Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER–III • EXAMINATION – WINTER • 2015

Subject Code: 630003 **Date: 29-12-2015**

Subject Name: Statistical Methods

Time: 10:30 am - 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.**

Q.1 **(a)** Define briefly the following terms: **07**

1. What is statistic?
2. Inter quartile Rang
3. Histogram
4. Ogive
5. Qualitative
6. Correlation
7. What is mean by equally likely events?

(b) 1. Construct a Stem-and-leaf display for following data. [4]

70	72	75	64	58	83	80	82
76	75	68	65	57	78	85	72

Construct a frequency distribution.

2. Consider a sample with data values of 10, 20, 21, 17, 16 and 12 compute the mean and median. **[3]**

Q.2 **(a)** Give are five Observations for two variables x and y. **07**

xi	1	2	3	4	5
yi	3	7	5	11	14

1. Develop a scatter diagram for these data.
2. Develop the estimated regression equation.
3. Use the estimated regression equation to predict the value of y when x=4

(b) **07**

xi	2	3	5	1	8
yi	25	25	20	30	16

1. Compute SSE, SST and SSR.
2. Compute the coefficient of determination r^2.
3. Compute the sample correlation Coefficient.

The estimated regression equation for these data is $\hat{y} = 30.33-1.88x$.

OR

(b) **07**

xi	6	11	15	18	20
yi	6	8	12	20	30

1. Develop an estimated regression equation for these data.
2. Compute residuals.

Q.3 **(a)** Suppose that we have a sample space s = {E_1, E_2, E_3, E_4, E_5, E_6, E_7} where E_1, $E_2 \ldots E_7$ denote the sample points. The following probability assignments apply $P(E_1)=0.05$, $P(E_2)=0.20$, $P(E_3)=0.20$, $P(E_4)=0.25$, $P(E_5)=0.15$, $P(E_6)=0.10$, and $P(E_7)=0.05$ Let $A=\{E_1,E_4,E_6\}$, $B=\{E_2,E_4,E_7\}$, $C=\{E_2,E_3,E_5,E_7\}$. **07**

1. Find *P(A), P(B)* and *P(C).*
2. Find *A U B* and *P(A U B).*
3. Find $A \cap B$ and $P(A \cap B)$.
4. Are event *A* and *C* mutually exclusive?
5. Find B^c and $P(B^c)$.

(b) The following data on the age and marital status of 140 customers **07**

Marital Status			
Age		Single	Married
	Under 30	77	14
	30 or Over	28	21

1. Develop a join probability table for these data.
2. What is the probability of finding a customer who is single and under the age of 30?
3. If the customer is under 30, what is the probability that he or she is single?

OR

Q.3 **(a)** Explain: **07**

1. Type – I and Type – II error
2. Simple Random sampling
3. The sample distribution

(b) The following table provides a probability distribution for the random variable y. **07**

y	f(y)
2	0.20
4	0.30
7	0.40
8	0.10

1. Compute *E*(y).
2. Compute Var (y) and б.

Q.4 **(a)** A simple random sample of 400 individuals provides 100 yes responses. **07**

1. What is the point estimate of the proportion of the population that would provide Yes responses?
2. What is your estimate of the standard error of the proportion б $\bar{p}$?
3. Compute the 95% Confidence interval for the population proportion.

(b) The following sample data are from a normal population 10, 8, 12, 15, 13, 11, 6, 5. **07**

1. What is the point estimate of the population mean?
2. What is the point estimate of the population standard deviations?
3. With 95% confidence, what is the margin of error for the estimation of the population mean?
4. What is the 95% confidence interval for the population mean?

OR

Q.4 **(a)** Consider a binomial experiment with two trials and p = 0.40. **07**

1. Draw a tree diagram for this experiment.
2. Compute the probability of one success, *f*(1).
3. Compute *f*(0).
4. Compute the probability of at least one success.
5. Compute the expected value variance and standard deviation.

(b) Consider a Poisson distribution with a mean of two occurrences per time period. **07**

1. Write the appropriate Poisson probability function.
2. Compute the probability of two occurrences in one time period.
3. Compute the probability of six occurrences in three time period.
4. Compute the probability of five occurrences in two time period.

Q.5 **(a)** Two types of drugs were used on 5 and 7 patients for reducing their weight. Drug A was imported and drug B indigenous. The decrease in the weight after using the drugs for six months was as follows. **07**

Drug A	10	12	13	11	14		
Drug B	8	9	12	14	15	10	9

Is there a significant difference in the efficacy of the two drugs? If not, which drug should you buy? (For v=10, $t_{0.05} = 2.223$)

(b) 1000 Student at college level are graded according to their I.Q and their economic conditions. Use chi–square test to find out whether there is any association between economic conditions and the level of IQ. **07**

Economic Conditions	I.Q.			
	High	Medium	Low	Total
Rich	160	300	140	600
Poor	140	100	160	400
Total	300	400	300	1000

OR

Q.5 **(a)** To verify whether a course in accounting improved performance, a similar test was given to 12 participants both before and after the course. The original marks recorded in alphabetical order of the participants were 44, 40, 61, 52, 32, 44, 70, 41, 67, 72, 53, and 72 After the course, the marks were in the same order, 53, 38, 69, 57, 46, 39, 73, 48, 73, 74, 60 and 78. Was the course useful? **07**

(b) A set of 5 coins is tossed 3,200 times, and the number of heads appearing each time is noted. The results are given below : **07**

No. of heads	0	1	2	3	4	5
Frequency	80	570	1100	900	50	50

Test the hypothesis that the coins are unbiased.

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