

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
MBA – SEMESTER 01– • EXAMINATION – WINTER 2015

Subject Code: 2810007

Date: 28/12/2015

Subject Name: Quantitative Analysis-I

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. Scientific calculator & statistical table (Z, t, F & chi square) are permitted.**

- Q.1 (a) Answer all the following multiple choice questions. 06
1. When a person collects information from the entire population, this is called a _____.
A. Sample B. Census
C. Statistics D. Parameter
 2. The probability of committing a Type I error is called _____.
A. The level of significance B. Beta
C. The power of the test D. Sampling error
 3. Which of the following nonrandom sampling technique is similar to stratified sampling?
A. Judgment sampling B. Quota sampling
C. Convenience sampling D. Systematic sampling
 4. In a chi-square goodness-of-fit test, actual frequencies are also called _____ frequencies.
A. Calculated B. Expected
C. Theoretical D. Observed
 5. In regression analysis, the independent variable is also known as the _____.
A. Decision variable B. Response variable
C. Controlled variable D. Explanatory variable
 6. Analysis of variance tests use the _____.
A. *t* distribution B. Z distribution
C. *F* distribution D. Exponential distribution
- Q.1 (b) Define the following terms. 04
1. Median
 2. Mutually Exclusive Events
 3. Normal Distribution
 4. Independent Events
- Q.1 (c) Explain Chebyshev's Theorem. 04
- Q.2 (a) Kerav Electronics is considering employing one of two training 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? 07
- (b) According to the HRD statistics in India, 75 % of the women of 18 to 25 years age group are student. Suppose 78 % of the women in that age group are married. Suppose also that 61% of all women of 18 to 25 years age group are married and are student. What is the probability that a randomly selected woman in that age group is married or is student? What is the probability that a randomly selected woman in the age group is 07

married or is student but not both? What is the probability that a randomly selected woman in that age group is neither married nor student?

OR

- (b) In a manufacturing plant, machines A, B, and C all produce the same two parts, W and M. Of all the parts produced, machine A, produces 35 %, machine B produces 45 % and machine C produces 20 %. 80 % of the parts made by machine A are part W. 65 % of the parts made by machine B are part W and 30 % of the parts made by machine C are part W. A part produced by this company is randomly selected and is determined to be a W part. With the knowledge that it is an W part, revise the probabilities that the part came from machine A, B or C. 07

- Q.3 (a) Classify each of the following as nominal, ordinal, interval and ratio data. 07

- 1 The time required to produce each engine on an assembly line.
- 2 The ranking of a company by Fortune 500
- 3 Pin code in India
- 4 Student enrolment number
- 5 The age of each of students
- 6 Per capita income of India
- 7 Satisfaction level for state transportation service

- (b) A pendrive company averages 1.2 defective pendrive per packet produced (200 pendrives). The number of defects per packet is Poisson distributed. What is the probability of selecting a packet and finding no defective pendrives? What is the probability of finding eight or more defective pendrives in packet? Suppose a purchaser of these pendrives will quit buying from the company if a packet contains more than three defective pendrives. What is the probability that a packet contains more than three defective pendrives? 07

OR

- Q.3 (a) Discuss Type I and Type II Errors. 07

- (b) Madan Bhatiya, an auditor for a large credit card company, knows that, on average, the monthly balance of any given customer is Rs. 11200, and the standard deviation is Rs. 5600. If Mr. Bhatiya audits 50 randomly selected accounts, what is the probability that the sample average monthly balance is below Rs. 10000? Between Rs. 10000 and Rs. 13000? 07

- Q.4 (a) Explain Co-efficient of Correlation and Co-efficient of Determination. 07

- (b) Family transportation costs are usually higher than most people believe because those costs include various costs. Twenty randomly selected families in four major cities of Gujarat are asked to use their records to estimate a monthly figure for transportation cost (in Rs.). Use the data obtained and ANOVA to test whether there is significant difference in monthly transportation costs for families living in these cities. Use 0.05 significance level. 07

| | | | | | |
|-----------|-----|-----|-----|-----|-----|
| Ahmedabad | 650 | 480 | 550 | 600 | 675 |
| Baroda | 250 | 525 | 300 | 175 | 500 |
| Surat | 850 | 700 | 950 | 780 | 600 |
| Rajkot | 540 | 450 | 675 | 550 | 600 |

OR

- Q.4 (a) Discuss the application of one way analysis of variance with example. 07

- (b) A Brand manager of Chocolate company is concerned that his brand's share may be unevenly distributed 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. At 0.05 significance level, test whether brand share is the same across the four regions. 07

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

- Q.5 Dr. Trivedi, the dean of students at KR institute, is wondering about grade distribution at the institute. He has heard grumblings that the GPAs in the Business School are about 0.25 lower than those in the institute of Arts and Sciences. A quick random sampling produced the following GPAs. 14

Business Institute: 2.86, 2.77, 3.18, 2.80, 3.14, 2.87, 3.19, 3.24, 2.91, 3.00, 2.83

Arts and Sciences: 3.35, 3.32, 3.36, 3.63, 3.41, 3.37, 3.45, 3.43, 3.44, 3.17, 3.26,
Institute 3.18, 3.41

Do these data indicate that there is a factual basis for the grumblings? State and test appropriate hypotheses at $\alpha=0.02$.

OR

- Q.5 Recent study reports that the average price for a gallon of self serve regular unleaded gasoline is Rs. 116. Mr. Gupta believes that the figure is higher in your area of the country. He decided to test this claim for part of the Maharashtra by randomly calling gasoline stations. His random survey of 25 stations produces the following prices in Rs. 14

127 129 116 120 137 120 123 119 120 124 116 107 127 109 135
115 123 114 105 135 121 114 114 107 110

Assume gasoline prices for a region are normally distributed. Do the data you obtained provide enough evidence to reject the claim? Use a 1% level of significance.
