Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA INTEGRATED – SEMESTER - III EXAMINATION- SUMMER-2023

Subject Code: 2638602   **Date: 04/07/2023**
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)** What is Data? Explain different types of Data Measurement.   **07**
       (b) For the following data calculate Correlation Coefficient.   **07**

X	22	24	23	26	28	30	32	33
Y	35	36	34	37	38	39	42	43

Q.2 **(a)** Construct a stem-and-leaf plot for the following data. Let the leaf contain one   **07**
       digit. 312, 324, 289, 335, 298, 314, 309, 294, 326, 317, 290, 311, 317, 301, 316,
       306, 286, 308, 284, 324
       (b) Using given marks of 10 students in a sample, compute mean, median, mode,   **07**
       Standard deviation and coefficient of variation.
       Marks: 13,12,14,16,17,18,19,20,22,23

                                    OR
       (b) The probability that a bomb dropped from an aero plane will hit the target is 0.4.   **07**
       Five bombs are dropped from the aero plane to destroy a bridge. 2 bombs are
       sufficient to destroy the bridge. What is the probability that the bridge will be
       destroyed?

Q.3 **(a)** In a manufacturing plant, machine A produces 10% of a certain product, machine   **07**
       B produces 40% of this product, and machine C produces 50% of this product.
       Five percent of machine A products are defective, 12% of machine B products
       are defective, and 8% of machine C products are defective. The company
       inspector has just sampled a product from this plant and has found it to be
       defective. Determine the revised probabilities that the sampled product was
       produced by machine A, machine B, or machine C.
       (b) Phone calls arrive at the rate of 48 per hour at the reservation desk for Regional **07**
       airways.
        (1) Compute the probability of receiving three calls in a five minute interval of
       time.
        (2) Compute the probability of receiving exactly ten calls in fifteen minutes.
        (3) If no calls are being processed, what is the probability that the agent can take
       three minutes for personal time without being interrupted by a call?

                                    OR
Q.3 **(a)** Tompkins Associates reports that the mean clear height for a Class A warehouse   **07**
       in the United States is 22 feet. Suppose clear heights are normally distributed and
       that the standard deviation is 4 feet. A Class A warehouse in the United States is
       randomly selected.
       a. What is the probability that the clear height is greater than 17 feet?
       b. What is the probability that the clear height is less than 13 feet?
       c. What is the probability that the clear height is between 25 and 31 feet?

(b) List all types of sampling methods. Explain any two Probabilistic and any two non-probabilistic sampling methods.   **07**

Q.4 **(a)** Suppose a random sample of size 36 is drawn from a population with a mean of 278. If 86% of the time the sample mean is less than 280, what is the population standard deviation?   **07**

(b) A random sample of size 39 is taken from a population of 200 members. The sample mean is 66 and the population standard deviation is 11. Construct a 96% confidence interval to estimate the population mean. What is the point estimate of the population mean?   **07**

OR

Q.4 **(a)** A sample of 400 male students is found to have a mean height of 151.38 cm. Can it reasonably regarded as a sample from a large population with mean height 171.17 cm. and standard deviation 3.30cm?   **07**

(b) Explain Type-I and Type -II errors in brief.   **07**

Q.5 **(a)** It is claimed that 20% of Indian consumers used internet to buy gifts during Diwali festival. In a sample of 900 customers this year, it is found that 15% used internet to buy gifts during Diwali. Test the claim at $\alpha = 0.05$.   **07**

(b) The manufacturer of a certain make of electric bulbs claims that his bulbs have a mean life of 25 months with a standard deviation of 5 months. A random sample of 6 bulbs gave the following values.
Life of months : 24,26,30,20,20,18
Can you regard the producer's claim to be valid at 1% level of significance?   **07**

OR

Q.5 **(a)** For the Following Data   **07**

X	12	13	15	11	18
Y	25	25	20	30	16

Calculate
(1)Develop a Scatter diagram for this data.
(2)Compute the estimated regression equation.

(b) According to the U.S. Bureau of Labor Statistics, the average weekly earnings of a production worker in 1997 were $424.20. Suppose a labor researcher wants to test to determine whether this figure is still accurate today. The researcher randomly selects 54 production workers from across the United States and obtains a representative earnings statement for one week from each. The resulting sample average is $432.69. Assuming a population standard deviation of $33.90, and a 5% level of significance, determine whether the mean weekly earnings of a production worker have changed.   **07**

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