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THREE YEAR B.A. (Honors) (CBCS) DEGREE EXAMINATION, APRIL/MAY 2024.

SECOND SEMESTER

Economics (Major)

Paper IV — MATHEMATICAL METHODS FOR ECONOMICS

(w.e.f. 2023-24 Admitted Batch)

Time : Three hours Maximum : 70 marks

(No additional sheet will be supplied)

SECTION A — (5 × 4 = 20 marks)

Answer any FIVE of the following questions.

1. (a) List of the proper subsets of $A\{s, i, v\}$.

   (b) If $A = \{1, 2, 3\}$ and $B = \{a, b\}$ then find $A \times B$ and $B \times A$.

2. If $A = \{a, b, c, d\}$ and $B = [1, 2, 3, 4, 5)$ and $f = ((a, 2)(b, 5)(c, 4)(d, 1))$ then find Range of f?

3. Prove that the function $f(x) = 5x + 3$ is continuous at $x = 2$.

4. If $y = \sin(2x + 3)$ then find $\frac{dy}{dx}$.

5. Find the minimum value of $x^2 + y^2 + z^2$ given $x + y + z = 3a$.

6. If $f(x) = 3x^3 - 9x^2 - 27x + 15$. Find extreme values.

7. Definition of Linear Programming.

8. If Marginal revenue if $MR = 9 - 4x^2$, find the demand function.

9. If $A = \begin{bmatrix} 3 & 4 \\ 5 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ then find $A - B$.

10. If $A = \begin{bmatrix} 3 & 2 \\ 1 & -4 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & -1 \\ 2 & 1 \end{bmatrix}$ then find AB.

SECTION B — (5 × 10 = 50 marks)

Answer ALL questions. Each question carries 10 marks.

11. Explain the role of mathematical methods in Economics.

Or

12. If $A = \{2, 3, 4\}$ $B = \{1, 3, 5, 7\}$ $C = \{2, 5, 9\}$. Then

   (a) $A \cup B = B \cup A$

   (b) $A \cup (B \cup C) = (A \cup B) \cup C$

   (c) $A \subset (A \cup B)$ state these are True or False.

13. Explain the properties of Limits.

Or

14. If $u = \log(x^2 + y^2)$ then prove that $\frac{\partial^2 u}{\partial y \partial x} = \frac{\partial^2 u}{\partial x \partial y}$.

15. Explain the Optimization with suitable examples.

Or

16. Maximize profit function $\pi = 50x - 2x^2 - xy - 3y^2 + 95y$. Subject to $x + y = 25$.

17. Define Integration and explain the simple rules of Integration.

Or

18. Find Basic feasible solution of $x_1 + 2x_2 + x_3 = 4,\ 2x_1 + x_2 + 5x_3 = 5$.

19. Define the Matrix and explain types of Matrix.

Or

20. Find the Inverse of the matrix $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 5 \\ 2 & 7 & -4 \end{bmatrix}$.
