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S – 5705

Reg. No. : ....

Name : ....

First Semester M.A. Degree Examination, October 2023

Behavioural Economics and Data Science

BEDS 513 : QUANTITATIVE TOOLS FOR BEHAVIOURAL ECONOMICS

(2020 Admission Onwards)

Time : 3 Hours

Max. Marks : 75

PART – I

Answer all questions. **Each** question carries **1** mark.

1. Mutually exclusive events

2. Coefficient of variation

3. Skewness

4. Quadratic function

5. Venn diagram

6. Chi-square test

7. Rank of a matrix

8. First order and second order derivative

9. Binomial distribution

10. Optimization

(10 × 1 = 10 Marks)

P.T.O.

PART – II

Answer **any seven** questions in less than **400** words. **Each** question carries **5 marks.**

11. Compute Median from the following data.

Class Intervals :	110-120	120-130	130-140	140-150	150-160	160-170	170-180	180-190	190-200
Frequency :	6	25	48	72	116	60	38	22	3

12. Briefly explain Central limit theorem.

13. Fit a Poisson distribution to the following data and calculate the theoretical frequencies.

    X :   0   1   2   3   4

    Frequency : 123 59 14 3 1

14. If $A = \{1, 2, 3, 4, 5, 6, 7\}$ $B = \{2, 4, 5, 8\}$ find

    (a) $A \cup B$

    (b) $A \cap B$

    (c) $A - B$

    (d) $B - A$.

15. Solve using Crammer's rule

    $X + Y + Z = 6$

    $X + 2Y + 3Z = 14$

    $-X + Y + -Z = -2$

16. Determine the maxima and minima value of $x^3 - 6x^2 + 9x - 5$.

17. A bag contains 4 white and 6 black balls. Two balls are drawn one after another with replacement.

    (a) what is the probability that both are white

    (b) find the probability if the first ball is not replaced before the second drawn.

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18. Solve the linear simultaneous equation system:

$$20x + 6y = 500$$
$$10x - 2y = 200$$

19. Find the rank of the matrix $\begin{bmatrix} 1 & 2 & -1 \\ 2 & 4 & 3 \\ -1 & -2 & 6 \end{bmatrix}$.

20. Solve the following quadratic equation: $2q^2 - 85q + 200 = 0$.

<div align="right">(7 × 5 = 35 Marks)</div>

PART – III

Answer **any three** questions in less than **1200** words. **Each** question carries **10** marks.

21. Optimize $z = x^2 + y^2$ subject to the constraint $y = 10 - x$ using the Lagrange multiplier method.

22. Briefly explain the economic applications of Differential calculus and Integral calculus with suitable examples.

23. Prices of shares of a company on the different days in a month were found to be 66, 65, 69, 70, 69, 71, 70, 63, 64, 68. Discuss whether mean price of the shares in the month is 65 using t-distribution.

24. Find the Karl Pearson's Coefficient of skewness.

Wages :	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150
No. of persons :	12	18	35	42	50	45	20	8

25. Find the inverse of the matrix $A = \begin{bmatrix} 1 & 3 & 0 \\ -2 & 3 & 3 \\ 1 & 1 & 4 \end{bmatrix}$.

<div align="right">(3 × 10 = 30 Marks)</div>