Enrolment No. /Seat No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA INTEGRATED– SEMESTER III- EXAMINATION –SUMMER-2024

Subject Code: 2638602 **Date: 23/05/2024**

Subject Name: Basic Statistics

Time: 02:30 PM TO 05:00 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)** **Answer the following.** **03**

1. Define ogive.
2. List the business applications of statistics.
3. Define kurtosis.

(b) Explain levels of measurement. **04**

(c) Generate stem and leaf plot for following data. **07**

3.67	2.75	9.15	5.11	3.32	2.09
1.83	10.94	1.93	3.89	7.20	2.78
6.72	7.80	5.47	4.15	3.55	3.53
3.34	4.95	5.42	8.64	4.84	4.10
5.10	6.45	4.65	1.97	2.84	3.21

Q.2 **(a)** Calculate class midpoint, relative frequency and cumulative frequency for the below given frequency distribution. **07**

Class-Interval	Frequency
0-2	218
2-4	207
4-6	56
6-8	11
8-10	8

(b) A data set contains the seven values. 6 2 4 9 1 3 5 **07**

a. Find the range.
b. Find the mean absolute deviation.
c. Find the population variance.
d. Find the population standard deviation.
e. Find the inter-quartile range.

OR

(b) Given cross tabulation table, find following: **07**

1. P(G|A)
2. P(B|F)
3. P(C|E)
4. P(E|G)

	E	F	G
A	15	12	8
B	11	17	19
C	21	32	27
D	18	13	12

Q.3 **(a)** Explain assumptions of binomial distribution. Find out P (x=3) using binomial formula, if n = 4, p = 0.10. **07**

(b) According to the one report, the average annual cost for automobile insurance in the US in a recent year was $691. Suppose automobile insurance costs are uniformly distributed in US with a range from $200 to $1,182. **07**

1. What is the standard deviation of this uniform distribution?
2. What is the height of the distribution?
3. What is the probability that a person's annual cost for automobile insurance in the United States is between $410 and $825?

OR

Q.3 **(a)** List the characteristics of normal distribution. Write down the probability density function of normal distribution. **07**

(b) According to a study several years ago, the average wireless phone user earns $62,600 per year. Suppose a researcher believes that the average annual earnings of a wireless phone user are lower now, and he sets up a study in an attempt to prove his theory. He randomly samples 18 wireless phone users and finds out that the average annual salary for this sample is $58,974, with a population standard deviation of $7810. Use $\alpha = .01$ to test the researcher's theory. Assume wages in this industry are normally distributed. **07**

Q.4 **(a)** Describe sampling. List the random sampling techniques and explain any two. **07**

(b) A random sample of 81 items is taken, producing a sample mean of 47. The population standard deviation is 5.89. Construct a 90% confidence interval to estimate the population mean. **07**

OR

Q.4 **(a)** Explain type-I and type-II errors in detail. **07**

(b) On Monday mornings, the First National Bank only has one teller window open or deposits and withdrawals. Experience has shown that the average number of arriving customers in a four-minute interval on Monday mornings is 2.8, and each teller can serve more than that number efficiently. These random arrivals at this bank on Monday mornings are Poisson distributed. **07**

a. What is the probability that on a Monday morning exactly six customers will arrive in a four-minute interval?

b. What is the probability that no one will arrive at the bank to make a deposit or withdrawal during a four-minute interval?

c. Suppose the teller can serve no more than four customers in any four-minute interval at this window on a Monday morning. What is the probability that, during any given four-minute interval, the teller will be unable to meet the demand? What is the probability that the teller will be able to meet the demand? When demand cannot be met during any given interval, a second window is opened. What percentage of the time will a second window have to be opened?

Q.5 **(a)** Compute coefficient of correlation r for following data. **07**

x	y
47.6	15.1
46.3	15.4
50.6	15.9
52.6	15.6
52.4	16.4
52.7	18.1

(b) The equation of a regression line is and the data are as follows. **07**

$$\hat{y} = 50.506 - 1.646x$$

x	5	7	11	12	19	25
y	47	38	32	24	22	10

Compute SSE and S_e for the above data.

OR

Q.5 **(a)** Determine the equation of the regression line. **07**

x	140	119	103	91	65	29	24
y	25	29	46	70	88	112	128

(b) One study showed that 79% of companies offer employees flexible scheduling. Suppose a researcher believes that in accounting firms this figure is lower. The researcher randomly selects 415 accounting firms and through interviews determines that 303 of these firms have flexible scheduling. With a 1% level of significance, does the test show enough evidence to conclude that a significantly lower proportion of accounting firms offer employees flexible scheduling? **07**

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