

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – SUMMER 2021****Subject Code:3151408****Date:15/09/2021****Subject Name:Thermal and Non Thermal Processing of Foods****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.

- Q.1**
- (a) Describe the concept of aseptic packaging with its application in food industry. **04**
- (b) What are the stages of sterilization process for food products? **03**
- (c) Write Short notes on: **07**
- i. D-Value
 - ii. F-Value
 - iii. Z-Value
 - iv. 12 D Concept

- Q.2**
- (a) Write the differences between dielectric, ohmic and infrared energy. **04**
- (b) Enlist the non-thermal methods for processing of food products **03**
- (c) Derive the equations for the zero and first order deteriorative reaction in the food products. **07**

OR

- (c) What is blanching? Describe the methods of blanching with their advantages and limitations. **07**

- Q.3**
- (a) Write a short note on infrared heating process for food products. **03**
- (b) Classify single screw extruder according to the extent of shearing action. **04**
- (c) Explain the concept of hurdle technology? How various hurdles can be applied in fermented food products? **07**

OR

- Q.3**
- (a) Write two advantages and disadvantages of direct heating system. **03**
- (b) Estimate the penetration depth of a chicken meat during processing in home type microwave oven. Chicken meat has a dielectric constant of 53.2 and dielectric loss factor of 18.1. Assume that dielectric properties are constant during heating. **04**
- (c) What are the advantages and concerns over use of irradiation technology in food processing? Describe the effect of irradiation on microorganism. **07**

- Q.4**
- (a) What are the factors influencing the rate of heat penetration into a food. **04**
- (b) “Under-blanching causes more damage to food” Give the suitable reason for the above statement. **03**
- (c) What are different types of pasteurization? Mention the equipments used for the pasteurization of packaged and unpackaged food products. **07**

OR

- Q.4**
- (a) Discuss the mechanisms by which micro-organisms are destroyed by application of pulsed electric field. **04**
- (b) Compare the conventional and ohmic heating process. **03**
- (c) Describe the theoretical aspects of high pressure processing. Mention the application, advantage and limitation of high pressure processing. **07**

- Q.5** (a) Discuss the mechanisms by which micro-organisms are destroyed by application of pulsed electric field **04**
- (b) Write the function of different processing zones of a extruder. **03**
- (c) Is Ultrasound effective as preservation technique? If yes, give the suitable reason. **07**
If not, how this technology can be made effective for food preservation.

OR

- Q.5** (a) What are the major components and their functions of microwave oven? Describe any one of them. **07**
- (b) How is pulsed light used for the processing of food products? **04**
- (c) The shelf life of a food stored at 30°C is 7 days. Assuming that Q_{10} value of the deteriorative reactions occurring in the food is 1.8, estimate the shelf life when it is stored at 10°C. **03**
