

**GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE- SEMESTER-IV (NEW) EXAMINATION – WINTER 2024**

**Subject Code:3141402**

**Date:19-11-2024**

**Subject Name: Food and Industrial Microbiology**

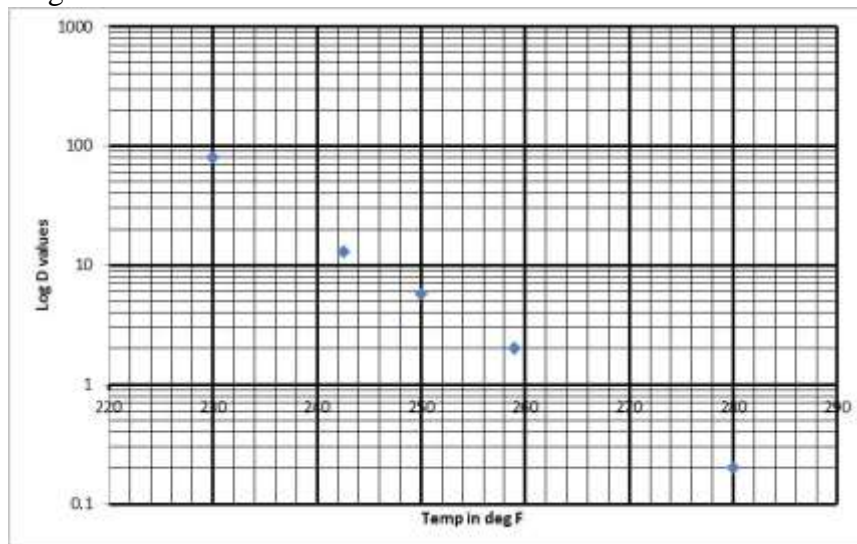
**Time:02:30 PM TO 05:00 PM**

**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) Draw a well-illustrated schematic diagram to depict the sub parts and probes of a fermenter **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 *ETEC*, *EPEC*, *EIEC*, *EHEC*, *EAEC* **07**
- Q.2**
- (a) Enlist difference between exotoxin and endotoxin **03**
- (b) Draw a diagram to depict infection caused by *Vibrio cholerae* **04**
- (c) Describe the concept and application of D, Z, 12 D, F value. Determine the Z value for given data. **07**



**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<sup>-1</sup> 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) Describe the genetic regulation of beta galactosidase through Lac operon when either both glucose and lactose is present or when both sugars are absent **04**
- (c) Explain the concept of Iso electric focusing. Justify that it is also known as 2 D gel electrophoresis **07**

**OR**

- Q.3** (a) Enlist factors affecting efficacy of heat treatment in foods **03**  
(b) Explain how low temperature is effective in reducing microbial load in foods? **04**  
(c) Discuss the microbial spoilage of canned products? **07**

- Q.4** (a) Explain the concept of dialysis. For which protein (smaller or larger) should this method be used? **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 lactose intolerance? How can it be cured? **03**  
(b) Explain the purification of proteins on the basis of solubility **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**

- 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 chromatography? **04**  
(c) Enlist the microbial causatives of spoilage of fruits and vegetables **07**

**OR**

- Q.5** (a) Write a short note on food preservation using chemicals. **03**  
(b) Explain types of pasteurization methods especially the time and temperature combination. **04**  
(c) Draw a flow chart to represent purification and recovery of proteins based on size, polarity, solubility, and binding. **07**

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