L – 6247

Reg. No. : ....

Name : ....

First Semester M.A. Degree Examination, August 2021

Economics

EC 214 : QUANTITATIVE METHODS

(2013 – 2017 Admissions)

Time : 3 Hours   Max. Marks : 75

PART – A

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

1. $A = \begin{bmatrix} -11 & -15 \\ 6 & -7 \end{bmatrix}$ Find the determinant of the matrix.

2. What is Laplace expansion?

3. Distinguish between maximin and minimax strategy.

4. What is optimal solution?

5. What is the significance of Lagrange multiplier?

6. The demand function D = 50-2p and the supply function S = -60+3p. Find equilibrium quantity.

7. Find $\int \left(x^3 - \sqrt{x} + \frac{1}{x} \right) dx$.

8. What is difference equation? Give its two economic applications.

9. Distinguish between ordinary differential equation partial differential equation.

10. What is duality in linear programming?

(10 × 1 = 10 Marks)

PART – B

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

11. Solve $8y_{t+1} + 4y_t = 3$, $y_0 = 1/2$.

12. Determine the rank of the matrix $\begin{bmatrix} 4 & 6 & 7 \\ 1 & 0 & 4 \\ 8 & 12 & 14 \end{bmatrix}$.

13. Solve the following simultaneous equations by Cramer's rule

$2x + 4y + 3z = 27$

$5y - 3z = 12$

$4x - y = 21$

14. Graphically solve the following linear programming problem

Maximise $8x + 6y$

Subject to $2x + 2y \leq 8$, $4x + 2y \leq 12$, $x \geq 0$, $y \geq 0$.

15. The demand function for a commodity is $P = 30 - 2q$ and supply function $P = \dfrac{5 + x}{2}$, find consumer's surplus.

2

16. Evaluate $\int\limits_{4}^{0} x\sqrt{1+2x}\,dx$.

17. Solve by inverse method $\begin{array}{l} 5x+7y=85 \\ 3x+9y=75 \end{array}$

18. Discuss the economic applications of differential calculus.

19. Given marginal revenue MR = 100-2Q, and marginal cost MC = $100-5q+q^2$. Find total revenue, average revenue, total cost, average variable cost at $q=5$.

20. Distinguish between sequential game and simultaneous game. Discuss the nature of the game from the following pay-off matrix.

Parle

		Advertise	Not advertise
Britania	Advertise	2, 2	5, 1
	Not advertise	1, 5	3, 3

(7 × 5 = 35 Marks)

PART – C

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

21. With a suitable example discuss the properties of determinants.

22. Find the inverse of matrix $\begin{bmatrix} 7 & -5 & 4 \\ -3 & 0 & 5 \\ 1 & 2 & 8 \end{bmatrix}$.

L – 6247

23. Diagrammatically explain the concepts of producer's surplus and consumer's surplus. If the consumer demand function is $Q=\sqrt{(60-2p)}$. Find the consumer's surplus when $p=12$.

24. Minimise $Z=10\,X_1+20\,X_2$

    Subject to

    $$18\,X_1+3\,X_2\geq54$$
    $$1.5\,X_1+6\,X_2\geq18$$
    $$10\,X_1+5\,X_2\geq50$$
    $$X_1,\ X_2\geq0$$

25. A monopolist discriminates price between two markets and his average revenue function are given by $P_1=110-8q_1$, $P_2=50-6q_2$ and the total cost function is given by $C=40-10q+4q^2$. Find the profit maximising output.

(3 × 10 = 30 Marks)

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