

Enrollment No./Seat No.:

## GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering - SEMESTER - VI EXAMINATION - SUMMER 2025

Subject Code: 3165102

Date: 22-05-2025

Subject Name: Recent Advances in Fruits and Vegetable Processing

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.

	Marks
<b>Q.1 (a)</b> Explain the physical attributes of fresh fruits and vegetable	03
<b>(b)</b> Explain the following equations. 1. Size measurement 2. Sphericity 3. Roundness 4. Roundness ratio 5. Bulk density 6. True density 7. Porosity 8. Apparent density	04
<b>(c)</b> Eight tonnes of apple having specific heat of 0.80 kcal/Kg-°C is to be cooled from 25 to 14°C in 24 hours. The heat of respiration per 24 hour is 745 kcal/t. Three men will work for 4 hours and lighting load is estimated to be 100 watt. Air infiltration load is assumed as 980 kcal in 24 hours. The cold storage measures 6 × 6 × 3 m on the inside and is constructed of bricks laid in cement mortar. Wall thickness is 40 cm and there is 10 cm thick cork insulation on the inside of the four walls. The cement plaster is 1 cm thick. The heat transfer coefficient for the ceiling is 20% more than that for the walls. The outside temperature is 30°C and the inside is maintained at 5°C. Calculate the plant capacity needed in tonnes of refrigeration. <b>Thermal conductivity of brick</b> = 0.45 kcal/hr/m-°C <b>Thermal conductivity of cork</b> = 0.025 kcal/hr/m-°C <b>Thermal conductivity of cement plaster</b> = 0.25 kcal/hr/m-°C <b>Heat of respiration for men</b> = 170 kcal/hr	07
<b>Q.2 (a)</b> What is the difference between maturity and ripeness in fruits and vegetables?	03
<b>(b)</b> Define the Senescence? detailed explain with its types.	04
<b>(c)</b> Provide a detailed explanation of the various types of fruits and vegetables	07
<b>OR</b>	
<b>(c)</b> Explain edible coatings for fruits and their functions. Additionally, discuss the selection criteria for edible coatings and define wettability along with its types.	07
<b>Q.3 (a)</b> What is the difference between control atmosphere storage (CAS) and modified atmosphere storage(MAS) for food commodity?	03
<b>(b)</b> Define the blanching? Detailed explain with its types and suitable figures.	04
<b>(c)</b> A What is the minimal processing? Explain which operation are include in the minimal processing? With suitable flow chart of fruits and vegetable.	07
<b>OR</b>	
<b>(a)</b> Explain vacuum packaging for fresh fruits and vegetables with conceptual diagram.	03

- (b) What are the quality parameters of fresh cut fruits and vegetables product 04
- (c) What are the Preservative treatments for Fresh-cut Fruits and Vegetables 07
- Q.4** (a) What do you understand by the maturity indices and ripeness indices ? 03
- (b) How is the time and temperature for pasteurization determined? 04
- (c) Explain the high pressure processing with working principle and its application, also draw the conceptual figure. 07

**OR**

- (a) Define the role of food packaging. Enlist the major types of packaging and describe primary packaging. 03
- (b) Explain the ultrasonic (US) with its working principle and advantages or disadvantages. 04
- (c) Explain the recent advanced techniques and also explain the Microwave and Radio Frequency Processing 07
- Q.5** (a) Explain the various pasteurization methods used in food processing, highlighting their operating temperatures, time requirements, and typical applications. 03
- (b) Why has minimal processing become essential in the food industry, and what steps are typically included in this method? 04
- (c) Explain the Pulse Electric Field (PFE) with its working principle and advantages or disadvantages, also draw the conceptual diagram. 07

**OR**

- (a) What is canning? Explain its uses, advantages, and any limitations associated with the process. 03
- (b) What does the process of harvesting involve? Describe its types and highlight their benefits or uses. 04
- (c) Enlist the Quality attributes of fresh fruits and vegetables explain the only sensory attributes. 07

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