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Department of Management **Roll No...**
Odd Semester Examination - January 2024
MBA-I Semester
Subject Code: MBA FG 108 , Subject Name: Quantitative Methods

Duration: 3 Hour

Max.Marks -60

Note: Attempt any Five Questions, All questions carry equal marks

(12X5=60)

Q1: Calculate the Coefficient of Variation and Inter-Quartile Range from the following data:

X	21	24	19	14	28	30	32	29	10
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Q2: a. A random sample of size 39 is taken from a population of 200 members. The sample mean is 66 and the population standard deviation is 11. Construct a 96% confidence interval to estimate the population mean. What is the point estimate of the population mean? (Use the following critical values: $Z_{0.05} = \pm 1.96$, $Z_{0.04} = \pm 2.054$)

b. A random sample of 51 items is taken, with $\bar{X}=58.42$ and $s^2=25.68$. Use these data to test the following hypotheses, assuming you want to take only a 1% risk of committing a Type I error and that x is normally distributed. (Use the following critical values: $Z_{0.01} = \pm 2.33$, $Z_{0.10} = \pm 1.28$, $T_{0.01,50} = 2.403$)

$H_0: \mu = 60$

$H_a: \mu < 60$

Q3: What is Run-Test? When do we use Run test? Illustrate small sample run test with the help of an example.

Q4: A company produces two types of products, Product A and Product B. The company has two machines, Machine 1 and Machine 2, and the time (in hours) required to produce each unit of each product on each machine is given below:

Machine 1: Product A: 2 hours Product B: 1 hour

Machine 2: Product A: 1 hour Product B: 3 hours

The company has a total of 60 hours available on Machine 1 and 40 hours available on Machine 2 per week. The profit for each unit of Product A is \$5, and for Product B is \$4.

Formulate a linear programming problem to maximize the profit and find the optimal production quantities for Products A and B.

Q5: An increasing number of consumers believe they have to look out for themselves in the marketplace. According to a survey conducted by the Yankelovich Partners for *USA WEEKEND* magazine, 60% of all consumers have called an 800 or 900 telephone number for information about some product. Suppose a random sample of 25 consumers is contacted and interviewed about their buying habits.

- What is the probability that 15 or more of these consumers have called an 800 or 900 telephone number for information about some product?
- What is the probability that more than 20 of these consumers have called an 800 or 900 telephone number for information about some product?
- What is the probability that fewer than 10 of these consumers have called an 800 or 900 telephone number for information about some product?

Q6: Shown below are rental and leasing revenue figures for office machinery and equipment in the United States over a seven-year period according to the U.S. Census Bureau. Use these data to construct a trend line and forecast the rental and leasing revenue for the year 2010 using these data. (Use Semi-Average method)

Year	Rental and Leasing (\$ millions)
2002	5860
2003	6632
2004	7125
2005	6000
2006	4380
2007	3326
2008	2642

Q7: Compute a one-way ANOVA on the following data.

A	B	C
2	5	3
1	3	4
3	6	5
3	4	5
2	5	3
1		5

Determine the observed F value. Compare the observed F value with the critical table F value and decide whether to reject the null hypothesis. Use $\alpha = .05$. (Use the following critical values: $F_{0.05,3,17} = 3.20$, $F_{0.05,2,14} = 3.74$)

Q8: Write short-note on (any two):

- Chi-Square Test
- Methods of Time-Series Analysis
- Parametric & Non-Parametric test