TM242221U

Reg. No :.....

Name :.....

MASTER'S DEGREE (C.S.S) EXAMINATION, MARCH 2024

2023 ADMISSIONS REGULAR

SEMESTER II - CORE COURSE Commerce and Management

CM2C09TM - Quantitative Techniques

Time : 3 Hours

Maximum Weight : 30

## Part A

**I. Answer any Eight questions. Each question carries 1 weight** (8x1=8)

1. Discuss Poisson distribution as a limiting case of Binomial distribution.
2. State the properties of Binomial distribution.
3. Describe Binomial distribution.
4. Define degree of freedom.
5. Explain coding with reference to analysis of variance.
6. Explain standard error and its uses.
7. Explain two sample sign tests.
8. Describe the situations where non-parametric tests are applied.
9. Describe P-Chart.
10. Describe Explaratory variable and Criterion variable.

## Part B

**II. Answer any Six questions. Each question carries 2 weight** (6x2=12)

11. Explain Mathematical Quantitative Techniques
12. Given a normal distribution with mean =40 and S.D =10, find the value of x that has (a) 15% of the area to its left (b) 20% of the area to its right.
13. The mean life of 100 florescent light tubes produced by a company is computed to be 1570 hours with standard deviation of 120 hours. The company claims that the average life of the tubes produced by the company is 1600 hours. Using the level of significance of 0.05, test the validity of the claim.
14. A random sample of size 16 has 53 as mean. The sum of the squares of the deviations taken from mean is 150. Obtain 95% and 99% confidence limits of the population mean.
15. A driver buys gasoline either at a Texaco station, T or at a Mobile station, M and the following arrangement shows the order of the station from which she bought gasoline over a certain period of time.
    T T T M T M T M T M M M T M M M T M M T M T M T M M T T M T M M M T M T T T M T T M T T T T M
    Test for randomness at the .05 level of significance.
16. The following are the numbers of tickets issued by two sales men on 11 days.
    I Sales man: 7, 10, 14, 12, 6, 9, 11, 13, 7, 6, 10
    II Sales man: 10, 13, 14, 11, 10, 7, 15, 11, 10, 9, 8
    Use the sign test at 1% level of significance to test the null hypothesis that on the average the two salesmen issue equal number of tickets.
17. Differentiate Process control and Product control.
18. Write notes on R-type and Q-type factor analyses.



## Part C

**III. Answer any Two questions. Each question carries 5 weight** **(2x5=10)**

19. Eight unbiased coins were tossed simultaneously. Find the probability of getting (i) exactly 4 heads, (ii) no heads at all, (iii) 6 or more heads, (iv) utmost two heads (v) number of heads ranging from 3 to 5.

20. The following table gives the yield of three varieties.

| Varieties | Yields | | | | |
|---|---|---|---|---|---|
| 1 | 30 | 27 | 42 | | |
| 2 | 51 | 47 | 37 | 48 | 42 |
| 3 | 44 | 35 | 41 | 36 | |

Perform an analysis of variance on this data.

21. The following are the kilometers per gallon which a test driver got for ten tankfuls each of three kinds of gasoline.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Gasoline A | 43 | 27 | 43 | 29 | 42 | 49 | 48 | 21 | 37 | |
| Gasoline B | 39 | 40 | 35 | 26 | 34 | 45 | 32 | 22 | 23 | 18 |
| Gasoline C | 28 | 30 | 25 | 31 | 41 | 38 | 36 | 44 | 19 | 50 |

Use Kruskal-Wallis test at 5% level of significance to test the null hypothesis that there is no difference in the average k.m yield of three types of gasoline.

22. The following figures give the number of defectives in 20 samples each sample containing 2000 items.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **425** | **430** | **216** | **341** | **225** | **322** | **280** | **306** | **337** | **305** |
| **356** | **402** | **216** | **264** | **126** | **409** | **193** | **326** | **280** | **389** |

Calculate the values for central line and the control limits for p-chart (Fraction-defective chart). Draw the p-chart and comment if the process can be regarded as under control or not.