

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-IV(NEW) – EXAMINATION – SUMMER 2019
Subject Code:2141402
Date:20/05/2019
Subject Name: Food & 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.

- Q.1**
- (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) Enlist the environmental and atleast 10 microbial causatives (genus and species) of spoilage of fruits and vegetables. What measures can be taken to prevent the microbial spoilage of fruits and vegetables? **07**

- Q.2**
- (a) Draw a well-illustrated schematic diagram to depict the sub parts and probes of a fermenter **03**
 - (b) Enlist difference between foodborne infection and intoxication. Also mention suitable examples and draw diagram **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 60 min using a semi-log graph. **07**

time	cfu/ml
0	123200000
2	49240000
5	10020000
8	2502000
10	920000
15	107200
20	9240

OR

- (c) A chef prepared a coconut cream pie without washing his hands and contaminated the pie with 500 cells of *S. aureus*. He didn't even refrigerate the pie for 6 hrs. **07**
 - i. What would be the generation time if the final no. of cells is 3 million (3×10^6).
 - ii. What would be the no. of cells if the chef didn't refrigerate for another 2 hours.
- Q.3**
- (a) How long would it take for an initial population of 6 to reach a size of 12,288 bacteria? Assume that the population doubles every 3 hours. **03**
 - (b) Describe foodborne infection. Draw diagrams to depict infection caused by serotypes of *E. coli*. (EPEC, ETEC, EAEC, EIEC) **04**
 - (c) 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. Comment on "Leaky expression" **07**

OR

- Q.3** (a) How would you screen for isolates producing beta galactosidase enzyme in lab **03**
(b) Draw a flowchart to indicate the production of citric acid. Enlist its properties and applications. **04**
(c) Discuss the microbial spoilage (both aerobic and anaerobic) of canned products? **07**

- Q.4** (a) What is Z value? How would you calculate it and what is its application **03**
(b) Explain the purification of proteins on the basis of solubility **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) Enlist factors affecting efficacy of heat treatment in foods **03**
(b) Explain the concept of 1) differential centrifugation 2) affinity elution chromatography **04**
(c) Milk and milk products are highly perishable food items. Describe the sources of contamination in milk and milk products. Enlist the microorganisms responsible for these defects and their activity responsible for specific defect. **07**
- Q.5** (a) Explain the concept of glycerol stocks for culture preservation for short term and long term. What is direct vat set culture? **03**
(b) Describe the effect of low temperature on food and microorganisms? Explain the factors which affect the low temperature treatment for preservation. **04**
(c) Explain the concept of 2dimensional electrophoresis. Justify that 2 D gel electrophoresis is better than 1D electrophoresis **07**

OR

- Q.5** (a) Write a short note on primary and secondary biointoxication. **03**
(b) Describe the concept of single cell protein and its uses **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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