

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-V (NEW) EXAMINATION – WINTER 2020****Subject Code:3151408****Date:01/02/2021****Subject Name:Thermal and Non Thermal Processing of Foods****Time:10:30 AM TO 12:30 PM****Total Marks: 56****Instructions:**

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) What are thermal processes? Give three examples. 03
(b) What are the industrial applications of microwave heating? 04
(c) Describe the concept of decimal reduction time and thermal death time. Draw and explain thermal resistance curve. 07
- Q.2** (a) What are advantages of blanching? 03
(b) What is hurdle technology? Give five examples of hurdles used to preserve food. 04
(c) Derive the equation for first order reaction. Draw a typical plot of first-order data as the concentration versus time. 07
- Q.3** (a) Write one limitation of steam blanching and water blanching. 03
(b) Discuss the individual quick blanching method in brief. 04
(c) The F_0 for *Clostridium botulinum* is 1.1 minutes for 99.999% inactivation. What would be the F_0 for a 12 D inactivation, if $Z=18^\circ\text{F}$. What would be D and F value at 275°F ? 07
- Q.4** (a) Write the purpose of pasteurization in low acid food and acid food. 03
(b) Explain with diagram the pasteurization of unpackaged liquid using a plate heat exchanger. 04
(c) Describe the construction and working of batch retort with a neat diagram. 07
- Q.5** (a) Differentiate between shallow and deep fat frying. 03
(b) What is extrusion? Describe principle of operation of twin-screw extruder. 04
(c) What is aseptic processing? Discuss direct and indirect sterilization of food products. 07
- Q.6** (a) Define: (a) Radappertisation (b) Radicidation (c) Radurisation 03
(b) Write the application of ohmic heating in food processing. Write two major advantages of ohmic heating. 04
(c) How processing of food is achieved through ultrasound? Explain ultrasonic probe and ultrasonic bath system. 07
- Q.7** (a) Write the advantages of non-thermal methods over thermal methods of food processing. 03

- (b) Describe the mechanism of dipole rotation and ionic interaction for dielectric heating of food. **04**
- (c) What is the principle of high pressure processing? What are the main components of a high-pressure system? Write two commercial application of HPP. **07**

- Q.8** (a) Write the procedure for the improved general method for process time calculation. **03**
- (b) Describe the concept of Q value? Write the relationship between Q value and shelf life of food products. **04**
- (c) Describe the concept of pulsed electric field processing. What are its advantage and limitations? **07**

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