

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA. Sem-III Regular Examination January 2011

Subject code: 630003

Subject Name: Statistical Methods

Date: 05 /01 /2011

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) (1) What is the application of statistics in Business and Economics and hence in computer? **03**

(2) Define the Exponential probability distribution. Give the properties of exponential Probability distribution. **02**

(3) Give the properties of Poisson distribution. **02**

(b) State the Baye's rule. A producer purchases parts of machine from two suppliers B_1 and B_2 And he stores the purchased parts in big urn. The producer knows that his past experience That 9 % of the parts purchased from B_1 and 5 % of the parts purchased from B_2 are defective The supplier supply parts to the producer in proportion 4 : 1. A part is chosen at random From the urn and found to be non-defective what is the probability that the part has been Supplied by B_1 ? **07**

Q.2 (a) What is the Difference between the Qualitative and Quantitative data ? **07**

(b) A random variable X denotes the number of accidents per week at the traffic signal situated In a crowded locality of a city and probability distribution is given below: **07**

X = x	0	1	2	3
F(x)	0.4	0.3	0.2	0.1

Find the probability that there is at most one and at least two accidents per week and draw The sketch graph of probability distribution. (Without graph paper)

OR

(b) For events A and B , $P(A' \cap B) = 0.1$, $P(A \cap B') = 0.4$ and $P(A' \cup B') = 0.6$ Find the (1) P (A) (2) P (B) (3) P (A $\cup$ B) (4) P (A' $\cup$ B) **07**

Q.3 (a) In a partially destroyed laboratory records on the analysis of correlation data, only the following are legible. **07**

Variance of X = 9, Regression equations $8X - 10Y + 66 = 0$, $40X - 18Y = 214$

Find (1) Mean of X and Y (2) Standard Deviation of Y

- (b) Find the correlation coefficient between the sales and expenses of the following 10 firms.
(Figure in '000 Rs.)

07

Firms	1	2	3	4	5	6	7	8	9	10
Sales	50	50	55	60	65	65	65	60	60	50
Expenses	11	13	14	16	16	15	15	14	13	13

OR

- Q.3 (a) Power impacts for 8 observations were prepared at different compaction pressure and Hardness of the tablet, the following data obtain.

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Observation	1	2	3	4	5	6	7	8
Pressure (tons) X	0.25	0.75	1.0	1.5	2.0	2.5	3.0	4.0
Hardness (Kg.) Y	1.0	1.3	1.9	2.6	2.8	3.3	4.2	5.3

Calculate coefficient of correlation and interpretation of your answer.

- (b) From the following data calculate two equation of line of regression.

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	X	Y
Mean	60	67.5
Standard Deviation	15	13.5

Correlation co-efficient between X and Y is 0.50 also estimate the value of Y for X = 72
Using the appropriate Regression equation.

- Q.4 (a) (1) In a city of some western country 70 % of the married persons take divorce. What is
The probability that at least three among four persons will take divorce?

03

- (2) The probability function of a binomial distribution is

04

$$f(x) = {}^6C_x p^x (1-p)^{6-x}, x = 0, 1, 2, 3, \dots, 6$$

If $3f(2) = 2f(3)$ find the value of p.

- (b) Define the normal distribution.

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Marks of large number of students are distribution normally with mean 50 and standard Deviation 12. If a student is selected at random what is the probability that his marks will be
Between (1) 38 and 62 (2) 26 and 74
(Given area between $z = 0$ and $z = 1$ is 0.34135 & $z = 0$ and $z = 2$ is 0.47725)

OR

- Q.4 (a) (1) Considering the following data on the number of hamburgers a fast-food restaurant
Each of 15 weeks.

04

1565 1852 1644 1766 1888 1912 2044 1812
1790 1679 2008 1852 1967 1954 1733

Construct a stem-and-leaf display.

(2) Compute the standard deviation and co-efficient of variance for

03

X_i : 46 54 42 46 32

(b) Relative and percent frequency distribution of soft drink purchases is given in following table

07

Soft Drinks	Relative frequency	Percent frequency
Coke – classic	0.38	38
Diet coke	0.16	16
Dr. Peppre	0.10	10
Pepsi – cola	0.26	26
Sprite	0.10	10
Total	1.00	100

Construct a bar graph and a pie chart.

Q.5 (a) Find the median from the following data

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Class	0-30	30-60	60-90	90-120	120-150	150-180
Fi	8	13	22	27	18	7

And verify it graphically. (Use the graph paper)

(b) Find the co-variance of cholesterol and Diastolic B.P.

07

Person	1	2	3	4	5	6	7	8	9	10
Cholesterol	307	259	341	317	274	267	320	274	336	300
Diastolic B.P.	80	75	90	74	110	70	85	88	78	79

OR

Q.5 (a) Define the chi-square test.

07

A die is thrown 150 times and the following results are obtained.

Number turned up	1	2	3	4	5	6
Frequency	19	23	28	17	32	31

Test the hypothesis that the die is unbiased at 5 % level of significance

(At 5 % level of significance for 5 d.f. $\chi^2_{0.05} = 11.07$)

b) A man buys 50 electric bulbs of 'Philips' and 50 electric bulbs of 'HMT' Brand.

07

He fined that 'Philips' bulbs give an average life of 1500 hrs. With standard deviation of 60 hrs. and 'HMT' bulbs gave an average life of 1512 hours with standard deviation of 80 hrs. is there a significant difference in the mean life of two brands of bulbs ?

(At 1 % level significance = 1.58)
