

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA Integrated - SEMESTER- III- EXAMINATION – WINTER 2018

Subject Code: 4430603**Date: 04-12-18****Subject Name: Statistical Methods****Time: 10.30 am to 1.00 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 (a)** Define the following terms with suitable example: **07**
- 1) Mutually Exclusive Event
 - 2) Independent Event
 - 3) Ogive
 - 4) Frequency Distribution
 - 5) Percentiles
 - 6) Sampling
 - 7) Coefficient of Variation
- (b)** 1) Differentiate: Qualitative Data and Quantitative Data. **03** **07**
- 2) Explain scales of data measurement. **04**
- Q.2 (a)** Construct box plot for the following data: **07**
- 71, 87, 82, 64, 72, 75, 81, 69, 76, 79, 65, 68, 80, 73, 85, 71, 70, 79, 63, 62, 81, 84, 77, 73, 82, 74, 74, 73, 84, 72, 81, 65, 74, 62, 64, 68, 73, 82, 69, 71

- (b)** Find out $P(B|F)$, $P(G|C)$ and $P(D|F)$ for the following Data: **07**
- Events:-
 Finance =A, Manufacturing =B, Communication = C, Northeast = D,
 Southeast=E, Midwest = F, West= G

| | | Geographic Location | | | |
|----------------------|---------------|----------------------------|-----------|---------|------|
| | | Northeast | Southeast | Midwest | West |
| Industry Type | Finance | .12 | .05 | .04 | .07 |
| | Manufacturing | .15 | .03 | .11 | .06 |
| | Communication | .14 | .09 | .06 | .08 |

OR

- (b)** List out the characteristics of Binomial Distribution. **07**
- Q.3 (a)** Bank customers arrive randomly on weekday afternoons at an average of 3.2 customers every 4 minutes. What is the probability of having more than 7 customers in a 4-minute interval on a weekday afternoon? **07**
- (b)** Suppose you want to estimate the average age of all Boeing 737-300 airplanes now in active domestic U. S. service. You want to be 95% confident, and you want your estimate to be within one year of the actual figure. The 737-300 was first placed in service about 24 years ago, but you believe that no active 737-300s in the U.S. domestic fleet are more than 20 years old. How large of a sample should you take? **07**

OR

- Q.3** (a) Suppose that during any hour in a large department store, the average number of shoppers is 448, with a standard deviation of 21 shoppers. What is the probability that a random sample of 49 different shopping hours will yield a sample mean between 441 and 446 shoppers? **07**
- (b) What is the probability of obtaining a score greater than 750 on a GMAT test that has a mean of 540 and a standard deviation of 100? Assume GMAT scores are normally distributed. **07**
- Q.4** (a) A survey of the morning beverage market shows that the primary breakfast beverage for 17% of Americans is milk. A milk producer in Wisconsin, where milk is plentiful, believes the figure is higher for Wisconsin. To test this idea, she contacts a random sample of 550 Wisconsin residents and asks which primary beverage they consumed for breakfast that day. Suppose 115 replied that milk was the primary beverage. Using a level of significance of .05, test the idea that the milk figure is higher for Wisconsin. **07**
- (b) A sample of 87 professional working woman showed that the average amount paid annually into a private pension fund per person was \$3352. The population standard deviation is \$1100. A sample of 76 professional working men showed that the average amount paid annually into a private pension fund per person was \$5727, with a population standard deviation of \$1700. A women’s activist group wants to “prove” that women do not pay as much per year as men into private pension funds. If they use $\alpha=.001$ and these sample data, will they be able to reject a null hypothesis that women annually pay the same as or more than men into private pension funds? **07**

OR

- Q.4** (a) Explain random and non random sampling techniques. **07**
- (b) Consumers are asked to rate a company both before and after viewing a video on the company twice a day for a week. Use an alpha of .05 to test to determine whether there is a significant increase in the ratings of the company after the one-week video treatment. Assume that differences in rating are normally distributed in the population. **07**

| | | | | | | | |
|-------------------|----|----|----|----|----|----|----|
| Individual | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Before | 32 | 11 | 21 | 17 | 30 | 38 | 14 |
| After | 39 | 15 | 35 | 13 | 41 | 39 | 22 |

- Q.5** (a) In a random sample of 1000 persons from town A, 400 are found to be consumers of wheat. In a sample of 800 from town B, 400 are found to be consumers of wheat. Do these data reveal a significant difference between town A and town B, so far as the proportion of wheat consumers is concerned? **07**
- (b) The manufacturer of a certain make of electric bulbs claims that his bulbs have a mean life of 25 months with a standard deviation of 5 months. A random sample of 6 such bulbs gave the following values. **07**
 Life of bulbs: 24, 26, 30, 20, 20, 18
 Can you regard the producer’s claim to be valid at 1% level of significance?

OR

- Q.5** (a) Explain Type – I and Type – II Errors. **07**
- (b) For the following Data: **07**

| | | | | | | | | | | | | |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|
| X | 61 | 63 | 67 | 69 | 70 | 74 | 76 | 81 | 86 | 91 | 95 | 97 |
| Y | 4.28 | 4.08 | 4.42 | 4.17 | 4.48 | 4.30 | 4.82 | 4.70 | 5.11 | 5.13 | 5.64 | 5.56 |

- 1) Estimate the Regression Equation.
- 2) Calculate SSE and coefficient of determination.
