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P – 4619

Reg. No. :

Name :

First Semester M.A. Degree Examination, February 2023

SDE

Economics

EC 214 : QUANTITATIVE METHODS

(2017 Admission onwards)

Time : 3 Hours

Max. Marks : 75

PART I

Answer **all** the questions in **one** or **two** sentences.

1. Minor of a matrix
2. Static input output model
3. Corner solution
4. Zero sum game
5. Consumer surplus
6. Langrange multiplier
7. Market equilibrium
8. Investment
9. Conditions for maximizing a function while applying differential calculus
10. Dynamic stability

(10 × 1 = 10 Marks)

P.T.O.

PART II

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

11. State the steps in deriving rank of a matrix.
12. List out the applications of linear programming.
13. Explain the significance of integration in economics.
14. State dominance rule.

15. If matrices A and B are $A = \begin{bmatrix} 4 & 7 \\ 3 & 2 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 5 \\ 6 & 8 \end{bmatrix}$

Find BA

16. The following inter industry transactions table was constructed. Calculate technology coefficient matrix.

	Industry I	Industry II	Final Consumption
Industry I	550	1800	4000
Industry II	1650	1400	4600
Labour	250	4800	

17. Solve the following LP problem using graphical method

$$\text{Max } Z = 4x + 4y$$

Subject to

$$3X + 5Y \leq 150$$

$$X - 2Y \leq 10$$

$$5X + 3Y \leq 150$$

$$X, Y \geq 0$$

18. Solve the following set of simultaneous equations using Rao Crammer rule

$$5X + 2Y + 3Z = 4$$

$$2X + 3Y + Z = 2$$

$$3X + Y + 2Z = 3$$

19. Given $Y = 4X^4$ write all possible derivatives.
20. Given a production function $q = f(x_1, x_2, x_3)$ and a budget constraint $C = r_1x_1 + r_2x_2 + r_3x_3 + F$, find the first and second order conditions for maximizing output.

(7 × 5 = 35 Marks)

PART III

Answer any three questions. Each question carries 10 marks.

21. Explain the input output frame work for estimating final demand.
22. Mathematically derive discriminating monopoly market equilibrium.
23. Find inverse of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 5 & 7 & 4 \\ 2 & 1 & 3 \end{bmatrix}$
24. (a) Define dual in linear programming (b) What are the advantages of forming dual (c) Explain how a primal problem can be converted into a dual (d) Write the dual of the following primal

$$\text{Max } Z = 80X + 75Y$$

Constraints

$$X + 3Y \leq 4$$

$$2X + 5Y \leq 8$$

$$X, Y \geq 0$$

25. Explain the applications of differential and differential equations in economics.

(3 × 10 = 30 Marks)