

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**MCA – SEMESTER – II - EXAMINATION – SUMMER 2022**

**Subject Code: 629409****Date: 01/08/2022****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) Do as directed. 07**
- 1) The outcomes of an experiment are classified as \_\_\_\_\_.
  - 2) Define probability density function (pdf).
  - 3) If Null Hypothesis is accepted when it is false, it will be Type-I error. – True or false? Justify your answer.
  - 4) If  $P(A) = 0.8$ ,  $P(B) = 0.5$  and  $P(A \cup B) = 0.9$  find  $P(A|B)$ .
  - 5) If  $nPr = 336$  and  $nCr = 56$  then find the value of  $n$  and  $r$ .
  - 6) The statement " $Q_1 = P_{25}$ " is true or false? Explain your answer.
  - 7) Statistical inference refers to the process of drawing inferences about the \_\_\_\_\_ based on the characteristics of the \_\_\_\_\_ .  
 (population, sample)
- (b) Consider the following data: 07**
- 12 10 16 24 12 14 18 23  
 31 14 15 19 17 9 19 28  
 24 16 21 13 20 12 22 18  
 22 18 30 16 26 18 16 14  
 8 25 22 15 33 24 17 19
- Summarize these data using the following:
- (1) Stem and leaf display (Use class Interval of 10)
  - (2) Frequency distribution (Use Class Interval of 5)
  - (3) Relative frequency distribution
- Q.2 (a) A random sample of 81 units is taken, producing a sample mean of 211 with a population standard deviation of 6. Construct 95% confidence level interval to estimate population mean. 07**
- (b) Find mean and standard deviation of a binomial random variable  $x$  if  $n=6$  and if  $9P(x=4) = p(x=2)$ . 07**
- OR**
- (b) In Poisson distribution key punching of 80 column IBM cards, the arithmetic mean number of mistakes per card is 0.3. What per cent of cards will have (i) no mistake, (ii) one mistake, and (iii) two mistakes 07**
- Q.3 (a) 1) What are the applications of statistics in Business and Economics and hence in computer? 04**
- 2) Define Statistics and Differentiate Quantitative and Qualitative Data. 03**
- (b) The tensile strengths of a large number of steel wires were determined and were found to follow a normal distribution with mean of 250 pounds and standard deviation of 15 pounds. 07**
- i) What percentage of the wires tested were between 245 pounds and 260 pounds?
  - ii) What percentage of the wires tested were over 280 pounds?

**OR**

- Q.3** (a) A random sample of 1,000 persons from town A, 400 is found to be consumers of wheat. In a sample of 800 from town B, 400 are found to be consumers of wheat. Do these data reveal a significant difference between town A and town B, so far as the proportion of wheat consumer is concerned? **07**
- (b) Explain normal distribution with parameter. State the properties of normal distribution. **07**

- Q.4** (a) Suppose 30% elements of the sample proportion has the characteristics of population proportion. If a population proportion is 0.28 and sample size is 140, find out the probability that the population proportion will be less than the given sample proportion. **07**
- (b) (1) Explain Type I and Type II error with example. **04**  
(2) Define degree of freedom, level of significance and Null Hypothesis. **03**

**OR**

- Q.4** (a) It is estimated that no more than 40% of company uses particular product. Find out sample size with 98% confidence to estimate population proportion with the result to be within 0.03 of true population proportion. **07**
- (b) Explain briefly any four probabilistic sampling methods and three nonprobabilistic sampling methods. **07**

- Q.5** (a) Five observations taken for two variables follow: **07**

X	12	21	28	8	20
Y	17	15	22	19	24

- (1) Develop the estimated regression equation by computing the values of  $b_0$  and  $b_1$ .
- (2) Use the estimated regression equation to predict the value of  $y$  when  $x = 10$ .
- (b) A husband and wife appear in an interview for two vacancies in the same post. The probability of husband's selection is  $1/7$  and that of wife's selection is  $1/5$ . What is the probability that (1) Both of them will be selected (2) Only one of them will be selected. **07**

**OR**

- Q.5** (a) Use the following data **07**

X	5	7	3	16	12	9
Y	8	9	11	27	15	13

- and determine the regression equation, SSE, Se and  $r^2$
- (b) The following mistakes per page were observed in a book. Fit a Poisson distribution to the following data. **07**
- |                |     |    |    |   |   |
|----------------|-----|----|----|---|---|
| No of mistakes | 0   | 1  | 2  | 3 | 4 |
| Frequencies    | 211 | 90 | 19 | 5 | 0 |

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