

QP CODE: 24020537

Reg No	:	
Name	:	

# B.A DEGREE (CBCS) REGULAR / IMPROVEMENT / REAPPEARANCE EXAMINATIONS, MAY 2024

## **Second Semester**

B.A Economics Model I

Complementary Course - MM2CMT04 - MATRIX,LINEAR PROGRAMMING AND INTEGRAL CALCULUS

2017 ADMISSION ONWARDS

CFCA7611

Time: 3 Hours

Max. Marks : 80

### Part A

Answer any **ten** questions. Each question carries **2** marks.

1. Write the matrix representation of the linear system of equations.

8x + 11y = 224x + 7y = 505x + 3y = 10

- 2. Find the inverse of  $A = \begin{bmatrix} 3 & 7 \\ 8 & 9 \end{bmatrix}$ .
- 3. What is IS-LM analysis?
- 4. What are Hessian matrices?
- 5. What is an LPP?
- 6. The basic feasible solutions of the profit function 8x + 6y under a given set of constraints are (0,8), (3,7), (6,4), and (8,0). Find the optimal solution.
- 7. Evaluate  $\int 15e^{t/4}dt$ .
- 8. Write the formula for integration by parts of two functions.
- 9. Evaluate  $\int_2^6 8x dx$ .
- 10. What are multivariable functions?
- 11. State quotient rule of partial differentiation.

12. What are autonomous consumption multipliers and autonomous tax multipliers?

 $(10 \times 2 = 20)$ 

#### Part B

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

- <sup>13.</sup> If  $A = \begin{bmatrix} 3 & 5 \\ 9 & 2 \end{bmatrix}$  and  $B = \begin{bmatrix} 8 & 6 & 4 \\ 1 & 7 & 2 \end{bmatrix}$ , find AB. <sup>14.</sup> Find the determinant of  $A = \begin{bmatrix} 9 & 1 & 8 \\ 4 & 6 & 5 \\ 3 & 7 & 2 \end{bmatrix}$ .
- 15. Solve the following system of linear equations by finding the inverse matrix of the coefficient matrix.

8x + 3y = 149x + 2y = 24

- 16. A game warden wants his animals to get a minimum of 36mg of iodine, 84mg of iron and 16mg of zinc each day. One feed provides 3mg of iodine, 6mg of iron and 1mg of zinc and another feed provides 2mg of iodine, 6mg of iron and 4mg of zinc. The cost of feeds are Rs.20/- and Rs.15/- respectively. What is the least cost combination of feeds guaranteeing daily requirements?
- 17. Using integration by substitution, find  $\int 99x^2\sqrt{22x^3+19}dx$ .
- 18. Find the area between the curves  $y_1 = 6$  and  $y_2 = x^2 3$  from x = -3 to x = 3.
- 19. Find the producer's surplus, given the demand function P =  $(Q + 6)^2$  and assuming that the market equilibrium is  $Q_0 = 3$  and  $P_0 = 81$ .
- 20. Find all second order partial derivatives of  $z = 4x^5 + 7xy + 8y^4$ .
- 21. For a firm producing two goods x and y (a) find the levels of x and y at which profit is maximized, given the profit function is  $\pi = 120x 2x^2 3xy 3y^2 + 165y 250$ . (6×5=30)

### Part C

Answer any **two** questions. Each question carries **15** marks.

22. Solve the following system of linear equations using Cramer's rule.

4x + 2y + 7z = 353x + y + 8z = 255x + 3y + z = 40

- 23. Solve the following maximization problem. Maximize 25x+50ysubject to  $9x + 12y \le 144$   $10x + 6y \le 120$   $y \le 9$  $x, y \ge 0$
- 24. Show that  $\int_0^{25} (5x + x^{-1/2}) dx = \int_0^9 (5x + x^{-1/2}) dx + \int_9^{16} (5x + x^{-1/2}) dx + \int_{16}^{25} (5x + x^{-1/2}) dx$
- 25. Optamize  $z = 5x^2 2xy + 8y^2$  subject to x+y = 60, using Lagrange multiplier method.

(2×15=30)