Enrolment No. /Seat No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA– SEMESTER IV- EXAMINATION –SUMMER-2024

Subject Code: 4649302 **Date: 13/05/2024**

Subject Name: Statistical Methods

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. **Use of simple calculators and non-programmable scientific calculators are permitted.**

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

i. Pie chart ii. Box plot
iii. Probability iv. Independent Event
v. Sample vi. Population
vii. Kurtosis

(b) Find out the class midpoints, relative frequency and cumulative frequency for the given frequency distribution and also draw histogram for the same: **07**

Class Interval	Frequency
1 – under 3	16
3 – under 5	2
5 – under 7	4
7 – under 9	3
9 – under 11	9
11 – under 13	6

Q.2 **(a)** Explain measures of central tendency with suitable example. **07**

(b) Find out the Mean, MAD, variance and SD for the given data: **07**
5, 9, 16, 17, 18

OR

(b) Determine the value of r for the following data: **07**

Day	Interest Rate	Futures Index
1	7.43	221
2	7.48	222
3	8.00	226
4	7.75	225
5	7.60	224
6	7.63	223
7	7.68	223
8	7.67	226
9	7.59	226
10	8.07	235
11	8.03	233
12	8.00	241

Q.3 **(a)** Define the terms related to probability: **07**
Experiment, Event, Sample Space, Union, intersection, Combinations, Mutually exclusive event

(b) Shown here are the raw values matrix for the results of a national survey of 200 **07**

executives who were asked to identify the geographic locale of their company and their company's industry type. The executives were only allowed to select one locale and one industry type.

		Geographic Location				
		Northeast	**Southeast**	**Midwest**	**West**	**Total**
Industry Type	**Finance**	24	10	8	14	**56**
	Manufacturing	30	6	22	12	**70**
	Communication	28	18	12	16	**74**
	Total	**82**	**34**	**42**	**42**	**200**

a) Write down the probability matrix for the above matrix.
b) What is the probability that the respondent is from the Midwest?
c) What is the probability that the respondent is from the communications industry or from the Northeast?
d) What is the probability that the respondent is from the Southeast and from the finance industry?

OR

Q.3 **(a)** Write down the formula and properties of binomial probability distribution. **07**

(b) Bank customers arrive randomly on weekday afternoons at an average of 3.2 customers every 4 minutes. What is the probability of having more than 7 customers in a 4-minute interval on a weekday afternoon? What is the probability of getting exactly 10 customers during an 8-minute interval on a weekday afternoon? **07**

Q.4 **(a)** Explain one – way ANOVA with example. **07**

(b) A production company's 350 hourly employees average 37.6 years of age, with standard deviation of 8.3 years. if a random sample of 45 hourly employees is taken, what is the probability that the sample will have an average age of less than 40 years? **07**

OR

Q.4 **(a)** A clothing company produces men's jeans. The jeans are made and sold with either a regular cut or a boot cut. In an effort to estimate the proportion of their men's jeans market in Chilanga City that prefers boot-cut jeans, the analyst takes a random sample of 212 jeans sales from the company's two Chilanga City retail outlets. Only 34 of the sales were for boot-cut jeans. Construct a 90% confidence interval to estimate the proportion of the population in Chilanga City who prefer boot-cut jeans. **07**

(b) Explain various sampling techniques. **07**

Q.5 **(a)** Explain one-tail and two-tail test with example. **07**

(b) Determine the equation of regression for the following data: **07**

X	15	8	19	12	5
Y	47	36	56	44	21

OR

Q.5 **(a)** Explain Multiple regression analysis in detail. **07**

(b) $\mu = 471$, $n=23$, $\alpha = 0.05$. Sample data are given below: **07**
445, 489, 474,505,553,477,454,463,466,557,502,449,438,500,466,477,557,433, 545,511,590,561,560
Use this information to test the hypothesis.

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