

SECTION – IV

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

32. (a) Integrate $x \sqrt[3]{x-2}$. (7)

(b) The marginal cost function of a firm is $2 + 3e^x$, where x is the output. Find the average cost function if the fixed cost is Rs.500 (8)

33. If the marginal revenue function for output q is $MR = \left\{ \frac{6}{(q+2)^2} - 5 \right\}$, show that the demand function is $p = \frac{3}{(q+2)} - 5$. (15)

34. (a) Compute $\begin{bmatrix} 1 & 2 & -3 \\ -4 & 3 & 0 \end{bmatrix} \begin{bmatrix} -1 & 0 & 2 & 3 & 1 \\ 2 & -1 & 4 & 0 & -3 \\ -3 & 0 & 1 & 2 & -1 \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 1 \end{bmatrix}$. (7)

(b) Obtain the inverse of the matrix $\begin{bmatrix} 1 & 4 & 3 \\ 4 & 2 & 1 \\ 3 & 2 & 2 \end{bmatrix}$. (8)

35. (a) Find the value of $\begin{vmatrix} 3 & 4 & 7 \\ 2 & 1 & 3 \\ -5 & -1 & 2 \end{vmatrix}$. (7)

(b) Solve for x, y and z using Cramer's rule from the following set of equations.

$$\begin{aligned} x - 2y + 3z &= 1 \\ 3x - y + 4z &= 3 \\ 2x + y - 2z &= -1 \end{aligned} \quad (8)$$

(2 × 15 = 30 Marks)

(Pages : 4)

S – 3401

Reg. No. :

Name :

Third Semester B.A. Degree Examination, February 2024

First Degree Programme under CBCSS

Mathematics

Complementary Course for Economics

MM 1331.5 — MATHEMATICS FOR ECONOMICS – III

(2021 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – I

All the first **ten** questions are compulsory. Each question carries **1** mark.

1. Find $\int dx$.

2. Find $\int e^x dx$.

3. Evaluate $\int 4x^3 dx$.

4. Find $\int 5x^{-1/2} dx$.

5. Find $\int x\sqrt{x} dx$.

6. What is the order of the matrix $\begin{bmatrix} 2 & 1 \\ 4 & 3 \\ 1 & 0 \end{bmatrix}$?

7. Define a square matrix.

8. Write the transpose of $\begin{bmatrix} 2 & 1 & 6 & 0 \\ 4 & 3 & 1 & -1 \end{bmatrix}$.

9. Find the determinant of the matrix $\begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}$.

10. Compute $\begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix} - \begin{bmatrix} 6 & 4 \\ 2 & -3 \end{bmatrix}$.

(10 × 1 = 10 Marks)

SECTION – II

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

11. Find $\int \frac{x^4 - 8}{x^2} dx$.

12. Evaluate $\int \left(e^x + \frac{1}{x^3} \right) dx$.

13. Evaluate $\int \sqrt{5x+3} dx$.

14. Find $\int (x-1)(x+2) dx$.

15. Find $\int \frac{1}{x^4} dx$.

16. Evaluate $\int_1^3 3\sqrt{x} dx$.

17. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 2 \\ 2 & -1 \end{bmatrix}$, compute $2A - 3B$.

18. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, find A^2 .

19. Verify whether the matrix $A = \begin{bmatrix} -1 & 3 & 5 \\ 3 & 2 & -4 \\ 5 & 4 & 0 \end{bmatrix}$ is symmetric.

20. Prove that $\begin{bmatrix} -1/4 & 3/8 \\ 1/2 & -1/4 \end{bmatrix}$ is the inverse of $\begin{bmatrix} 2 & 3 \\ 4 & 2 \end{bmatrix}$.

21. Find the matrix of co-factors of $\begin{bmatrix} 3 & 4 \\ 1 & 2 \end{bmatrix}$.

22. Solve by Cramer's rule

$$3x + 3y - 5 = 0$$

$$3x - 4y = 2$$

(8 × 2 = 16 Marks)

SECTION – III

Answer any **six** questions. Each question carries **4** marks.

23. Find $\int x(1+x)(1-x) dx$.

24. Evaluate $\int_1^3 (1+x+x^2) dx$.

25. Integrate $x^2 e^{-x}$.

26. The marginal cost function for some product is $1+x+6x^2$ where x is the output. Find the total cost function if the fixed cost is Rs.100 when the output is zero.

27. State the properties of transpose of a matrix.

28. If $A = \begin{bmatrix} 3 \\ 0 \\ 5 \\ 1 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 2 & -1 & 0 \end{bmatrix}$, find AB and BA .

29. If $A = \begin{bmatrix} 1 & 2 & 0 & 4 \\ 2 & 4 & -1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 & 0 & 3 \\ 1 & -1 & 2 & 3 \end{bmatrix}$, find a 2×4 matrix X such that $A - X = 3B$.

30. Find the adjoint of $A = \begin{bmatrix} 3 & 0 \\ 2 & -1 \end{bmatrix}$.

31. Find the solution of the following system of equations by Cramer's rule

$$5x + 2y = 30$$

$$6x - 2y = 8$$

(6 × 4 = 24 Marks)