**
4.	**a.**	You have received 100 kg of cow milk with 4.5% fat. How much water is to be added to it to make it to 3% fat?	[L3][CO3]	**[3M]**
	b.	You are having 100 kg of the milk with 2% fat. What should you do to get the final fat of 3%?	[L3][CO3]	**[3M]**
	c.	What should be the ratio of the milk with 4.5% fat and water to be added so that the final milk is of 3% fat?	[L3][CO3]	**[3M]**
	d.	What should be the ratio of milk with 3% fat and cream with 45% fat to get the final milk with 4.5% fat?	[L3][CO3]	**[3M]**
5.	**a.**	Explain the differences between blanching, pasteurization and sterilization	[L2][CO3]	**[3M]**
	b.	What are the different methods of vat pasteurization? Explain the general requirements of batch type pasteurization and listout the vat pasteuriser controls.	[L2][CO3]	**[6M]**
	c.	Write advantages and disadvantages of vat pasteurization	[L2][CO3]	**[3M]**
6.	**a.**	Draw the flow chart of HTST pasteurization system and explain the flow process	[L2][CO3]	**[8M]**
	b.	How the temperature, flow rate and pressure are controlled in HTST pasteurisers?	[L1][CO3]	**[4M]**
7.	**a.**	Define Sterilization. Explain the difference between the conventional canning and aseptic processing	[L2][CO3]	**[6M]**
	b.	Explain Hydrostatic retort with neat sketch.	[L2][CO3]	**[6M]**
8.	**a.**	Write the classification of UHT sterilization process.	[L1][CO3]	**[4M]**
	b.	Explain the process flow chart of a continuous UHT sterilization process	[L2][CO3]	**[8M]**
9.	**a.**	Define thermal processing and what are the objectives of thermal processing	[L1][CO3]	**[3M]**
	b.	What are the primary functions of blanching	[L1][CO3]	**[3M]**
	c.	Explain hot water blanchers and steam blanchers	[L2][CO3]	**[6M]**
10.	**a**	Define thermal death time (D-Value) and thermal reduction time (Z- value)	[L1][CO3]	**[3M]**
	b	Explain continuous rotary retort for sterilization.	[L2][CO3]	**[6M]**
	c.	What are the impoertant accessories for in-bottle sterilization	[L1][CO3]	**[3M]**

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UNIT-III

HOMOGENIZATION, PACKAGING, BUTTER MANUFACTURE AND DAIRY PLANT DESIGN AND LAYOUT

1.	**a.**	What is homogenization of milk and why homogenization is required in milk processing.	[L1][CO4]	**[8M]**
	b.	What are the four different forms of fat globules in milk?	[L1][CO4]	**[4M]**
2.		Explain the different parts of the homogenizer with suitable figures and also state their functions.	[L2][CO4]	**[12M]**
3.	**a.**	Explain two stage Homogenising valve with 3-plunger pump with neat sketch	[L2][CO4]	**[6M]**
	b.	Explain the effect of operational parameters (pressure and temperature) during homogenization	[L2][CO4]	**[6M]**
4.	**a.**	Define (a) Butterfat (b) AMF (c) Butter oil (d) Butter	[L1][CO4]	**[6M]**
	b.	Draw the flow chart for butter manufacture and state the principal equipment used.	[L2][CO4]	**[6M]**
5.	**a.**	Explain the working principle of Tubular bowl centrifuge with neat sketch.	[L2][CO4]	**[6M]**
	b.	Explain the working principle of Disc centrifuge with neat sketch	[L2][CO4]	**[6M]**
6.	**a.**	Define and distinguish between Paneer, butter, and ghee.	[L2][CO4]	**[3M]**
	b.	Give the process flow chart for manufacturing of paneer and list out the equipments required.	[L2][CO4]	**[6M]**
	c.	What are the main factors causing deterioration during storage	[L1][CO4]	**[3M]**
7.	**a.**	What are the basic requirements of food packaging	[L1][CO4]	**[4M]**
	b.	Explain the packaging of milk, cultured milk, concentrated milk anddried milk products.	[L2][CO4]	**[8M]**
8.	**a.**	Write short notes on Filling milk by gravity system	[L1][CO4]	**[4M]**
	b.	Explain Piston type filling system and Metering cup filling system.	[L2][CO4]	**[8M]**
9.	**a.**	What are the factors considered while planning dairy building	[L1][CO5]	**[6M]**
	b.	What are the advantages of good plant layout	[L1][CO5]	**[6M]**
10.	**a.**	What are the points considered during selecting the location of building for dairy plant	[L1][CO5]	**[6M]**
	b.	What is the importance of site selection in dairy plant design	[L1][CO5]	**[6M]**

