Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER– III EXAMINATION – SUMMER - 2016

Subject Code: 2630003 **Date: 30-05-2016**

Subject Name: STATISTICAL METHODS

Time: 02.30 p.m. To 05.00p.m. **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Statistical tables for various distributions are permitted to be used.**

Q.1 (a) **Answer the following questions:** **07**

1. Arithmetic operations are appropriate for _____data.(Quantitative / Qualitative).
2. The value added or subtracted from a point estimate in order to develop an interval estimate of population parameter is known as _____.(Margined of Error / Standard Error).
3. In general, higher confidence level provides _____ confidence interval.(Wider / narrow).
4. If sample correlation coefficient of two variables is 0.97, then these two variables have very _____linear relationship.(weak / strong).
5. The ogive of "Less than type" and "More than type" for a data intersect at _____ of the data.(mean / median).
6. Find standard deviation for Binomial Distribution, if n = 10 & p = 0.3.
7. If A & B are two mutually exclusive event then what is the value of P(A∩ B)?

Q.1 (b) It is given that 3% of electric bulbs manufactured by a company is defective. Using Poisson approximation, find the probability that a sample of 100 bulbs will contain, **01**

1. No defective. **02**
2. Exactly one defective. **02**
3. At the most two defective. **02**

Q.2 (a) 1. Consider a sample with data values 27, 25,20,15,30,34,28,25. Compute mean and standard deviation. **04**

2. The result of national survey shows that on average adult sleep 6.9 hours per night. Suppose that standard deviation is 1.2hours. Use Chebyshev's theorem to calculate the percentage of individuals who sleep between 4.5 AND 9.3 HOURS. **03**

(b) Consider a sample with data value of 27,25,20,15,30,34,28,25

1. Provide the five number summary of the data. **04**
2. Show the Box Plot for the data. **03**

OR

(b) 1. A simple random sample of 800 elements generates a sample proportion = 0.7.

1. Provide a 90% confidence interval for the population proportion. **02**
2. Provide a 95% confidence interval for the population proportion. **02**

2. In a survey, the planning value for the population proportion = 0.35.How large a sample should be taken to provide 95% confidence interval with a margine of error of 0.05? **03**

Q.3 (a) Eight coins are thrown simultaneously. Find the chance of obtaining,

1. At least 6 heads. **03**
2. No heads **02**
3. All heads **02**

(b) A random sample of 1,000 persons from town A, 400 is found to be consumers of wheat. In a sample of 800 from town B, 400 are found to be consumers of wheat. Do these data reveal a significant difference between town A and town B, so far as the proportion of wheat consumer is concerned? **07**

OR

Q.3 (a) In an test administered to 1,000 students the average scores was 42 and standard deviation 24.find,

1. The number of students exceeding a scores of 50. **02**
2. The number of students lying between 30 and 54. **02**
3. The value of score exceeds by the top 100 students. **03**

(b) Intelligence test on two group of boys and girls gave the following results: **07**

	Mean	**S.D.**	**N**
Girls	75	15	150
Boys	70	20	250

Is there a significance difference in the mean scores obtained by boys and girls?

Q.4 (a) 1. **Described** various sampling methods. **03**

2. The mean height obtained from a random sample of size 100 is 64 inches. The standard deviation of the distribution of height of the population is known to be 3 inches. Test the statement that the mean height of the population is 67 inches at 1% level of significance. **04**

(b) 1. A drug is given to 10 patients and increment in their blood pressure were recorded to be 3,6,-2,4,-3,4,6,0,0,2.Is it reasonable to believe at 5% level of significance, that the drug has no effect on blood pressure? **03**

2. 680 heads and 520 tails are obtained in tossing a coin 1200 times. Can it conclude that the coin is unbiased, at 5% level of significance? **04**

OR

Q.4 (a) 1. Define a point estimator. Write properties of good estimators. **03**

2. The mean life time of a sample of 400 florescent light bulb, produced by a company is found to be 1570 hours with standard deviation of 150 hours. Test the hypothesis that the mean life time of the bulbs produced by the company is greater than or equal to 1600 hours against the alternative hypothesis that it is smaller than 1600 hours at 1% level of significance. **04**

(b) 1. A random sample of size 16 has 53 as mean. The sum of square of the deviation taken from mean is 135. Can this sample be regarded, at 5% level of significance, as a sample taken from population having 56 as mean? Also obtained 95% confidence interval of the mean of the population. **04**

2. In 324 throws of six faced die, odd points appeared 180 times. Would you say that the die is fair at 5% level of significance? **03**

Q.5 (a) For randomsampleof10 persons, fed on diet A, the increase weight in pound in a certain period was: 10,6,16,17,13,12,8,14,15,9. For another random sample of 12 persons, fed on diet B, the increase in the same period were: 7,13,22,15,12,14,18,8,21,23,10,17. Test whether the diet A and B differ significantly as regards their effect on increase in weight. **07**

Given that:

Degree of freedom	19	20	21	22	23
Value of t at 5% level	2.09	2.09	2.08	2.07	2.07

(b) Using the following data, test the hypothesis, at 5% level of significance that the drug is no better than sugar pills for curing cold. **07**

	HELPED	**HARMED**	**NO FFECT**
DRUG	50	12	18
SUGAR PILLS	40	14	26

OR

Q.5 (a) The following data relate to advertising expenditure and sales.

Advertising expenditure	1	2	3	4	5
Sales(Rs. Laths)	10	20	30	50	40

1. **Find Regression Equation.** **03**
2. **Find SSE,SST& SSR.** **02**
3. **Find r^2** **02**

(b) The number of defects per unit in a sample of manufactured product was found as follows: **07**

No. of defects	0	1	2	3	4
No. of units	200	90	20	8	2

Fit Poisson distribution to the data and test the goodness of the fit.($\alpha = 0.05$)

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