Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – WINTER 2015

Subject Code: 171402 **Date:07/12/2015**

Subject Name: Food Standards and Quality Assurance

Time: 10:30am to 1:00pm **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) i) Differentiate between customer satisfaction and enchantment. **07**
ii) What do you meant by humble customer?
iii) Introduce briefly SQF.
iv) What are advantages of chlorine as disinfectant?
v) State the significance of GMP in food industry.
vi) Inspection is end pipe approach. Justify the statement.
vii) Why employees are considered to be an essence of an organization?

(b) What is Food Safety? Discuss the classifications of hazards. State the significance of determining critical control points in the process. **07**

Q.2 (a) What is the need of FSSAI? Highlight on the features of FSSA. **07**

(b) Define 'Hedonic Evaluation' and explain Fiducial Limits.? Five samples A (coded control), B, C, D and E of a RTE food were subjected to 9-point hedonic evaluation involving 15-panelists for establishing relative preference. The average hedonic scores for A, B, C, D and E are 1.8, 2.1, 2.7, 3.2 and 5.5 respectively. The fiducial limits for sample A at 5% and 1% significance level was calculated as 2.6 ± 0.4 and 2.6 ± 0.7 respectively Answer the following questions supported by logical reasons: **07**

(i) Which sample(s) is/are superior to A?
(ii) Which sample(s) is/are inferior to A.?
(iii) Which sample(s) is/are neither inferior nor superior to A.

OR

(b) Define probability distribution and state the law of conditional probability. From a given lot of packed chocolates produced by a automatic packaging machine, six packets were picked up randomly for inspection. What is the probability that four or more non-defective packets are found in the sample drawn? It is given that the machine produces chocolate packet lots which contain 10% defectives. **07**

Q.3 (a) How value addition can be correlated with customer satisfaction? Explain with a neat diagrammatic representation. **07**

(b) Draw a neat sketch of PDCA cycle with seven steps. Highlight the importance of Plan and Act component. **07**

OR

Q.3 (a) Explain Transition TQM Model with schematic representation. **07**

(b) Discuss 5'S concept along with its implementation stages and advantages. **07**

Q.4 **(a)** Two samples A & B of red wine were subjected to directional paired comparison test to determine which one of them is preferred. It was found that A was preferred 20 times while B was preferred 12 times. A null hypothesis H_o was set up which claims that the desired preference for A & B should be 12 & 15 times respectively. Examine at 95% and 99% confidence levels if there is significant difference between the hypothesized & observed results. **04**

Degrees of Freedom(k)	X^2 - Values	
	Level of significance	
	1%	5%
1	6.33	3.84

(b) An automatic FFS filling machine was purchased to produce 100 g packets of glucose powder. For testing its filling accuracy, a large lot of glucose packets were produced. From this lot a random sample of 10 packets were drawn up whose weights in gram were recorded as 100, 98, 104, 88, 90, 96, 92, 90, 98 and 95. Test at 95% and 99% confidence level if the filling machine is working as per the rated metering capacity. **04**

[Take t = 2.262 at k = 9 & α = 5% & t = 3.25 at k = 9 & α = 1%]

(c) Write meaningful notes on the following: **06**

(i) ANOVA technique (ii) Point estimation technique
(iii) Regression analysis (iv) UMVUE
(v) Criteria for good estimators (vi) Two tailed tests

OR

Q.4 **(a)** Explain "Point Estimation" and "Interval Estimation" techniques. A random sample of 600 candies was drawn up from a large lot. On inspection it was found that 60 of them were underweight. Calculate the standard error of the proportion of underweight candies in the sample drawn. Determine the % range within which the underweight candies would almost certainly lie. **04**

Confidence Coefficient (%)	Critical values t_α
95	1.96
99	2.58
99.73	3.00

(b) To demonstrate the success of an advertisement the daily sales data of a recently launched snack food was obtained from six different retail outlets and is presented as follows: **04**

Retail Outlets	1	2	3	4	5	6
Sales before advertisement	100	84	108	60	96	98
Sales after advertisement	112	94	118	64	105	110

Test at 95% and 99% confidence level if the advertisement could be termed as purposeful?

[Take t = 2.02 at k = 5 & α = 5% & t = 3.36 at k = 5 & α = 1%].

(c) Write short notes on the following: **06**

(i) F-Test (ii) Test for goodness of fits
(iii) Linear Regression (iv) β-risk
(v) Unbiased estimators (vi) Efficient estimators

Q.5 (a) Define Normal distribution and state its properties. What is the importance of such a distribution in quality control of food products? **07**

Examine the function defined as N(x) = $\sqrt{\frac{2}{\pi}}\, e^{-2\,(x-6)^2}$; where - ∞ < x < ∞.

Show mathematically that it represents a Normal distribution function. Calculate its mean, standard deviation and variance.

(b) Explain the following briefly: **07**

i) Binomial distribution ii) Degrees of freedom
iiii) Critical region in hypothesis testing iv) Neyman and Pearson Lemmas
v) Level of confidence vi) Standard deviation
vii) Producers and consumer's risk

OR

Q.5 (a) What is Poisson's distribution? State the properties and importance of such a distribution related to food quality control. For a Poisson's variate x, p(2) = 9p(4) + 90 p(6) . Find out the following: **07**

(i) Mean, Variance and standard deviation of the distribution.
(ii) p(1 or 3)

(b) Differentiate between simple and composite hypotheses giving examples. What is Null Hypotheses? Explain the possible decisions that can be taken in any statistical hypotheses test process. What are the possible errors involved. Which type of error is more risky and why? As a QC officer, which type of error would you want to minimize and how? **07**

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