

**GUJARAT TECHNOLOGICAL UNIVERSITY****MCA – SEMESTER -III EXAMINATION –WINTER-2021****Subject Code: 630003****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) Explain with example: **07**
1. Mean, Median, Mode
  2. Histogram
  3. Skewness
  4. Confidence interval
  5. Correlation
  6. Standard Deviation
  7. Standard Error

- (b) State and explain with example Chebyshev's Theorem and its empirical rule for measures of distribution shape. **07**

- Q.2** (a) Consider a sample with data values 2, 5, 9, 7, 4 and 3. Compute Mean, Median, Standard Deviation and Interquartile Range. **07**
- (b) For the following data obtain correlation coefficient. **07**

Age	43	21	25	42	57	59
Level	99	65	79	75	87	81

**OR**

- (b) From the following frequency distribution compute Sample Mean, Sample Variance, Sample Standard Deviation and Coefficient of Variation: **07**

Class	3-7	8-12	13-17	18-22
Frequency	4	7	9	5

- Q.3** (a) Consider the following data to answer the questions given. **07**

$X_i$	7	4	8	6	5
$Y_i$	6	5	9	8	2

- (i) Find out the covariance between 'Xi' and 'Yi'.
  - (ii) Find out the coefficient of correlation between 'Xi' and 'Yi'.
- (b) The monthly earnings of computer software developer are normally distributed with a mean of Rs.24,300. If only 5 percent of the software developer have a monthly income of more than Rs. 26,140, what is the value of the standard deviation of the monthly earnings of the software developer? **07**

**OR**

- Q.3** (a) Explain Stratified Random Sampling, Cluster Sampling, Systematic Sampling, Convenience Sampling, Judgment Sampling. **07**
- (b) As a company manager for Zenith Corporation, there is a 0.40 probability that you will be promoted this year. There is a 0.72 probability that you will get either promotion or raise or both. The probability of getting both promotion and raise is 0.25. **07**
1. What is the probability that you will get a raise?
  2. If you get a promotion, what is the probability that you will also get a raise?

- Q.4** (a) A machine produced 40 defective articles in a batch of 800. After overhauling it produced 20 defectives in a batch of 600. Has the machine improved? **07**
- (b) In a sample of 800 parts manufactured by RK company, the number of defective parts was found to be 60. The company, however, claimed that only 5% of their product is defective. Test at 5% level of significance whether the claim of the company is acceptable. **07**

**OR**

- Q.4** (a) Given the five observations for two variables x and y: **07**

$X_i$	3	12	6	20	14
$Y_i$	55	40	55	10	15

The estimated regression equation for these data is  $\hat{y} = 68 - 3x$ .

- (i) Compute SSE, SST and SSR.
- (ii) Find the coefficient of determination  $r^2$ . Comment on the goodness of fit.
- (iii) Also find the coefficient of correlation.
- (b) A coin is tossed 900 times. Using the normal approximation of the binomial distribution, find the probability that the number of heads is between 435 and 465. **07**

- Q.5** (a) Two types of batteries are tested for length of time and following data are obtained: **07**

Type	Sample	Mean (hrs.)	Variance
A	9	600	121
B	8	640	144

Is there a significant difference between the two means? (Use 't' – Test) [Given: The critical value of 't' at 5 % level of significance for 15 degrees of freedom is 1.753]

- (b) From the following data calculate two equation of line of regression. **07**

	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.

**OR**

- Q.5** (a) The number of defects per unit in a sample of manufactured product was found as follows: **07**

No. of Defects	0	1	2	3	4
No. of units	200	90	20	8	2

Fit Poisson distribution to the data and test the goodness of the fit.

- (b) Define and Differentiate. **07**
- Type-I and Type-II errors
  - Tow-tailed and One-tailed test

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