**DECEMBER 2023** **U/ID 32506/URM2A**

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer any TEN questions.

1. What is the slope of a straight line in Economics?

2. How graphs are used in Economics?

3. What is the equation of the line whose angle of inclination is 45 degrees and x-intercept is - 3/5?

4. What is a linear and nonlinear function in Economics?

5. What is the formula for an elementary function?

6. Which of the following functions are nonlinear and why?

   (a) $f(x) = 4$

   (b) $f(x) = 3^x - 7$

   (c) $f(x) = \sin x$ .

7. What is the mathematical notation for a vector?

8. What is sequence in Mathematical Economics?

9. What is the maxima and minima in Economics?

10. Differentiate $f(x) = 9x^3 - 6x + 5$ with respect to $x$.

11. What is the exponential and natural logarithmic function?

12. What is consumer surplus in Economics?

PART B — ($5 \times 5 = 25$ marks)

Answer any FIVE questions.

13. Find the equation of the straight line that has slope $m = 3$ and passes through the point $(-2, -5)$.

14. Find the slope of the line $y = 5x + 2$.

15. A consumer has an income of \$2400 to spend on two goods, *X* and *Y*. Prices of *X* and *Y* are \$30 and \$50 respectively. What happens to his budget line if the price of *X* doubles?

16. Show the differences between Linear and Nonlinear Functions.

17. List the basic rules for summation in the series.

18. Let us consider a function with one explanatory variable such that $y = 5x^2 - 40x + 20$. To determine the extreme value (maximum or minimum).

19. Why does $\log(x.y) = \log(x) + \log(y)$?

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

20. Explain slope intercept form with an example.

21. A consumer has an income of \$200 to spend on two goods, $X$ and $Y$. Prices of $X$ and $Y$ are \$20 and \$5 respectively.

    (a) If the consumer spends the whole \$200 on $X$ and $Y$, draw his budget line.

    (b) What happens if the budget falls to \$80?

22. Explain average rate of return in investment appraisal with an appropriate example.

23. Explain Derivative of a product of two functions with suitable example.

24. The marginal cost function is $MC = 300x^{2/5}$ and fixed cost is zero. Find out the total cost and average cost functions.

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