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Odd Semester Examination - January 2023 – February 2023

MBA-I Semester / MBA(I) -I Semester

Paper Code: MBA-FG-108 / MBA(I) - FG-108

Paper Title: Quantitative Methods

Duration: 3 Hours **Max Marks: 60**

Note: Attempt any Five Questions, all questions carry equal marks. [12*5=60]

Q1: A survey conducted by the Ethics Resource Center discovered that 35% of all workers say that co-workers have committed some kind of office theft. Suppose a survey is conducted in your large company to ask the same question of 13 randomly selected employees. The results are that five of the sample say co-workers have committed some kind of office theft and eight say they are not aware of such infractions. The sequence of responses follows. (Y denotes a Yes answer and N denotes a No answer.)

Use $\alpha = 0.05$ to test to determine whether this sequence represents a random sample.

N N N N Y Y Y N N N N Y Y

Q2: 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.

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

Q3: Calculate Population Mean, Population Variance & Inter-Quartile Range from the following data:

X	15	18	17	19	22	14	21	24	20

Q4: Test each of the following hypotheses by using the given information. Assume the populations are normally distributed.

a. $\alpha = .05$, $n = 18$, $s = 11$

Ha: $\sigma^2 = 20$

$H_0: \sigma^2 < 20$

b. $\alpha = .05, n = 10, N = 100, \bar{X} = 13.45, s = 10.9$

$Ha: \mu = 20$

$H_0: \mu \neq 20$

Q5: It appears that over the past 45 years, the number of farms in the United States declined while the average size of farms increased. The following data provided by the U.S. Department of Agriculture show five-year interval data for U.S. farms. Use these data to develop the equation of a regression line to predict the average size of a farm by the number of farms. Discuss the slope and y-intercept of the model.

Year	Number of Farms (millions)	Average Size (acres)
1945	5.1	220
1950	4.3	210
1955	8.2	212
1960	7.3	240
1965	6.4	234
1970	5.2	235
1975	4.5	219
1980	3.7	220
1985	2.8	229
1990	2.0	230
2000	3.8	238

Q6: Attempt both of the following.

a. Differentiate between the Parametric Test & Non-Parametric Test.

b. A population has a mean of 50 and a standard deviation of 10. If a random sample of 64 is taken, what is the probability that the sample mean is between 50.6 & 51.3.

Q7: Suppose a manufacturer of printed circuits has a stock of 200 resistors, 120 transistors and 150 capacitors and is required to produce two types of circuits. Type A requires 20 resistors, 10 transistors and 10 capacitors. Type B requires 10 resistors, 20 transistors and 30 capacitors. If the profit on type A circuits is $ 5 and that on type B circuits is $ 12, how many of each circuit should be produced in order to maximize profit?

Q8: Write short note on the following:

a. Use of Time-Series Analysis in Marketing

b. Application of Hypothesis Testing

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