

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-III (NEW) EXAMINATION – WINTER 2024

Subject Code:3135102

Date:26-11-2024

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) Write a short note on present status of Indian food industry.	03
	(b) What do you mean by base unit? Write the SI unit with its symbol.	04
	(c) Skim milk, with a fat content of 0.4% by mass, is produced by centrifuging whole milk (containing 3.5% fat). The cream layer, which separates from the skim milk in the centrifuge, contains 50% fat. What will be the proportion of skim milk to cream?	07
Q.2	(a) What are the objectives of the study of food engineering and technology?	03
	(b) Write the Government initiatives for growth of food industry? What is ODOP Scheme?	04
	(c) Tomato juice containing 7% solids by mass is fed to an evaporator and water is removed at a rate of 500 kg h^{-1} . If the concentrate is to contain 35% solids, determine the necessary feed rate.	07
	OR	
	(c) The dried vegetable containing 7% moisture content (wet basis) was conveyed to a water spraying chamber. If the moisture content of the vegetable is required to be raised to 35% (wet basis), find out the amount of water sprayed to the vegetable.	07
Q.3	(a) What are the different types of equipment and machinery used in the food processing industry?	03
	(b) Describe the role of cleaning in the food processing industry and the methods used for cleaning different food products.	04
	(c) What are the different methods of peeling used in food processing? Compare steam peeling and abrasive peeling methods.	07
	OR	
Q.3	(a) What are the factors to consider when selecting size reduction equipment for food materials?	03
	(b) Explain the various techniques used for grading food products. How do size, shape, and quality impact the grading process?	04

- (c) Discuss the types of cutting operations in the food industry, such as slicing, dicing, chopping, and mincing. Which equipment is used for these processes? **07**
- Q.4** (a) How do microbial activities affect food spoilage, and what are common microorganisms involved? **03**
- (b) What are the primary factors that lead to food deterioration? Discuss with examples. **04**
- (c) Describe the principles of Controlled Atmosphere Storage (CAS) and its application in extending the shelf life of fruits and vegetables. **07**
- OR**
- Q.4** (a) Discuss the impact of modern food preservation techniques on food quality, safety, and nutrition. **03**
- (b) How does salting and sugaring preserve food? Give examples of foods preserved by these methods. **04**
- (c) How does Modified Atmosphere Packaging (MAP) work to extend the shelf life of perishable foods? **07**
- Q.5** (a) What is the role of the Food Safety and Standards Authority of India (FSSAI) in regulating the Indian food market? **03**
- (b) 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. **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) Calculate the power required to crush the product further where 80% is less than 1 mm. **07**
- OR**
- Q.5** (a) What are the key factors that necessitate the evaluation of food quality in the food processing industry? **03**
- (b) How much power is required to crush 2 t/h of a material if 80% of the feed passes through IS sieve No. 480 (4.75 mm opening) and 80% of the product passes through IS sieve No. 50 (0.5 mm opening)? Given the work index of the material as 6.30. **04**
- (c) In a wheat milling experiment, it was found that to grind 4.33 mm sized grains to IS sieve 35 (0.351 mm opening), the power requirement was 8 kW. Calculate power requirement for milling of wheat by the same mill to IS sieve 15 (0.157 mm opening) using (1) Rittinger's law and (2) Kick's law. Feed rate of milling is 200 kg/h. **07**
