MAY 2025 **U/ID 32506/URM2A**

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer any TEN questions.

1. What is called a variable?
2. How can you represent a fraction?
3. Define Slope.
4. Define Unique solution.
5. Express Goods Market equilibrium condition.
6. Sketch the different real roots occur in quadratic equation.
7. Define Matrix.
8. What are called decision variables?
9. Write down the constant rule for differentiation.
10. Define Elasticity.
11. Integrate : $\int e^x dx$.
12. Mention the consumer surplus formula.

PART B — ($5 \times 5 = 25$ marks)

Answer any FIVE questions.

13. If a firm produces 600 units of a good at a average cost of Rs. 76 each and sells them at a price of Rs. 99. What is the total profit?

14. Find the slope and intercept for the line $x - 3y - 7 = 0$.

15. Solve the equations :

$$2x + y - z = 4,$$
$$x + y - z = 3$$

and $2x + 2y + 2z = 12$.

16. The supply and demand functions of a particular market are given by the equations $p_s = q^2 + 6q + 9$ and $p_d = q^2 - 10q + 25$. Sketch the graph of each function over the interval $q = 0$ to $q = 5$.

17. Shiva borrows Rs. 1,000 for a period of 2 years. He agrees to pay interest at the rate of 8% p.a. on simple interest basis. What is the amount outstanding at the end of two years?

18. Find the derivative of $f(x)=5x^3 + 7x^2 - 3x + 1$.

19. Give a short note about applications of Exponential functions.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

20. The demand function is given by the equation $p = 100 - 0.5q$:

    (a) State and give a verbal description of the slope and intercepts.

    (b) What is the quantity demanded when $p = 5$?

    (c) Plot the demand function $p = 100 - 0.5q$ for $0 \leq q \leq 2.0$.

    (d) Find an expression for the demand function in the form $q = f(p)$ and graph it.

21. The labour demand and supply functions are given as $W_d = 9 - 0.6\,L_d$ and $W_s = 2 + 0.4L_s$. Calculate the equilibrium wage and equilibrium number of workers algebraically and graphically :

    [Here / Worker = 1 unit of labour]

22. Explain the procedure of graphical method of solving linear programming problems.

23. Given the demand function $p = 6 - 0.5q$. Find the value of MR for $q = 1, 2, 3, 4, 5, 6, 7$.

24. Calculate the consumer surplus for the demand function $p = \frac{100}{q + 2}$. When the market price is $P_0 = 20$ by integration.