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UNIT-IV
EVAPORATION

1.	**a**	Define Evaporation and List out the types of evaporators	[L1][CO6]	**[3M]**
	b	Define steam economy with related equation.	[L1][CO6]	**[3M]**
	c	Draw the schematic flow diagram of of Mechanical and thermal recompression systems.	[L1][CO6]	**[6M]**
2.	**a.**	Define evaporation. Write the objectives of evaporation.	[L1][CO6]	**[4M]**
	b.	What are the basic functions of an evaporator?	[L2][CO6]	**[4M]**
	c.	Draw the schematic flow diagram of an evaporator to show the basic components of the evaporation system.	[L2][CO6]	**[4M]**
3.	**a.**	Write about different types of evaporators.	[L1][CO6]	**[6M]**
	b.	Explain the short tube and long tube evaporators with neat sketch.	[L2][CO6]	**[6M]**
4.		Explain the design of single effect evaporator with neat sketch and related expressions.	[L2][CO6]	**[12M]**
5.		Explain the design of multiple effect evaporator with neat sketch and related expressions.	[L2][CO6]	**[12M]**
6.	**a.**	Explain forced circulation evaporator with neat sketch.	[L2][CO6]	**[6M]**
	b.	Explain agitated thin film evaporator with neat sketch.	[L2][CO6]	**[6M]**
7.	**a.**	Write the advantages and limitations of Reversed feed and parallel feed evaporation system.	[L1][CO6]	**[12M]**
	b.	Write the advantages and limitations of For-ward feed and Mixed feed evaporation system.	[L1][CO6]	**[6M]**
8.	**a.**	Discuss about boiling point elevation. What are the factors effecting the liquid boiling point	[L2][CO6]	**[4M]**
	b.	What are the factors affecting the selection of an evaporator, rate of heat transfer, economy of operation and evaporation process?	[L1][CO6]	**[8M]**
9.		A single effect evaporator is required to concentrate a solution from 10% solids to 30% solids at the rate of 250kg of feed per hour. If the pressure in the evaporator is 77kPa absolute, and if steam is available at 200kPa gauge, calculate the quantity of steam required f er hour and the area of heat transfer surface if the overall heat transfer coefficient is 1700 $Jm^{-2}S^{-Io}C^{-I}$. Assume that the temperature of the feed is 18°C and that the boiling point of the solution under the pressure of 77kPa absolute is 91°C. Assume, also, that the specific heat of the solution is the same as for water, that is 4.186 x 10^3 $Jkg^{-I0}C^{-I}$, and the latent heat of vaporization of the solution is the same as that for water under the same conditions. From steam tables, condensing temperature of steam at 200kPa gauge (300kPa abs.) is 134°C and latent heat 2164 $kJkg^{-I}$; the condensing temperature at 77kPa (abs.) is 91°C and latent heat is 2281 kJ kg^{-1}.	[L3][CO6]	**[12M]**
10.		Apple juice is being concentrated in a natural-circulation single-effect evaporator. At steady-state conditions, dilute juice is the feed introduced at a rate of 0.67 kg/s. The concentration of the dilute juice is 11% total solids. The	[L3][CO6]	**[12M]**

		juice is concentrated to 75% total solids. The specific heats of dilute apple juice and concentrate are 3.9 and 2.3 kJ/(kg °C), respectively. The steam pressure is measured to be 304.42 kPa. The inlet feed temperature is 43.3°C. The product inside the evaporator boils at 62.2°C. The overall heat-transfer coefficient is assumed to be 943 W/(m 2 °C). Assume negligible boiling-point elevation. Calculate the mass flow rate of concentrated product, steam requirements, steam economy, and the heat-transfer area. From the steam table: Temperature of steam at 304.42 kPa =134°C; Enthalpy for saturated vapor at 134°C = 2725.9 kJ/kg; Enthalpy for saturated liquid at 134°C =563.41 kJ/kg; Enthalpy for saturated vapor at 62.2°C = 2613.4 kJ/kg.		

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UNIT-V
FREEZING, EXTRACTION, FILTRATION, MEMBRANE SEPARATION AND THERMAL PROCESSING

1.	**a.**	Define freezing. What are the advantages and dis advantages of freezing.	[L1][CO6]	**[4M]**
	b.	Explain freezing curve with neat sketch.	[L2][CO6]	**[4M]**
	c.	Explain about plate freezer.	[L2][CO6]	**[4M]**
2.	**a.**	Explain the freezing of foods. Enlist the freezing equipment's.	[L2][CO6]	**[6M]**
	b.	Explain the working mechanism of air blast freezer with neat sketch.	[L2][CO6]	**[6M]**
3.	**a.**	Briefly discuss about spiral freezer.	[L2][CO6]	**[6M]**
	b.	Write short notes on fluidized bed freezer	[L2][CO6]	**[6M]**
4.	**a.**	Derive the planks equation for predicting the freezing time with neat sketch.	[L3][CO6]	**[8M]**
	b.	A spherical food product is being frozen in an air-blast freezer. The initial product temperature is 10°C and the cold air -40°C. The product has a 7 cm 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. Compute the freezing time.	[L3][CO6]	**[4M]**
5.	**a.**	Discuss membrane processing and write the uses of membrane filtration.	[L1][CO6]	**[6M]**
	b.	Explain ultra filtration and write the characteristics of ultra fitration.	[L2][CO6]	**[6M]**
6.	**a.**	Discuss reverse osmosis and write the characteristics of reverse osmosis.	[L2][CO6]	**[6M]**
	b.	Write advantages, limitations and applications of reverse osmosis	[L2][CO6]	**[6M]**
7.	**a.**	List out membrane separation methods and explain the microfiltration process.	[L2][CO6]	**[6M]**
	b.	Explain the nano filtration process	[L2][CO6]	**[6M]**
8.	**a.**	Define proximate analysis. Give the proimate analysis of a 100gm of rice grain	[L1][CO6]	**[6M]**
	b.	Explain the method for determination of carbohydrates.	[L2][CO6]	**[6M]**
9	**a.**	Explain the method for determination of proteins.	[L2][CO6]	**[6M]**
	b.	What are the methods for controlling water content and explain the effect of water content during storage.	[L1][CO6]	**[6M]**
10		Explain the changes occurred during heating, evaporation, drying and freezing of a food component	[L2][CO6]	**[12M]**

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