GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER– IV   EXAMINATION – WINTER 2019

Subject code: 4649302   **Date: 26-11-2019**

Subject Name: Statistical Methods

Time 10:30am to 1:00pm   **Total Marks: 70**

Instructions:

    1. Attempt all questions.

    2. Make suitable assumptions wherever necessary.

    3. Figures to the right indicate full marks.

Q1 **A)** **I)** What are the applications of statistics in Business & Economics **03**

      II) Differentiate the following **04**

          I.   Type I and Type II Error
          II.   Qualitative and Quantitative data.

  B) **I)** A data set contains the following seven values. **05**

          X: 6   2   4   9   1   3   5

      a) Find the mean absolute deviation.
      b) Find the population variance.
      c) Find the population standard deviation.
      d) Find the interquartile range.
      e) Coefficient of variation

Relative and percent frequency distribution of soft drink purchases is given in following table

      II)

Soft Drinks	Relative frequency	Percent frequency
Coke-classic	0.38	38
Diet coke	0.16	16
Dr. pepper	0.10	10
Pepsi	0.26	26
Sprite	0.10	10
Total	1.00	100

02

Construct bar graph and pie chart

Q2 A)   Graphic location   **07**

		Northeast D	Southeast E	Midwest F	West G
Industry Type	Finance A	24	10	8	14
	Manufacturing B	30	6	22	12
	Communication C	28	18	12	16

Suppose a respondent is selected randomly from these data.

a) What is the probability that the respondent is from the Midwest (F)?
b) What is the probability that the respondent is from the communications industry (C) or from the Northeast (D)?
c) What is the probability that the respondent is from the Southeast (E) or From the finance industry (A)?

B)   Machines A, B and C all produce the same two parts, X and Y. Of all the parts   **07**
produced, machine A produces 60%, machine B produces 30%, and machine C
produces 10%. In addition,

40% of the parts made by machine A are part X.

50% of the parts made by machine B are part X.

70% of the parts made by machine C are part X.

A part produced by this company is randomly sampled and is determined to be an
X part. With the knowledge that it is an X part, revise the probabilities that the
part came from machine A, B, or C.

OR

B)   According to the U.S. Census Bureau, approximately 6% of all workers in   **07**
Jackson, Mississippi, are unemployed. In conducting a random telephone survey
in Jackson, what is the probability of getting two or fewer unemployed workers in
a sample of 20?

Q3 A)   Bank customers arrive randomly on weekday afternoons at an average of 3.2   **07**
customers every 4 minutes. What is the probability of having more than 7
customers in a 4-minute interval on a weekday afternoon?

B) What is the probability of obtaining a score greater than 700 and 500 or less than on a GMAT test that has a mean of 494 and a standard deviation of 100? Assume GMAT scores are normally distributed. **07**

OR

Q3 A) A manufacturing firm has been involved in statistical quality control for several years. As part of the production process, parts are randomly selected and tested. From the records of these tests, it has been established that a defective part occurs in a pattern that is Poisson distributed on the average of 1.38 defects every 20 minutes during production runs. Use this information to determine the probability that less than 15 minutes will elapse between any two defects. **07**

B) Define Sampling? Explain Types of sampling **07**

Q4 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) Suppose the following data are selected randomly from a population of normally distributed values. **07**

40 51 43 48 44 57 54 39 42 48 45 39 43

Construct a 95% confidence interval to estimate the population mean.

OR

Q4 A) If a population proportion is 0.28 and if the sample size is 140, 30% of the time the sample proportion will be less than what value if you are taking random samples? **07**

B) A survey of CPAs across the United States found that the average net income for sole proprietor CPAs is $74,914. Because this survey is now more than ten years old, an accounting researcher wants to test this figure by taking a random sample of 112 sole proprietor accountants in the United States to determine whether the net income figure changed. The researcher could use the eight steps of hypothesis testing to do so. Assume the population standard deviation of net incomes for sole proprietor CPAs is $14,530. **07**

Q5 A) A random sample of size 20 is taken, resulting in a sample mean of 16.45 and a **07** sample standard deviation of 3.59. Assume *x* is normally distributed and use this information and α = 0.5 to test the following hypotheses.

$$Ho : \mu = 16 \qquad Ha: \mu \neq 16$$

B) A survey of the morning beverage market shows that the primary breakfast **07** 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.

OR

A) Determine the value of the coefficient of determination, for the following data. **07**

$$X : \quad 1 \quad 2 \quad 3 \quad 4 \quad 5$$

$$Y : \quad 3 \quad 7 \quad 5 \quad 11 \quad 14$$

B) The range for a set of data is estimated to be 36. **07**

1. At 95% confidence, how large a sample would provide a margin of error of 3?
2. At 95% confidence, how large a sample would provide a margin of error of 2?

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