TIM222070W **Reg. No :.....**

Name :.....

INTEGRATED M A PROGRAMME IN SOCIAL SCIENCES - ECONOMICS EXAMINATION, MARCH 2023

(2022 Admission Regular)

SEMESTER II - CORE COURSE

EC02C08IM20 - MATHEMATICS AND MARGINAL ANALYSIS

Time : 3 Hours **Maximum Weight : 30**

Part A

I. Answer any Eight questions. Each question carries 1 weight **(8x1=8)**

1. Bring out the differences between definitional, behavioural and conditional equations.
2. Differentiate between a constant and a parameter.
3. Write slope and intercept of the function y = 3x+2.
4. Define the concepts of origin and quadrants in a graph.
5. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$, find 5A?
6. If $A = \begin{bmatrix} 6 & 0 & 7 \\ 7 & -2 & 3 \end{bmatrix}$ find 3A.
7. What are the implications of difference quotient being positive or negative?
8. Differentiate (a) $y = x^2 + 62$ (b) $y = 10x^2 + x^{1/2}$
9. State the sufficient and necessary condition for profit maximisation.
10. If $TC = Q^2 + 7Q + 23$, find MC?

Part B

II. Answer any Six questions. Each question carries 2 weight **(6x2=12)**

11. Solve the following simultaneous equations:

    $y = 2x^2+3x+2$;

    $y = x^2+2x+8$.

12. Prepare a table of values of y = 2x + 1, and plot the graph.
13. If $A = \begin{bmatrix} 3 & 4 & 7 \\ -2 & 5 & 6 \\ 7 & 3 & -9 \end{bmatrix}$, find cofactors of the elements 6 and -9.
14. Find the inverse of A, where $A = \begin{bmatrix} 3 & 5 & 7 \\ 2 & -3 & 1 \\ 1 & 1 & 2 \end{bmatrix}$
15. Differentiate $y = \frac{5x^2-9x+8}{x^2+1}$
16. Explain what happens to a multiplicative constant and additive constant during differentiation by solving 3x+2.

17. Define the marginal concepts of revenue and cost.
18. Explain the conditions of (a) maxima and minima (b)concavity and convexity.

Part C

III. Answer any Two questions. Each question carries 5 weight **(2x5=10)**

19. Solve the simultaneous equations:

    z=x+y+4

    z=2x-y

    z=3x-4y

20. Find the equilibrium price and quantity for the following markets, with the aid of graphs: (a) Qs=-20+3P & Qd =220-5P (b) Qs +32 - 7P= 0 & Qd-128+9P=0
21. Use matrix inversion to solve the following linear simultaneous equations:

    $$4x + y - 5z = 8$$
    $$-2x + 3y + z = 12$$
    $$3x - y + 4z = 5$$

22. For each of the following functions, (1) find the second-order derivative and (2) evaluate it at x =2. (a) $y=7x^3 +5x^2 +12$ (b) $y=x^6 + 3x^4 +x$ (c) $y = (2x+3) (8x^2-6)$ (d) $(x^4-3) (x^3-2)$ (e) $y = \frac{5x}{1-3x}$