MID-WEST UNIVERSITY
SCHOOL OF MANAGEMENT (MUSOM)
(An Autonomous Institution)
MUSOM EXAMINATIONS SECTION
FINAL EXAMINATION-2024 (2081)
MASTER OF BUSINESS ADMINISTRATION (MBA)
SEMESTER – I

Subject: Statistics for Management **Course Code: MGT 515**
Full Marks: 100 **Time: 4 Hrs.**

Exam Roll No.: ……

Section A: Multiple Choice Questions (1×20 = 20 Marks) **Time: 20 Minutes**

Tick (✓) the correct answers

1. Sampling is used in the following situations;
   a. blood test of a person
   b. when the population is infinite
   c. testing of the life of dry battery cells
   d. all of the above
2. The value of the correlation coefficient lies between _____.
   a. -1 to 1
   b. -1 to 0
   c. 0 to 1
   d. 0 to ∞
3. The average of the 7 numbers 7, 9, 12, x, 5, 4, 11 is 9. The missing number x is ____.
   a. 13
   b. 14
   c. 15
   d. 8
4. The degree of freedom for statistic-t for paired t-test based on n pairs of observations is _____.
   a. 2 (n-1)
   b. n-1
   c. 2n-1
   d. none of the above
5. To test any hypothesis about the proportions of items in a class, the usual test is _____.
   a. t-test
   b. F-test
   c. Z-test
   d. none of above
6. The degree of freedom for Chi-square in the case of a contingency table of order (4 x 3) is ___.
   a. 12
   b. 9
   c. 8
   d. 6
7. Analysis of variance utilizes _____.
   a. F-test
   b. Chi-square test
   c. Z-test
   d. t-test
8. A hypothesis may be classified as _____.
   a. simple
   b. composite
   c. null
   d. all the above
9. Probability can take values from _____.
   a. -∞ to ∞
   b. - ∞ to 1
   c. -1 to 1
   d. 0 to 1
10. For Binomial distribution with probability p of a success and q of a failure, the relation between mean and variance that holds is _____.
    a. mean < variance
    b. a mean > variance
    c. mean = variance
    d. mean ≤variance
11. A family of parametric distribution in which the mean is equal to variance is _____.
    a. Binomial distribution
    b. Gamma distribution
    c. Normal distribution
    d. Poisson distribution

12. The mean and variance of a binomial distribution are 8 and 4, respectively. Then p (x = 1) is equal to
    a. $\frac{1}{2^{12}}$
    b. $\frac{1}{2^4}$
    c. $\frac{1}{2^6}$
    d. $\frac{1}{2^8}$
13. The number of all possible samples of size two from a population of 4 units is:
    a. 2
    b. 4
    c. 8
    d. 12
14. The probability of drawing a unit at each selection remains the same in;
    a. SRSWOR
    b. SRSWR
    c. both (a) and (b)
    d. none of both
15. Paired t-test is applicable when the observations in the two samples are:
    a. paired
    b. correlated
    c. equal in number
    d. all the above
16. The number of possible samples of size n out of N population units without replacement is;
    a. N_{C_n}
    b. (N) n
    c. N^n
    d. n^N
17. The level of significance is the probability of _____.
    a. type I error
    b. type II error
    c. not committing error
    d. any of the above
18. Whether a test is one-sided or two-sided depends on _____.
    a. alternative hypothesis
    b. null hypothesis
    c. simple hypothesis
    d. composite hypothesis
19. The idea of testing of hypothesis was first set forth by:
    a. R.A. Fisher
    b. J. Neyman
    c. E. L. Lehman
    d. A. Wald
20. A sample consists of _____ of population.
    a. all units
    b. 50 % units
    c. 5% of units
    d. any fraction

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You are required to answer in your own words as far as applicable. The figures in the margin indicate full marks.

SECTION B: SHORT ANSWER QUESTIONS (5×6 = 30 MARKS)

Answer any five questions:

1. What is hypothesis testing? Describe the types of error in testing of hypothesis.
2. Testing of the hypothesis of two brand light bulbs:

Brands A	Brand B
$\bar{X}_1$ = 1282 hours	$\bar{X}_2$ = 1208 hours
n_1 = 53	n_2 = 51
s_1 = 80 hours	s_2 = 94 hours

3. Given that r_{12} = 0.80 r_{13} = 0.70 r_{23} = 0.60

   Find the partial correlation coefficient $r_{12.3}$, $r_{13.2}$ and $r_{1.23}$.
4. There are three machines A, B and C producing 1000, 2000 and 3000 articles per hour respectively. These machines are known to produce 1%, 2% and 3% defectives respectively. One article is selected at random from an hour of production of the three machines and found to be defective. What is the probability that the article is produced from (i) Machine B and (ii) Machine C?
5. Calculate the coefficient of variation of marks obtained by 20 students in an internal assessment.

Marks	10-20	20-30	30-40	40-50	50-60	60-70
No of students	2	5	4	6	1	2

6. Write short notes on stratified random sampling and cluster sampling.
7. A binomial random variable x satisfies the relation 9p (x=4) = p (x=2) when n = 6. Find the value of p and q.

SECTION C: LONG ANSWER QUESTIONS (2×15 = 30 MARKS)

Answer any two questions:

8. a) What is estimation? What characteristics of the good estimator are expected to possess?

   b) A sample of 45 light bulbs was selected from a light bulb machine and the average burning time was 1416 hours. The population standard deviation is 30 hours. (i) compute the standard error of the mean (ii) construct a 95% confidence interval for the population mean $Z_{0.05}$ = 1.96
9. Do the following data provide evidence of the effectiveness of inoculation in preventing tuberculosis:

	Attacked	Not attacked	Total
Inoculated	20	300	320
Not inoculated	80	600	680
Total	100	900	1000

$\chi^2_{(0.05,1)} = 3.841$

10. From the data given below, set up a table of variance analysis and find out if the means of the various samples differ significantly among themselves.

Sample I:	9	11	13	9	8
Sample II:	13	12	10	15	5
Sample III:	19	13	17	7	9
Sample IV:	14	10	13	17	16

Table value F (3,16) = 3.24 at 0.05 level of significance.

SECTION D: CASE STUDY (20 MARKS)

11. The following data reveals the sales of a company due to the number of salespersons and the years of experience.

Sales (000Rs):	20	30	25	20	40	60	15
No. of salesperson:	2	3	5	4	2	1	4
Average years of experience:	5	7	11	10	8	7	8

i) Fit the regression equation that best describes the data.

ii) Estimate the sales of the company using one salesperson with experience of six years.

iii) Compute the standard error of the estimate.