B.A. DEGREE EXAMINATION,APRIL 2020
III Year V Semester
Mathematics for Economists

Time : 3 Hours   **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. If A $= \begin{bmatrix} 2 & 0 \\ -5 & 6 \end{bmatrix}$ and B $= \begin{bmatrix} -3 & 6 \\ 4 & 1 \end{bmatrix}$ find A+B.

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

3. State Hawkins - Simon conditions.

4. State any 2 limitations of input and output Analysis.

5. Find $\dfrac{dy}{dx}$ if $y = 7x^3 + 6x^5 - 4x^4 + 8$.

6. Find $\dfrac{dy}{dx}$ if $y = (\sqrt[3]{x})^4$.

7. Write down the condition for maximum value of the function $f(x)$.

8. Define Marginal cost curve.

9. Define Cost and Revenue function.

10. Find the partial derivative of $z = 4x^2 + 4xy + y^2$.

11. Find the value of the determinant for $\begin{bmatrix} 3 & 4 \\ 10 & -2 \end{bmatrix}$

12. State any 2 applications of maxima and minima in Economics.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. If A $= \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, find $A^2 - 5A - 7I$.

14. Given A $= \begin{bmatrix} 0.4 & 0.1 \\ 0.7 & 0.6 \end{bmatrix}$ and the final demand is 50 and 100, Find the gross output.

15. If $x^3 + 5x^2y - yx$ find $\dfrac{dy}{dx}$.

16. Discuss about the Total, Average and Marginal cost curves and Revenue curves.

17. Discuss the application of partial derivative in Economics.

18. Find the maximum and minimum value of the function $y = x^3 - 3x + 1$.

19. Let A $= \begin{bmatrix} 2 & 4 \\ 3 & 2 \end{bmatrix}$ and B $= \begin{bmatrix} 1 & 0 \\ 3 & 2 \end{bmatrix}$ verify $(A + B)^T = A^T + B^T$ where A^T is transpose of A, B^T is the transpose of B.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Using Cramer's rule, solve the set of equations
    x - 2y + 3z =1
    3x - y + 4z =3
    2y + y - 2z = -1

21. Illustrate the concept of Input-Output Analysis with suitable example. Also, mention its application and limitations.

22. a)If $f(x) = x^3 - 5x^2 + 7$ find $f(x)$ and then find f'(x) and then find f'(1) and f''(2). For what value of x does f'(x) vanish?

    b) If xy=a+bx then show that $\dfrac{d^2y}{dx^2} + 2\dfrac{dy}{dx} = 0$

23. A firm has following total cost and demand function:
    $C = 1/3Q^3 + 7Q^2 + 111Q + 50$
    And Q=100-p
    Find profit maximising level of output. Also find the profit at this level of output.

24. Examine the function $z = 16 - (x + 2)^2 - (y - 2)^2$ for maximum and minimum value.

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