Reg. No. : ....

Name : ....

First Semester M.A. Degree Examination, May 2022

Economics

EC 214 – QUANTITATIVE METHODS FOR ECONOMICS

(2018 Admission onwards)

Time : 3 Hours   Max. Marks : 75

PART – A

Define the following in **one** or **two** sentences. Each carries **1** marks.

1.   Symmetic matrix.

2.   Technical constraints.

3.   Transpose of a matrix.

4.   Shadow price.

5.   Constrained Optimization.

6.   Find the average cost and the marginal cost functions from the total cost function $TC = 60 + 10x + 15x^2$.

7.   If $2x^2 - 3xy + y^2 = 0$ find the value of $\dfrac{dy}{dx}$ using the product rule.

8.   Contingency table.

9. Confidence interval.

10. Poisson distribution.

(10 × 1 = 10 Marks)

PART – B

Answer **any seven** questions. Each question carries **5** marks

11. Write a short note on dual in Linear Programming.

12. Find the value of the determinant $|A| = \begin{vmatrix} 1 & 18 & 72 \\ 2 & 40 & 96 \\ 2 & 45 & 75 \end{vmatrix}$.

13. Explain the economic applications of first order equations.

14. Solve the following equations by Crammer's Rule.

    $3x + 2y + z = 6$; $2x - 3y + 3z = 2$ and $x + y + z = 3$.

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

16. Maximise a function $Y = 5X_1 X_2$ subject to $X_1 + 2x_2 = 8$. Solve this equation using Lagrange method.

17. Obtain the dual of the following primal LP problem ;

    Maximize $Zx = X_1 - 2X_2 + 3X_3$

    Subject to the constraints

    (a) $-2X_1 + X_2 + 3X_3 = 2$,

    (b) $2X_1 + 3X_2 + 4X_3 = 1$ and $X_1, X_2, X_3 \geq 0$.

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18. The screws produced by certain machine were checked by examining samples. The following table shows the distribution of 128 sample according to the number of defective items they contained.

No. of defectives	0	1	2	3	4	5	6	7
No. of Samples	7	6	19	35	30	23	7	1

Fit a binomial distribution to find the mean and variance of the distribution.

19. Write a short note on methods of sampling.

20. Discuss the various tests of Normality.

(7 × 5 = 35 Marks)

PART – C

Answer **any three** questions. Each carries **10 marks**.

21. A firm is producing two goods A and B. It has two factories that jointly produce the two goods in the following quantities (Per hour).

Good	Factory 1	Factory 2
Good A	10	20
Good B	25	25

The firm receives an order for 300 units of A and 500 units of B. the costs of operating the two factories are 10000 and 8000 per hour. Formulate the linear programming problem of minimizing the total cost of meeting this order.

22. Solve the equations using matrix approach

$$2x - 3y + z = 7$$
$$2x + y - z = 1$$
$$4y + 3z = -11$$

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23. Briefly explain the important steps for testing of Hypothesis.

24. Fit a normal distribution to the following data and test the goodness of fit using x^2 test

Class	5-9	10-14	15-19	20-24	25-29
Frequency	10	22	40	21	7

25. Briefly explain the characteristics and properties of Binomial, Poisson and Normal distribution.

(3 × 10 = 30 Marks)