

GUJARAT TECHNOLOGICAL UNIVERSITY
MBA– SEMESTER -I - EXAMINATION- SUMMER-2023

Subject Code: 4519207

Date: 18/07/2023

Subject Name: Business Statistics

Time: 02:30 PM TO 05:30 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** Definitions / terms / explanations / short questions based on concepts of theory/practical **14**
- (a) State Empirical Rule for Normal Distributions.
 - (b) What is Type – I and Type – II error in Hypothesis Testing?
 - (c) State the Four assumptions of Linear Regression Model.
 - (d) Which test is the non-parametric version of One Way ANOVA?
 - (e) Which numbers are used in Box – Whisker Plot?
 - (f) What is the range of Karl Pearson's Coefficient of Correlation?
 - (g) Which test you will use in a hypothesis to check whether skills of a set of employees have changed before and after imparting a training program?

- Q.2** (a) The following data represents the weekly income of workers in a factory. **07**

| Income | No of workers |
|-----------|---------------|
| 1800-1900 | 24 |
| 1900-2000 | 39 |
| 2000-2100 | 64 |
| 2100-2200 | 36 |
| 2200-2300 | 22 |

Calculate Mean, Median & Mode.

- (b) Describe characteristics of Binomial Distribution. **07**

OR

- (b) Explain the steps of Hypothesis Testing. **07**

- Q.3** (a) At a certain university, 4% of boys are over 6 feet tall and 1% of girls are over 6 feet tall. The total student population of boys to girls is divided in the ratio 3:2. If a student is selected at random and found to have a height of over six feet tall. **07**

a) What is the probability that the student is a girl?

b) What is the probability that the student is a boy?

- (b) A research firm is investigating the safety of a dangerous road intersection. Historical data (from past police records) indicates an average of 6 accidents per month at this particular intersection. The number of accidents is distributed according to Poisson distribution. The research firm wants to calculate the probability of exactly 0, 1, 2, 3 accidents in any month. (Given: $e^{-6} = 0.002479$) **07**

OR

- Q.3** (a) A large mall has designed a parking lot which has a capacity to park 10,000 cars on an average with a standard deviation of 2000 cars. Find **07**

- a) Probability that the number of cars parked is between 9000 and 11000.
- b) Probability that the number of cars parked is more than 12000.

- (b) For a Uniform Distribution, the values are distributed between 200 and 240. 07
- a) Determine the mean and Standard Deviation for this distribution.
 - b) Find the Probability of $(205 \leq X \leq 220)$

- Q.4 (a) An automobile company is bringing out a new model of a bike. In order to map its advertisement campaign, it wants to determine whether the model appeal depends on age group or not. So the firm took a random sample of 500 people from different age group and obtained the following result. 07

| Persons who | Age Group | | | | Total |
|-------------------|-----------|-------|-------|----------|-------|
| | Under 20 | 20-40 | 40-50 | Above 50 | |
| Liked the Bike | 146 | 88 | 48 | 28 | 310 |
| Disliked the Bike | 54 | 42 | 32 | 62 | 190 |
| Total | 200 | 130 | 80 | 90 | 500 |

Test the Hypothesis whether liking for the bike is independent of the age group or not. (Take 5% level of significance)

- (b) Write a brief note on Multiple Regression. 07

OR

- Q.4 (a) A psychologist wanted to compare two methods A & B of teaching. He selected 11 pairs of students such that a pair of student has equal intelligence. In each pair one student was taught by method A and another by method B. Then examination was taken and marks obtained by the pairs are as shown below. 07

| Pair | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|----------|----|----|----|----|----|----|----|----|----|----|----|
| Method A | 24 | 29 | 18 | 14 | 31 | 19 | 27 | 30 | 20 | 28 | 11 |
| Method B | 37 | 35 | 17 | 26 | 23 | 27 | 19 | 20 | 16 | 11 | 21 |

Find Spearman's Rank Coefficient between Method A & Method B.

- (b) Write brief note on Mann-Whitney U-Test. 07

Q.5 **CASE STUDY:**

Use the following data where x is independent & y is dependent variable

| X | 53 | 47 | 41 | 50 | 58 | 62 | 45 | 60 |
|---|----|----|----|----|----|----|----|----|
| Y | 5 | 5 | 7 | 4 | 10 | 12 | 3 | 11 |

- (a) Find the regression line equation of Y on X. 07
- (b) Find the Sum Square of Error. 07

OR

- Q.5 (a) Find the Correlation Coefficient between X & Y. 07
- (b) What will be the Coefficient of Determination? 07
