Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA – SEMESTER -III EXAMINATION –WINTER-2021

Subject Code: 2630003   **Date: 22/12/2021**
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.**

Q.1 **(a)** Answer the following questions: **07**

1. (Algebraic) Sum of deviations from the mean can have a negative value.(TRUE/FALSE)

2. In general, higher confidence level provides _____ confidence interval.(Wider / narrow).

3. Find standard deviation for Binomial Distribution, if n = 10 & p = 0.3.

4. If A & B are two mutually exclusive event then what is the value of P(AΠ B)?

5. Define (i) Mutually Exclusive Events.

6. The ogive of "Less than type" and "More than type" for a data intersect at _____ of the data.(mean / median).

7. The median of marks of 60 students is 56%. It will imply that Q1 will be half of 56%, i. e. 28%.(TRUE/FALSE)

(b) Define sampling and methods of sampling. **07**

Q.2 **(a)** Draw Box Plot for following data **07**
3450,3550,3650,3480,3355,3310,3490,3730,3540,3925,3520,3480

(b) Answer the following

(I)Write Properties of Poisson distribution. **03**

(II)Write differences between qualitative and quantitative data **04**

OR

(b) A test for ovarian cancer has a 5% rate of false positives and a 2% rate of false negatives. On average, 1 in every 2,500 American women over age 35 actually has ovarian cancer. **07**

  1. If a woman over 35 years of age tests positive, what is the probability that she actually has cancer? Explain your reasoning.

2. If a woman over age 35 years of age tests negative, what is the probability that she actually has ovarian cancer?

Q.3 **(a)** 1. Explain Least Square Method. **04**

2. Write the following terms for Binomial Distribution. Properties, probability Mass function, mean & variance **03**

(b) A Population has a mean of 200 and a standard deviation of 50. Suppose a **07**

(1) What is the probability that the sample mean will be within ±5 of the population mean?

(2) What is the probability that the sample mean will be within ±10 of the population mean?

OR

Q.3 **(a)** A coin was tossed 500 times and the head appeared up 227 times. Test the hypothesis that the coin is unbiased. **07**

(b)

Hours Worked (x):	10	20	30	30	45
Weekly Pay (y):	85	191	216	175	280

    1. Develop the estimated regression equation for these data. **04**

    2. Compute SSE, SSR, and SST. **03**

Q.4 **(a)** 1. Described various sampling methods. **03**

2. The mean height obtained from a random sample of size 100 is 64 inches. The standard deviation of the distribution of height of the population is known to be 3 inches. Test the statement that the mean height of the population is 67 inches at 1% level of significance. **04**

(b) A random sample of 500 persons belonging to urban area 200 are found to be commuters of public transport. In another sample of 400 persons belonging to ruler area 200 are found to be commuter of public transport Discuss whether the data reveal that proportion of commuters of public transport is significantly higher for ruler area as compared to urban area at 1% level of significance? **07**

OR

Q.4 **(a)** Answer the following

    (I)   Define Type-I and Type-II errors. **03**

    (II)   A sample of 400 male students, it is found to have a mean height of 171.38 cm. Can it be reasonably regarded as a sample from a large population with mean height 171.17 cm and population standard deviation 3.30 cm?(Take $\alpha = 0.05$) **04**

(b) A population proportion is .40. A simple random sample of size 200 will be taken and the sample proportion will be used to estimate the population Proportion. **07**

    I.   What is the probability that the sample proportion will be within +0.03 of the population proportion?

    II.   What is the probability that the sample proportion will be within +.05 of the population proportion?

Q.5 **(a)** Given are five observations collected in a regression study on two variables. **07**

xi	2	6	9	13	20
yi	7	18	9	26	23

    a. Develop a scatter diagram for these data.

    b. Develop the estimated regression equation for these data.

    c. Use the estimated regression equation to predict the value of y when x = 6.

(b) Explain the Estimated regression equation for Prediction With Example. **07**

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

(b) What is t-Distribution? Explain it's Properties & Application. **07**

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