



Date: 24-11-2022

Dept. No.

Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

PART-A

Answer any FIVE questions in about 75 words each

(5x4=20 Marks)

1. State the procedure for deriving the minors of an element in a Matrix.
2. Solve: $\frac{3x+1}{x+2} = 2$
3. State the condition for minima in case of a function with only one independent variable.
4. Evaluate $\int (4x^3 + 3x^2 + 3) dx$
5. What is transpose of a Matrix? Give your own example.
6. Find the first, second and third derivative of $y = x^3 - 5x^2 + 7$.
7. Find the X and Y Intercepts of the equation $3x + 4y = 12$

PART-B

Answer any FOUR questions in about 300 words each

(4x10=40 Marks)

8. Find A^{-1} of $A = \begin{bmatrix} 8 & 4 \\ 3 & 1 \end{bmatrix}$
9. Explain the various properties of determinants with suitable examples.
10. Find the maximum, minimum or point of inflexion of the function $y = 2x^3 - 3x^2 + 5$.
11. Find AC and MC from the Total Cost: $C = Q^3 - 4Q^2 + 174Q$ and also prove that $AC = MC$ when AC is minimum.
12. Find $\frac{\delta z}{\delta x}, \frac{\delta z}{\delta y}, \frac{\delta^2 z}{\delta x^2}$ and $\frac{\delta^2 z}{\delta y^2}$ also prove that $\frac{\delta^2 z}{\delta x \delta y} = \frac{\delta^2 z}{\delta y \delta x}$ for $Z = x^3 y^4 + x^2 y$.
13. State and prove the Euler's theorem.
14. Solve the following simultaneous equations:

$$2x + 2y = 14$$

$$3x + y = 13$$

PART-C

Answer any TWO questions in about 1200 words each

(2x20=40 Marks)

15. Solve the following set of equations by Cramer's Rule

$$x + y - z = 6$$

$$3x - 2y + z = -5$$

$$x + 3y - 2z = 14$$

16. Elucidate the application of Derivatives and Partial Derivatives in Economics.
17. The demand and supply function of a commodity are $p_d = 18 - 2x - x^2$ and $p_s = 2x - 3$. Find the consumer's surplus and producer's surplus at equilibrium price.
18. Derive the relationship between AC and MC mathematically using derivatives.
