Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- VII EXAMINATION-SUMMER 2023

Subject Code: 3171401 Date: 27/06/2023

Subject Name: Food Standards and Quality Assurance

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)**	(i) Give applications of sensory evaluation for food products? (ii) Explain threshold level with an example. (iii) Explain triangle test?	**03**
	(b)	Answer the following: (i) What do you understand by confidence level? (ii) Define α and β risk with reference to food industry. (iii) Define the term olfaction. (iv) Calculate the degrees of freedom enjoyed by a binomial distribution.	**04**
	(c)	Answer the following: (i) AGMARK facilitates consumer to choose the product. Justify. (ii) What is SQF1000 certification? (iii) Define quality control and quality assurance. (iv) Why employees are considered to be an essence of an organization? (v) State the importance of Quality Function Deployment. (vi) What are advantages of *Idophor* as disinfecting agent? (vii) Why does an organization need vision and mission statement?	**07**
Q.2	**(a)**	Define Poisson's distribution and state its application. For a Poisson's distribution, p(1) = 0.5. Calculate the following: (i) Mean and SD of the distribution (ii) p(1 or 2)	**03**
	(b)	Explain simple and composite hypotheses with examples. Explain Type-I and Type-II errors in QC terminology?	**04**
	(c)	Answer the following: (i) Define 'Control'? (ii) State the law of conditional probability. (iii) Define Adaptation with an example. (iv) What is composite scoring test? (v) Define halo effect. (vi) What is Ranking test?	**07**

OR

(c) Identify and mark statements as TRUE/FALSE and rewrite them after corrections if any. **07**

(i) For a normal distribution, H: **{**$\mu = 3$ & $\sigma^2 = 16\}$ is a simple hypothesis.
(ii) An efficient estimator has minimum variability.
(iii) The confidence level for 3σ control is 99%.
(iv) For binomial distribution, Variance > Mean
(v) A coin is tossed thrice. The chance that it will be 'heads' every time is 1/6.
(vi) χ^2- distribution is a multi-modal curve.
(vii) Duo-tri test is test is done for product differentiation.

Q.3 **(a)** What do you understand by ISO 9001? **03**

(b) Explain 5'S? Enlist the advantages of 5'S. **04**

(c) Enlist and explain seven principles of HACCP. **07**

OR

Q.3 **(a)** Explain the need of BIS (Bureau of Indian Standards). **03**

(b) Explain 3-sigma accuracy. A food company is manufacturing mixed vegetable sauce. The specification for total solids is in the range of 34 – 40%. The process gives a mean (μ) of 36.8 and standard deviation 0.80. Calculate process capability and process capability index? Comment on the results. **04**

(c) Write briefly (Any Two): **07**

(i) Explain Deming's wheel with seven steps.
(ii) PDCA cycle
(iii) NABL accreditation

Q.4 **(a)** Define Normal distribution and state its importance? Show that the function N(x) = $\sqrt{\frac{3}{\pi}}\, e^{-3(x-5)^2}$; $-\infty < x < \infty$, represents a Normal distribution function. Calculate its mean, standard deviation and variance. **03**

(b) Explain Student t-test. Measurement of % total soluble solids performed on random samples of two brands of bottled tomato paste gave the following results: **04**

Brand X	30	31	28	29	32
Brand Y	33.2	33	31	33	29

It is claimed that brand Y has higher total solids than brand X. Examine this claim at $\alpha = 1\%$. [$t = 1.86$ at d.f.= 4 and $\alpha = 1\%$]

(c) Write short notes on the following: **07**

(i) Dilution test (ii) F-Test (iii) Regression (iv) UMVUE
(v) Significance level (vi) Neyman and Pearson *lemma* (vii) r-index

OR

Q.4 **(a)** Two samples X & Y of RTE snack food were subjected to Triangle Test to determine which one is preferred. It was found that X was preferred 20 times while Y was preferred 10 times. A null hypothesis H_o was set up to state that the desired preference for X & Y should be 12 & 15 times respectively. Examine if there is significant difference between the hypothesized & observed results. **03**

Degrees of Freedom (df)	χ^2 - Values	
	Significance level, α	
	1%	5%
1	6.35	3.85
2	9.23	6.0
3	11.33	7.86
4	13.33	9.69
5	15.12	11.13
6	16.2	12.3

(b) The sales data of an RTE food drawn from five different points of sale before and after a TV promotional campaign are given below: **04**

Points of Sales	1	2	3	4	5
Sales before campaign	205	65	61	85	201
Sales after Campaign	216	68	60	100	213

Examine if the promotional campaign be termed as effective at α = 1%
[t = 1.86 at d.f.= 4 and α = 1%]

(c) Explain criteria for good point estimators. A random sample of 700 bottles of soft drink was drawn from a large consignment. Out of these 150 were found defective in some respect. Determine 95% & 99 % confidence limits for the proportion of damaged cans in the consignment. **07**

α	Critical value of statistic
5%	1.957
1%	2.577

Q.5 **(a)** Explain Ishikawa diagram? **03**

(b) Briefly explain the implementation stages of TQM. What are the obstacles in implementing total quality management system in food industry? **04**

(c) Discuss the following briefly (Any Two): **07**
(i) Codex Alimentarius Commission (CAC)
(ii) KAIZEN
(iii) Scope and the mandate of FSSAI Act and Regulations.

OR

Q.5 **(a)** What is SWOT analysis? State the significance of SWOT in TQM. **03**

(b) Define Quality Audit. Discuss the different types of audit based on time frame and scope. **04**

(c) Why is customer satisfaction important in today's era? **07**
Explain the relation of value addition with customer satisfaction with the help of diagrammatic representation.

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