Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
MBA– SEMESTER -I–EXAMINATION – WINTER 2021

Subject Code:1519607 **Date: 23-03-2022**

Subject Name: Business Statistics

Time:10:30 AM TO 01:30 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 Explain the following terms. **14**

a) What will be the value of t table for one tail, significance level of 0.05 with degree of freedom of 8?
b) Moderating variable
c) Null and alternative hypothesis
d) Discriminant Analysis
e) Pie Chart
f) What will be the mean and standard deviation of binomial distribution if sample size n=10 and probability of success p = 0.8?
g) Ordinal Data

Q.2 **(a)** Discuss the various measures of the variability of the data. **07**

(b) In a manufacturing plant, machine A produces 20% of a certain product, machine B produces 30% 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. **07**

OR

(b) Suppose the probability of a bank making a mistake in processing a deposit is .0003. If 10,000 deposits (n) are audited, what is the probability that more than seven mistakes were made in processing deposits? **07**

Q.3 **(a)** Is the type of beverage ordered with lunch at a restaurant independent of the age of the consumer? A random poll of 320 lunch customers is taken, resulting in the following contingency table of observed values. Use ALPHA $\alpha = 0.05$ and the eight-step approach to determine whether the two variables are independent. **07**

		Preferred Beverage		
		Coffee/Tea	**Soft Drinks**	**Water**
AGE	21-34	20	46	74
	35-55	35	25	50
	> 55	13	42	15

(b) What do you mean by Parametric Tests in Hypothesis? Explain a small sample t-test in detail. **07**

OR

Q.3 **(a)** Suppose you are using a completely randomized design to study some phenomenon. There are five treatment levels and a total of 55 people in the study. Each treatment level has the same sample size. Complete the following ANOVA. **07**

Source of Variance	SS	df	MS	F
Treatment	583.39			
Error	972.18			
Total	1555.57			

(b) A study of female entrepreneurs was conducted to determine their definition of success. The women were offered optional choices such as happiness/self-fulfillment, sales/profit, and achievement/challenge. The women were divided into groups according to the gross sales of their businesses. **07**

A significantly higher proportion of female entrepreneurs in the Rs.100,000 to Rs.500,000 category than in the less than Rs. 100,000 categories seemed to rate sales/profit as a definition of success. Suppose you decide to test this result by taking a survey of your own and identifying female entrepreneurs by gross sales. You interview 100 female entrepreneurs with gross sales of less than Rs. 100,000, and 24 of them define sales/profit as success. You then interview 95 female entrepreneurs with gross sales of Rs. 100,000 to Rs. 500,000, and 39 cite sales/profit as a definition of success. Use this information to test to determine whether there is a significant difference in the proportions of the two groups that define success as sales/profit. Use $\alpha = .05$.

Q.4 **(a)** Explain in detail (a) Multiple Regression (b) Factor Analysis **07**

(b) Compute a Spearman's rank correlation to determine the degree of association between the two variables. **07**

Variable-1	101	129	133	147	156	179	189	190
Variable-2	87	89	84	79	70	64	67	71

OR

Q.4 **(a)** Explain in detail "Mann Whitney U Test with Small sample and large sample". **07**

(b) In an effort to determine whether any correlation exists between the price of stocks of airlines, an analyst sampled six days of activity of the stock market spread out over four months. Using the following prices of Airline-1 stock and Airline-2 stock, compute the coefficient of correlation. Stock prices have been rounded off to the nearest tenth for ease of computation. **07**

Airline-1 stock	Airline-2 stock
48	66
58	69
65	79
87	84
63	44
77	51

Q.5 CASE STUDY:

Suppose Remen Business Journal's 2020 Executive pay survey found the following per cent changes in the salaries paid to the chief executive officers of 39 industrial firms in different zones:

Industrial Firms	Percent changes	Industrial Firms	Percent Changes
North zone-A	11.2	East zone-A	20.3
North zone-B	20.0	East zone-B	22.7
North zone-C	31.9	East zone-C	-6.5
North zone-D	-2.9	East zone-D	5.3
North zone-E	29.7	East zone-E	17.6
North zone-F	19.1	East zone-F	64.1
North zone-G	-0.6	East zone-G	-33.5
North zone-H	-42.3	East zone-H	5.2
North zone-I	-8.5	East zone-I	-34.1
North zone-J	10.7	South Zone-A	26.3
North zone-K	12.4	South Zone-B	-16.9
West zone-A	9.7	South Zone-C	-3.8
West zone-B	1.3	South Zone-D	35.6
West zone-C	24.8	South Zone-E	28.7
West zone-D	8.5	South Zone-F	13.1
West zone-E	12.5	South Zone-G	26.2
West zone-F	10.9	South Zone-H	7.6
West zone-G	3.1	South Zone-I	26.7
West zone-H	25.3	South Zone-J	47.1
		South Zone-K	-0.8

(a). Calculate the mean and standard deviation for these 39 changes in salaries. **07**

(b). Assume that the 2020 percent changes in salaries of all industrial firms are normally distributed with mean and standard deviation as calculated in option (a). Find the probabilities that a randomly selected CEO had a pay change in 2020 of: **07**

- At least a 25 percent increase.
- Less than a 5 percent increase.

OR

Q.5 (a) Compute Interquartile Range for these 39 changes in salaries. **07**

(b) Assuming that these results are representatives of the salary changes for the CEOs of all industrial firms if the probability to raise pay is 74 percent. Find the probabilities that out of six randomly chosen employees, **07**

- At least five got raises in 2020
- Fewer than four got raises in 2020

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