

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
MBA SEMESTER I- • EXAMINATION – SUMMER-2019**Subject Code: 3519207****Date: 22/05/2019****Subject Name: Business Statistics****Time: 02:30 PM To 05:30 PM****Total Marks: 70****Instructions:**

1. Use of statistical table is allowed.
2. Figures to the right indicate full marks.

Q – 1 Briefly discuss the following concepts: 14

- a) Index numbers
- b) Autocorrelation
- c) Cumulative frequency
- d) Characteristics of normal distribution
- e) Coefficient of determination
- f) Posterior probability
- g) Explain Chebyshev's theorem

Q – 2 (A) There are two clubs in a society. In this, 60% members of the society are members of club A and 29% members of the society are member of club B. Whereas 13% members of the society are member of both clubs. Suppose one member is selected randomly, 7

- 1) What is the probability that he is a member of club A or club B?
- 2) What is the probability that he is neither member of club A nor club B?
- 3) What is the probability that he is not a member of club A but member of club B?

Q – 2 (B) In MBA semester I, unit test of 100 marks was administered for 100 students. The result is as under: 7

Marks	Number of Students
Below 10	4
Below 20	6
Below 30	24
Below 40	46
Below 50	67
Below 60	86
Below 70	96
Below 80	99
Below 90	100

Based on this information, develop the frequency distribution table and calculate mean, median and mode of the data.

OR

Q – 2 (B) Discuss nominal, ordinal, interval and ratio data types with examples. 7

Q – 3 (A) Workers in the manufacturing sector are subject to work related injuries. The Government labour department estimates that the average cost of these injuries to 7

employers and insurers is approximately Rs. 30000 per injured worker. Suppose these costs are normally distributed with a standard deviation of Rs. 9000/-.

- 1) What proportions of the costs are between Rs. 15000 to Rs. 45000?
- 2) What proportions of the costs are greater than Rs. 50000?
- 3) What proportions of the costs are between Rs. 5000 and Rs. 20000?
- 4) Suppose the standard deviation is unknown, but 90.82% of the costs are more than Rs. 7000, what would be the value of standard deviation?

Q – 3 (B) A survey showed that the average number of annual trips per family in Gujarat is Poisson distributed, with a mean of 0.7 trips per year. A family is selected randomly. What is the probability that

- 1) The family didn't make a trip last year?
- 2) The family took two or more trips last year?
- 3) The family took three or fewer trips over five-year period?
- 4) The family took exactly 4 trips during a six-year period?

OR

Q – 3 (A) Briefly discuss Binomial distribution and Poisson distribution. What are the conditions in which Poisson distribution is used as an approximation of Binomial distribution?.

Q – 3 (B) Mr. Patel, a farmer has collected the following information describing the prices and quantities of three harvested crops for the year 2011 – 2014:

Type of Crop ↓	Price (in Rs. Per ton)				Quantity Harvested (tons)			
	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>
X	108	109	113	111	1280	1150	1330	1360
Y	93	96	96	101	830	860	850	890
Z	97	99	106	107	1640	1760	1630	1660

Construct a Laspeyres price index for each of these four years using 2011 as the base year.

Q – 4 (A) Depict your understanding for Time-Series Analysis. Also discuss the components of Time-Series.

Q – 4 (B) Generally, accountants estimate overhead based on the level of production. At Shriram co., they have collected information on overhead expenses and units produced at different plants as under:

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

- 1) Develop the regression equation for accountants.
- 2) Predict overhead when 50 units are produced.
- 3) Calculate the standard error of estimate.

OR

Q – 4 (A) Explain simple and multiple regression with suitable examples.

Q – 4 (B) Depict your understanding for correlation and types of correlation. What is the use of Coefficient of correlation in statistics?

Q – 5

A manufacturing company has installed a machine costing Rs. 4 lacs and is in the process of deciding on an appropriate number of certain spare parts required for repairs. The spare parts cost Rs. 4000 per unit but are available only if they are ordered now. In case the machine fails and no spares are available, the cost to the company of mending the plant would be Rs. 18000/-. The plant has an estimated life of 8 years and the probability distribution of failure during this time, based on experience with similar machines, is as under:

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No. of failures during 8-yearly period	0	1	2	3	4	5	6+
Probability	0.1	0.2	0.3	0.2	0.1	0.1	00

Ignoring any discounting for time value of money, determine the following:

- The optimal number of units of the spare part on the basis of minimax principle, minimin principle, Laplace principle, and Hurwicz Principle (by Taking $\alpha = 0.7$).
- The expected number of failures in the 8-year period.

OR

- The optimal choice on the basis of least expected regret criterion using the regret table.
- Expected Value of Perfect Information.
