# LOYOLA COLLEGE (AUTONOMOUS), CHENNAI - 600034 

B.A. DEGREE EXAMINATION - ECONOMICS

FIRST SEMESTER - APRIL 2022
16/17/18UEC1MCO2 - MATHEMATICS FOR ECONOMICS

Date: 23-06-2022
Dept. No. $\square$ Max. : 100 Marks
Time: 09:00 AM - 12:00 NOON

## PART-A

## Answer any FIVE questions

(5x4=20)

1. State the first and second order conditions for maxima and minima of a function.
2. Find the value of $x$ for $4 x+3=2 x+5$.
3. If Total Revenue $R=20 Q-3 Q^{2}$, find average and marginal revenues.
4. Evaluate $\int\left(x^{3}+4 x^{2}+3\right) d x$
5. What is point of inflection?
6. If $\mathrm{A}=\left[\begin{array}{ll}1 & 2 \\ 3 & 4\end{array}\right]$ and $\mathrm{B}=\left[\begin{array}{cc}-1 & 2 \\ 2 & -1\end{array}\right]$, prove that $\mathrm{A}+\mathrm{B}=\mathrm{B}+\mathrm{A}$.
7. What is x intercept? What is the procedure for deriving it?

## PART-B

## Answer any FOUR questions

8. Find the inverse of $\mathrm{A}=\left[\begin{array}{lll}5 & 1 & 1 \\ 0 & 2 & 2 \\ 3 & 1 & 4\end{array}\right]$
9. Solve the following quadratic equation: $x^{2}+9 x+14=0$
10. Solve using simultaneous equations method:

$$
\begin{aligned}
& 4 x-2 y=4 \\
& 5 x+3 y=16
\end{aligned}
$$

11. Examine the function $Z=8 x^{3}+2 x y-3 x^{2}+y^{2}+1$ for maximum and minimum values.
12. State the properties of determinants.
13. Prove that the rate of fall of $M R$ curve is twice the rate of fall of $A R$ curve.
14. Solve: $8 x+5(x+7)+9(2 x+23)-3(x+6)=0$

## PART-C

## Answer any TWO questions

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

$$
\begin{aligned}
& 2 x-3 y+4 z=8 \\
& 3 x+4 y-5 z=-4 \\
& 4 x-5 y+6 z=-12
\end{aligned}
$$

16. Find the equilibrium quantity and price given the demand function $P_{D}=10-3 Q$ and the supply function $P_{S}=2 Q$. Also plot the demand and supply curves in a graph sheet and verify the answer graphically.
17. Discuss the application of derivatives and partial derivatives in economics.
18. Derive the relationship between AC and MC mathematically using derivatives.
