Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
MBA – SEMESTER I EXAMINATION – WINTER 2022

Subject Code: 1519504   **Date:24/02/2023**
Subject Name: Business Statistics
Time: 10.30 AM TO 1.30 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 Briefly answer the followings   **14**
(a) Type I & Type II Error
(b) Discrete Variable
(c) Kruskal Wallis Test
(d) Significance Level
(e) Nominal and Ordinal Data
(f) Uniform Distribution
(g) Find critical value for two tailed U test if $n_1=3$ and $n_2=6$ and $U_0 = 6$

Q.2 (a)   Discuss different non-parametric tests that can be applied on ordinal data.   **07**

(b)   Here are the ages of 50 members of a country social service program. State   **07**
policies on social service programs require that approximately 50 percent of the
program participants should be older than 50.

83	51	66	61	82	65	54	56	92	60
65	87	68	64	51	70	75	66	74	68
44	55	78	69	98	67	82	77	79	62
38	88	76	99	84	47	60	42	66	74
91	71	83	80	68	65	51	56	73	55

Use these data to construct relative frequency distributions to answer following
questions:
1. Is the program in compliance with the policy?
2. What is the proportion of program participants between 45 and 50 years
   old.

OR
(b)   A Bicycle manufacturing Company sampled its shipping records for a certain day   **07**
with these results:

Time from Receipt of Order to Delivery (in Days)									
4	12	8	14	11	6	7	13	13	11
11	20	5	19	10	15	24	7	19	6

1. Construct a frequency distribution for these data and a relative frequency
   distribution. Use intervals of 6 days.
2. If the company wants to ensure that at least half of its deliveries are made in
   12 or fewer days, can you determine from the frequency distribution whether
   they have reached this goal?

Q.3 (a) Discuss Poisson Distribution along with its properties   **07**

(b) Parminder Singh is the supervisor for the Krishna Hydroelectric Dam. He knows   **07** that the dam's turbines generate electricity at the peak rate only when at least 10,00,000 gallons of water pass through the dam each day. The daily flow of water is normally distributed with mean 8,50,000 and standard deviation of 200000 gallons.
    1. What is the probability that the turbine will generate electricity at peak rate?
    2. What is the probability that less than 7,50,000 gallons of water will pass through the dam?

OR

Q.3 (a) Discuss different measures of shape in detail   **07**

(b) In a small town, two lawn companies fertilize lawns during the summer. Tri-State   **07** Lawn Service has 72% of the market. Thirty percent of the lawns fertilized by Tri-State could be rated as very healthy one month after service. Greenchem has the other 28% of the market. Twenty percent of the lawns fertilized by Greenchem could be rated as very healthy one month after service. A lawn that has been treated with fertilizer by one of these companies within the last month is selected randomly. If the lawn is rated as very healthy, what is the probability that Tri-State treated the lawn? If the lawn is rated as very healthy, what is the probability that Greenchem treated the lawn?

Q.4 (a) Hinton Press hypothesizes that the average life of its largest web press is 14,500   **07** hours. They know that the standard deviation of press life is 2,100 hours. From a sample of 25 presses, the company finds a sample mean of 13,000 hours. At a significance level=0.01, should the company conclude that the average life of the presses is less than the 14,500 hours?

(b) A brand manager is concerned that her brand's share may be unevenly distributed   **07** throughout the country. In a survey in which the country was divided into four geographic regions, a random sampling of 100 consumers in each region was surveyed, with the following results.

	Region				
	North-East	North-West	South-East	South-West	Total
Purchase the brand	40	55	45	50	190
Do not purchase	60	45	55	50	210
Total	100	100	100	100	400

At $\alpha = 0.05$, test whether brand share is the same across the four regions.

OR

Q.4 (a) A ketchup manufacturer is in the process of deciding whether to produce a new   **07** extra-spicy brand. The company's marketing-research department took a sample of 6,000 households and found that the extra-spicy ketchup would be purchased by 335 of them. A much more extensive study made 2 years ago showed that 5 percent of the households would purchase the extra-spicy ketchup then. At 2% level of significance level, should the company conclude that there is an increased interest in the extra-spicy flavour?

(b) The data below shows the percentages of consumer loans with payments that are 30 days or more overdue for both bank credit cards and home equity loans over a 14-year period for a bank. Compute a Spearman's rank correlation to determine the degree of association between these two variables.　**07**

Year	Bank Credit Card	Home Equity Loan
1	2.51	2.07
2	2.86	1.95
3	2.33	1.66
4	2.54	1.77
5	2.54	1.51
6	2.18	1.47
7	3.34	1.75
8	2.86	1.73
9	2.74	1.48
10	2.54	1.51
11	3.18	1.25
12	3.53	1.44
13	3.51	1.38
14	3.11	1.3

Q.5　CASE STUDY:

Cost accountants often estimate overhead based on the level of production. At the Standard Knitting Co., they have collected information on overhead expenses and units produced at different plants.

Overhead (Rs.)	191	170	272	155	280	173	234	116	153	178
Units	40	42	53	35	56	39	48	30	37	40

(a) Develop a regression equation to predict future overhead expenses.　**07**
(b) Interpret the slope (b1) value. Predict overhead when 50 units are produced.　**07**

OR

Q.5 (a) Calculate the standard error of estimate.　**07**
(b) Calculate coefficient of determination and interpret it.　**07**

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