Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) EXAMINATION – WINTER 2023

Subject Code:3135102 Date:16-01-2024

Subject Name:Introduction to Food Engineering & Technology

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	What are the objectives of the study of food engineering and technology?	**03**
	(b)	What are the biological/intrinsic factors responsible for post harvest deterioration?	**04**
	(c)	Write the opportunities and challenges faced by the food processing sector? Also write the major food processing sectors in India.	**07**
Q.2	**(a)**	Discuss different types of blanching process used in food.	**03**
	(b)	What is One District One Product (ODOP) Scheme?	**04**
	(c)	A crusher requires 5 kWh for grinding a material at the rate of 100 kg/h from 2 cm size to 5 mm size. How much power will be required, if the reduction is 2 mm. (1) Rittinger's law and (2) Kick's law.	**07**
		OR	
	(c)	Milk with 3.8% fat and 8.1% Fat-Free Solids (FFS) is used to produce concentrated canned milk. The process includes the separation of cream in a centrifuge and the partially defatted milk concentration in an evaporator. If the cream produced in the centrifuge contains 55% water, 40% fat, and 5% Fat-Free Solids, calculate how much milk is necessary to produce a can of concentrated milk containing 410g milk with 7.8% fat and 18.1% FFS. How much cream and how much water must be removed in the centrifuge and the evaporation, respectively.	**07**
Q.3	**(a)**	What do you understand by physical quantities? Discuss different types of physical quantities.	**03**
	(b)	Write the Government initiatives for growth of food industry?	**04**
	(c)	It is desired to crush 100 tonnes/hour of phosphate rock from a feed size where 80% is less than 101.6 mm to a product where 80% is less than 3.175 mm. The work index is 10.13. (a) Calculate the power required. (b) 80% is less than 1 mm.	**07**
		OR	
Q.3	**(a)**	What are the guidelines for intake of dietary fat for Indians?	**03**
	(b)	Explain how nutritional variability affects on RDA value?	**04**

(c) Define: **07**
a. Decimal Reduction Time
b. Thermal death time
c. Thermal Resistance (Z value)

Q.4 **(a)** What do you mean by base unit? Write the SI unit with its symbol. **03**

(b) Write a short note on present status of Indian food industry. **04**

(c) Skim milk is prepared by the removal of some of the fat from whole milk. This skim milk is found to contain 90.5% water, 3.5% protein, 5.1% carbohydrate, 0.1% fat and 0.8% ash. If the original milk contained 4.5% fat, calculate its composition assuming that fat only was removed to make the skim milk and that there are no losses in processing. **07**

OR

Q.4 **(a)** Draw the line diagram of psychometric chart and explain the principle of wet bulb temperature. **03**

(b) Write a short notes on: **04**
1. Cleaning and Grading of food
2. Mixing of foods

(c) What do you understand by overall material balance? State the law of conservation of mass. **07**

Q.5 **(a)** What are the environmental/ extrinsic factors responsible for post harvest deterioration? **03**

(b) It is desired that 4 tonnes of parboiled paddy is to be dried on the open floor under the sun from 30% to 14% moisture content (wb) during 16 h effective drying time. The average rate of water removal is 0.5 kg/m^2.h, calculate the floor area required for sun drying. **04**

(c) Give the importance of size reduction process in food products. Discuss Kick's, Rittenger's and Bond's law of size reduction of grains. **07**

OR

Q.5 **(a)** Discuss the followings **03**
1. Uses psychometric chart in food industry
2. Relative humidity

(b) Orange juice (with a mean heat capacity of 3.8 kJ kg^{-1} K^{-1}) enters a heat exchanger at 12◦C with a flow rate of 500 kg h^{-1}. It is heated by water flowing at 0.11 kg s^{-1} and the water temperature falls from 80 to 30◦C. What is the final temperature of the orange juice? (Take: heat capacity of water 4.18 kJ kg^{-1} K^{-1}) **04**

(c) Write the different preservation techniques in food? **07**

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