Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
MBA – SEMESTER –I-EXAMINATION – WINTER-2022

Subject Code: 4519207   **Date: 01/03/2023**
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.**
4. **Use of simple calculators and non-programmable scientific calculators are permitted.**

Q.1 **(a)** Give definition of following terms: **14**

      1. Moderating Variable

      2. Extraneous Variable

      3. Discrete distribution

      4. Level of significance

      5. Univariate test

      6. Multidimensional scaling

      7. Discriminant analysis

Q.2 **(a)** What is central tendency? Explain various ways of measuring central tendency for **07** grouped and ungrouped data.

(b) A leading software company in India is considering employing one of two training **07** programs. Two groups were trained for the same task. Group 1 was trained by program A; group 2, by program B. For the first group, the times required to train the employees had an average of 32.11 hours and a variance of 68.09. In the second group, the average was 19.75 hours and the variance was 71.14. Which training program has less relative variability in its performance?

OR

(b) A doctor has decided to prescribe two new drugs to 200 heart patients as follows: 50 get **07** drug A, 50 get drug B, and 100 get both. The 200 patients were chosen so that each had an 80 percent chance of having a heart attack if given neither drug. Drug A reduces the probability of a heart attack by 35 percent, drug B reduces the probability by 20 percent, and the two drugs, when taken together, work independently. If a randomly selected patient in the program has a heart attack, what is the probability that the patient was given

both drugs?

Q.3 **(a)** Explain various types of hypothesis with necessary examples. **07**

(b) Explain measure differences between parametric and non-parametric tests with necessary examples. **07**

OR

Q.3 **(a)** Mr. X is the supervisor for the dam built of Sardar Sarovar. Mr. X knows that the dam's **07** turbines generate electricity at the peak rate only when 1,000,000 gallons of water pass through the dam each day. He also knows, from experience, that the daily flow with the mean equal to previous day's flow and a standard deviation of 200,000 gallons. Yesterday, 850,000 gallons flowed through the dam. What is the probability that the turbines will generate a) at the peak rate today and b) at less than half of the peak rate today?

(b) Figures released by the U.S. Department of Agriculture show that the average size of **07** farms has increased since 1940. In 1940, the mean size of a farm was 174 acres; by 1997, the average size was 471 acres. Between those years, the number of farms decreased but the amount of tillable land remained relatively constant, so now farms are bigger. This trend might be explained, in part, by the inability of small farms to compete with the prices and costs of large-scale operations and to produce a level of income necessary to support the farmers' desired standard of living. Suppose an agribusiness researcher believes the average size of farms has now increased from the 1997 mean figure of 471 acres. To test this notion, she randomly sampled 23 farms across the United States and ascertained the size of each farm from county records. The data she gathered follow. Use a 5% level of significance to test her hypothesis. Assume that number of acres per farm is normally distributed in the population.

445, 489, 474, 505, 553, 477, 454, 463, 466, 557, 502, 449, 438, 500, 466, 477, 557, 433, 545, 511, 590, 561, 560

Q.4 **(a)** What is factor analysis? Explain use and importance of factor analysis with necessary examples. **07**

(b) Explain various types of variables with suitable examples. **07**

OR

Q.4 **(a)** Is the type of beverage ordered with lunch at a restaurant independent of the age of the consumer? **07** A random poll of 309 lunch customers is taken, resulting in the following contingency table of observed values. Use a = .01 to determine whether the two variables are independent.

		Preferred Beverage			
		Coffee/Tea	Soft Drink	Other (Milk, etc.)	
	21 - 34	26	95	18	139
Age	35 - 55	41	40	20	101
	> 55	24	13	32	69
		91	148	70	309

(b) The causal life insurance company is considering purchasing a new fleet of company cars. **07** The financial department's director sampled 40 employees to determine the number of miles each drove over a 1 – year period. The results of the study follow. Calculate the range and interquartile range. (All figures are in hundreds)

36, 42, 47, 49, 53, 57, 67, 73, 77, 81, 83, 84, 87, 87, 89, 93, 95, 95, 97, 100, 103, 105, 107, 108, 110, 113, 113, 118, 121, 127, 129, 131, 135, 138, 146, 149, 163, 172, 185, 203

Q.5 Campus stores has been selling the Believe It or Not: Wonders of Statistics Study Guide **14** for 12 semesters and would like to estimate the relationship between sales and number of sections of elementary statistics taught in each semester. The following data have been collected:

Sales	33	38	24	61	52	45	65	82	29	63	50	79
No. of sections	3	7	6	6	10	12	12	13	12	13	14	15

(a) Calculate coefficient of correlation

(b) Develop the estimating equation that best fits the data.

OR

Q.5 **(a)** Calculate the coefficient of determination. **07**

(b) Calculate standard error. **07**

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