

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV (NEW) EXAMINATION – WINTER 2023****Subject Code:3141402****Date:11-01-2024****Subject Name:Food and Industrial Microbiology****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) Enlist factors affecting efficacy of heat treatment in foods **03**
- (b) Draw a flowchart to indicate the production of citric acid. Enlist its properties and applications. **04**
- (c) Describe foodborne infection. Draw diagrams to depict infection caused by serotypes of E. coli. **07**
- Q.2**
- (a) Explain types of pasteurization methods especially the time and temperature combination. **03**
- (b) Draw a diagram to depict infection caused by Vibrio cholerae **04**
- (c) Describe the concept and application of D value. Determine the D value for given data obtained by treating a microbial culture at 80°C for 20 min using an appropriate graph. **07**

time	cfu/ml
0	12320000
2	4924000
5	1002000
8	250200
10	92000
15	10720
20	924

OR

- (c) Egg sample was contaminated with 25 cells of Salmonella spp. and 32 cells of S. enterica. Taking into account that the generation time of Salmonella spp. is 30 minutes and its lag phase is 3 h, and that the specific growth rate constant of S. enterica using meat as substrate is 0.17 h⁻¹ and its lag phase lasts 5 h, calculate the number of Salmonella cells that will be present in the meat 10 hours after being prepared **07**
- Q.3**
- (a) A bacterial cell divides every 30 minutes. The initial no. of cells is exactly 100 bacterial cells. After 3 hours, how many bacteria are present? **03**
- (b) The beta galactosidase is genetically regulated by Lac operon. Explain the genetic regulation of operon responsible for production of beta galactosidase in case of 1) only glucose present 2) only lactose present 3) both glucose and lactose present 4) both glucose and lactose absent **04**
- (c) Explain the concept of 2dimensional electrophoresis. Justify that 2 D gel electrophoresis is better than 1D electrophoresis **07**

OR

- Q.3** (a) Draw a well-illustrated schematic diagram to depict the sub parts and probes of a fermenter **03**
 (b) Explain how low temperature is effective in reducing microbial load in foods? **04**
 (c) Discuss the microbial spoilage of canned products? What is the significance of 12D concept for packaging and processing of canned products? **07**
- Q.4** (a) Draw a flowchart to depict differential centrifugation. **03**
 (b) Describe both agar based and broth based methods used to determine antimicrobial resistance. **04**
 (c) What is bioethanol? How it is advantageous in comparison to gasoline? Enlist substrate for bioethanol production. Describe the steps by which bioethanol is produced on large scale. **07**
- OR**
- Q.4** (a) What is meant by indicator organism? Name the indicator organisms for sterilization, pasteurization and fecal contamination **03**
 (b) Explain the purification of proteins on the basis of solubility **04**
 (c) Draw a flow chart to represent purification and recovery of proteins based on size, polarity, solubility, and binding. **07**
- Q.5** (a) Enlist sources of contamination in milk during milking of cows, transport and storage. **03**
 (b) Describe affinity elution chromatography. How does it differ from affinity elution chromatography? **04**
 (c) Describe the defects in milk and milk products. Enlist the microorganisms responsible for these defects and their activity responsible for specific defect. **07**
- OR**
- Q.5** (a) Write a short note on food preservation using chemicals. **03**
 (b) Enlist difference between exotoxin and endotoxin **04**
 (c) Enlist the microbial causatives of spoilage of fruits and vegetables **07**
