



K23U 1909

Reg. No. : .....

Name : .....

**II Semester B.A. Degree (CBCSS – OBE – Regular/Supplementary/  
Improvement) Examination, April 2023  
(2019 Admission Onwards)  
COMPLEMENTARY ELECTIVE COURSE IN ECONOMICS/DEVELOPMENT  
ECONOMICS  
2C02ECO/DEVECO : Mathematics for Economic Analysis – II**

Time : 3 Hours

Max. Marks : 40

PART – A

(Answer **all** questions. **Each** carries **1** mark)

1. What do you mean by integration ?
2. Find  $\int x^{-1} dx$  where  $x > 0$ .
3. Define a square matrix.
4. What do you mean by scalar multiplication of matrix ?
5. What is meant by discriminant of a matrix ?
6. Define Eigen value. **(6×1=6)**

PART – B

(Answer **any six** questions. **Each** carries **2** marks)

7. Solve  $\int (5x^2 - 3x + 1) dx$ .
8. Distinguish between initial conditions and boundary conditions in the case of indefinite integrals.
9. Given the marginal cost function  $MC = 25 + 30Q - 9Q^2$  and fixed cost  $FC = 55$ , find total cost.

P.T.O.



10. Distinguish between identity matrix and null matrix.
11. Explain the commutative, associative and distributive laws in matrix algebra.
12. Given  $A = \begin{bmatrix} 2 & 3 & 5 \\ 5 & 1 & 2 \\ 2 & 3 & 5 \end{bmatrix}$ , prove that A is a singular matrix.
13. Define the rank of a matrix.
14. What is characteristic matrix ? (6×2=12)

## PART – C

(Answer **any four** questions. **Each** carries **3** marks)

15. Determine the following integral using the substitution method :  
 $\int 10x(x^2 + 3)^4$ .
16. Explain the properties of definite integrals.
17. Explain the properties of determinants.
18. Find the inverse of the matrix  $\begin{bmatrix} 4 & 2 & 5 \\ 3 & 1 & 8 \\ 9 & 6 & 7 \end{bmatrix}$ .
19. Use discriminants to determine whether the following quadratic function is positive or negative definite  $y = -3x_1^2 + 4x_1x_2 - 4x_2^2$ .
20. Given  $A = \begin{bmatrix} -6 & 3 \\ 3 & -6 \end{bmatrix}$  find the characteristic roots of A. (4×3=12)



PART – D

(Answer **any two** questions. **Each** carries **5** marks.)

21. Given the demand function  $P_d = 113 - Q^2$  and the supply function  $P_s = (Q + 1)^2$ , assuming pure competition, find the consumers' surplus and producers' surplus.

22. Use Cramer's rule to solve for the unknowns in the following :

$$5x_1 - 2x_2 + 3x_3 = 16$$

$$2x_1 + 3x_2 - 5x_3 = 2$$

$$4x_1 - 5x_2 + 6x_3 = 7$$

23. Determine the rank of the matrix  $\begin{bmatrix} -8 & 2 & -6 \\ 10 & -2.5 & 7.5 \\ 24 & -6 & 18 \end{bmatrix}$ .

24. Minimize a firm's total costs  $c = 45x^2 + 90xy + 90y^2$  when the firm has to meet a production quota equal to  $2x + 3y = 60$  by finding the critical values and using the bordered Hessian to test the second-order conditions.

(2×5=10)

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