

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII • EXAMINATION – SUMMER • 2014****Subject Code: 171402****Date: 03-06-2014****Subject Name: Food Standards and Quality Assurance****Time: 02:30 pm - 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) Do as directed. 07

- i) Define Quality.
- ii) Interdependency paves way for team work. Justify.
- iii) What are characteristics of “Vision statement”?
- iv) Introduce the term “Benchmarking”.
- v) What do you understand by Six sigma?
- vi) State the scope of Bureau of Indian Standards in food industry.
- vii) Highlight on limitations of chlorine as disinfecting agent.

(b) Answer the following questions briefly: 07

- i) Define the terms Synergy and Halo effect.
- ii) Mention desirable traits of sensory panels.
- iii) What do you understand by affective sensory tests?
- iv) Differentiate between paired comparison and duo-trio test.
- v) What do you understand by confidence level?
- vi) For a Poisson's variate x , $p(2) = 2/e^2$ & $p(4) = 4/e^2$. Calculate the value of p (4or 2)
- vii) Calculate the degrees of freedom enjoyed by a binomial distribution.

Q.2 (a) What do you understand by Hedonic Evaluation of food products? Three test samples A_1 , A_2 , & A_3 of an extruded RTE food were compared with a control sample (C) of the product to determine the relative superiority of the test samples. A 9-point hedonic scale (in decreasing order of superiority) was employed and 10 panelists were engaged for this purpose. The obtained data was tabulated as follows: 07

Panelist No.	Hedonic Scores			
	Test Sample A_1	Test Sample A_2	Test Sample A_3	Control Sample C
1	1	5	7	4
2	3	4	8	3
3	2	4	4	2
4	2	5	6	3
5	2	4	5	3
6	2	9	5	2
7	2	5	8	2
8	1	5	3	3
9	3	5	5	2
10	4	6	6	3

1. Calculate Fiducial Limits with respect to control at $\alpha = 5\%$ & 1%
 2. Which test sample is superior to control at 5% and 1% significance level?
 3. Which test sample(s) is/are inferior to control at 1% significance level?
- (Give logical reasons to support your responses)

- (b) Define Null Hypothesis. Differentiate between simple and composite hypotheses with examples. Name the likely errors while formulating hypothesis. Explain with an example which type of error is considered as more risky in quality control and why? **07**

Let $\gamma(h)$ be the probability distribution function of accepting the Null hypothesis H_0 when it is true and S be a given sample space;

Prove that $\gamma(h) = 1 - \beta(h)$;

where, $\beta(h) = P(x \in S - \omega \mid h)$ or $P(S - \omega \mid h)$ and $h \in H$ and ω is the region of S where H_0 is rejected.

What function [$\gamma(h)$ or $\beta(h)$] would you maximize and how?

OR

- (b) Explain the following giving examples: **07**

- (i) χ^2 - distribution (ii) Student t-test (iii) Binomial distribution
(iii) Degrees of freedom (v) Two-tailed tests (vi) Monadic tests (vii) r-index

- Q.3 (a)** Define Normal distribution? State the properties and importance of such a distribution in quality control. **07**

Plot the distribution $p(x) = \frac{5}{\sqrt{\pi}} e^{-36x^2}$ for $-\infty < x < \infty$ to demonstrate that it represents probability distribution function of a Normal distribution. Calculate its mean and variance.

- (b) Answer the following questions: **07**

- (i) Explain Gustation.
(ii) What are the criteria for good estimators of population parameters?
(iii) Prove that the efficiency of any estimator can't exceed unity.
(iv) What is method of maximum likely-hood for estimating population parameters?
(v) What is regression analysis?
(vi) Explain correlation coefficient.
(vii) What statistic is considered appropriate for testing goodness of fit?

OR

- Q.3 (a)** During trial runs of an automatic powder packaging machine a large lot of packed 100 g seasonings is generated. From this lot, six packets are then picked up randomly for inspection to identify defectives in terms of net weight variations. It is given that the lot contains 10 % defectives. What is the probability that there are 4 or more non-defective packets amongst the sample drawn? **07**

- (b) Write brief notes on the following: **07**

- (i) Criteria for good estimator (ii) Dilution test
(iii) Point estimation. (iv) Regression analysis
(v) UMVUE (vi) F-Test
(vii) Law of conditional probability.

- Q.4 (a)** Explain customer window and zero defect concept. **07**
(b) Enlist principles of Total Quality Management. Explain any three in detail. **07**

OR

- Q.4 (a)** Explain PDCA cycle with diagrammatic representation. **07**
(b) Discuss the classification of audit based on the scope. State the benefits of quality auditing. **07**

- Q.5 (a)** Discuss salient features of Quality Management System – ISO 9001. **07**
- (b)** Highlight on Codex Alimentarius Commission. **04**
- (c)** Draw a schematic representation of transition TQM model. **03**
- OR**
- Q.5 (a)** Define Food Safety. Discuss the classifications of hazards. State the significance of determining critical control points in the process. **07**
- (b)** What are the steps of Cleaning in place (CIP) of pipelines after handling of food product? **04**
- (c)** Kaizen promotes employee involvement in an organization. Justify. **03**
