GUJARAT TECHNOLOGICAL UNIVERSITY
MCA INTEGRATED– SEMESTER -III EXAMINATION –WINTER-2021

Subject Code: 2638602   **Date: 27/12/2021**
Subject Name: Basic Statistics
Time: 10:30 AM TO 01:00 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 briefly the following terms:**   **07**
       1) Median
       2) Skewness
       3) Sample Space
       4) Corelation
       5) Bar Chart
       6) Mutually Exclusive Event
       7) Null Hypothesis

       07

    (b) A Data Set Contain Following 7 Values:
       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
       f) Q2 (second quartile)
       g) 50th percentile

Q-2   **(a)** The prior probabilities for events A1, A2, and A3 are P(A1) = 0.20, P(A2) = 0.50   **07**
and P(A3) = 0.30. The conditional probabilities of event B given A1, A2, and
A3are P(B/A1) = 0.50, P(B/A2) = 0.40, and P(B /A3) = 0.30. Use the tabular
approach to applying Bayes' theorem to compute P(A1/B), P(A2/B) and
P(A3/B).

    (b) Determine the value of the coefficient of determination, for the following data.   **07**
       X: 1 2 3 4   5
       Y: 3 7 5 11 14

<div align="center">OR</div>

    (b) Discuss different types of Sampling methods with example.   **07**

Q-3   **(a)** Suppose that IQ scores of students have a bell-shaped distribution with a mean   **07**
of 100 and Standard deviation of 15.
       1.What Percentage of People should have an IQ Score between 85 and 115?
       2.What Percentage of People should have an IQ Score between 70 and 130?

    (b) 95% confidence interval for a population mean was reported to be 152 to 160.If   **07**
σ=15, what sample size was used in this study?

<div align="center">OR</div>

    (a) According to a recent survey, the probability that a passenger files a complaint   **07**
with the Department of Transportation about a particular U.S. airline is .000014.
Suppose 100,000 passengers who flew with this particular airline are randomly
contacted.
       a. What is the probability that exactly five passengers filed complaints?
       b. What is the probability that none of the passengers filed complaints?
       c. What is the probability that more than six passengers filed complaints?

(b) Values are uniformly distributed between 200 and 240.   **07**
      a. What is the value of f (x) for this distribution?
      b. Determine the mean and standard deviation of this distribution.
      c. Probability of (x 230) = ?
      d. Probability of (205 x 220) = ?
      e. Probability of (x 225) = ?

OR

Q-4 **(a)** The following sample data are from a normal population: 10, 8, 12, 15, 13, 11,   **07**
     6,5
     1. With 95% of confidence, what is the margin of error for the estimation of the
       population mean?
     2. What is the 95% confidence interval for the population mean?

(b) Give the difference Between (i) One tailed and two tailed test (ii) Type-I and   **07**
Type II Error.

OR

Q-4 **(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) If a population proportion is 0.28 and if the sample size is 140, 30% of the time   **07**
the sample Proportion will be less than what value if you are taking random
samples?

Q-5 **(a)** According to the United National Environmental Program and World Health   **07**
Organization, in Mumbai, India, air pollution standards for particulate matter are
exceeded an average of 5.6 days in every three-week period. Assume that the
distribution of number of days exceeding the standards per three-week period is
Poisson distributed.
    a. What is the probability that the standard is not exceeded on any day during a
    three-week period?
    b. What is the probability that the standard is exceeded exactly six days of a
    three-week period?
    c. What is the probability that the standard is exceeded 15 or more days during a
    three-week period? If this outcome actually occurred, what might you conclude?

(b) A random sample of size 81 is drawn from a population with a standard   **07**
deviation of 12. If only 18% of the time a sample mean greater than 300 is
obtained, what is the mean of the population?

OR

(a) Write Chebyshev's Theorem.   Fifty percent of Indians believed the country was   **07**
in a recession, due to COVID 19 the Economy had shown two straight quarters
of negative growth. For a sample of 20 Indians make the following calculations.
    a. Compute the probability that exactly 12 people believed the country was in
    a recession.
    b. Compute the probability that no more than five people believed the
    country was in a recession.
    c. How many people would you expect to say the country was in a recession?

(b) Market researcher Gartner Dataquest reports that Dell Computer controls 27% of   **07**
the PC market in the United States. Suppose a business researcher randomly
selects 130 recent purchasers of PC.
a**.** What is the probability that more than 39 PC purchasers bought a Dell
    computer**?**
b. What is the probability that between 28 and 38 PC purchasers (inclusive)
bought a Dell computer?
c. What is the probability that fewer than 23 PC purchasers bought a Dell
computer?
d. What is the probability that exactly 33 PC purchasers bought a Dell computer?

******