

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



**B.A. DEGREE EXAMINATION – ECONOMICS
FIRST SEMESTER – NOVEMBER 2019**

16/17/18UEC1MC02 – MATHEMATICS FOR ECONOMICS

Date: 01-11-2019
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

PART-A

Answer any FIVE questions in about 75 words each.

(5 x 4 = 20 marks)

1. Find the equation of the Straight line if y intercept is -9 and slope is $\frac{2}{3}$
2. Given $A = \begin{pmatrix} 3 & 2 & 6 \\ 5 & 8 & -9 \\ 1 & 2 & 3 \end{pmatrix}$, $B = \begin{pmatrix} 6 & 5 & 8 \\ 11 & 12 & -11 \\ 3 & 4 & -5 \end{pmatrix}$ find $3A+5B$.
3. Find $\frac{dy}{dx}$, $y = (x - 5)(6x - 2)$.
4. The Demand function of a monopolist is $P = 15 - 2x$ and the cost function is $C(x) = x^2 + 2x$. Find (i) Marginal cost (ii) Marginal revenue.
5. Find first and second order derivatives of $y = 6x^4 + 8x^3 + 9x^2 + 5x + 90$.
6. Evaluate $\int \left[\frac{(3x-2)}{(x+1)^2(x+3)} \right]$.
7. Solve $5x^2 + 23x + 12 = 0$ using the quadratic equation formula.

PART- B

Answer any FOUR questions in about 250 words each.

(4 x 10 =40 marks)

8. The salary of an employee in 2017 was Rs.1200. In 2019, it will be Rs.1350. Express salary as a linear function of time and estimate his salary in 2020.
9. Solve the following equation by Cramer's Rule.
$$\begin{aligned} 2x - 3y + 5z &= 11 \\ 2x + 5y - 7z &= -9 \\ -4x + 3y + z &= 5 \end{aligned}$$
10. A demand function of a monopolist is given by $P = 100 - x - x^2$. Find marginal revenue for any level of output x and also estimate the marginal revenue when (a) $x = 2$, and (b) $x = 5$.
11. If the market demand curve is $p = 20 - 2x$, where p and x are respectively the price and quantity demanded of a commodity. Find the consumer surplus when $p = 4$ and $p = 8$.
12. If the demand functions of a multiproduct firm are as follows: $q_1 = 5200 - 10p_1$, and $q_2 = 8200 - 20p_2$ and the joint cost of production is $C = .1q_1^2 + .1q_1q_2 + .2q_2^2 + 325$.. Find the profit maximising level of output, prices and profit.

13. Integrate the following definite integral, $\int_2^5 \frac{3x}{(x+1)^2} dx$.

14. Solve by matrix method $2x + 4y + z = 5$; $x + y + z = 6$; $2x + 3y = z = 6$

PART – C

Answer any TWO questions in about 900 words each.

(2 x 20=40 marks)

15. a) The demand for a commodity is $D = 35 - 7p$. The supply function is $S = 2P - 5$. Find

- (i) Equilibrium price (ii) The quantity exchanged in the market at this price.

b) An automobile spare part manufacturing company introduces production bonus to the employees that increases the cost of the spare part. The daily cost of production C for a number of spare parts is given by

$$C(x) = 2.05x + 550$$

(i) If each spare part is sold for Rs. 3 determine the minimum number that must be produced and sold daily

to ensure no loss.

(ii) If the selling price is increased by 30 Ps per piece, what would be the breakeven point?

(iii) If it is known that atleast 500 parts can be sold daily, what price the company should charge per piece of spare part to guarantee no loss.

16. Find the Inverse of Matrix $A = \begin{pmatrix} 2 & -3 & 0 \\ 3 & 1 & -2 \\ -1 & 0 & 4 \end{pmatrix}$ and also verify that $AA^{-1} = 1$.

17. The demand and supply function under perfect competition are $Y = 18 - x^2$ and $Y = 2x^2 + 6$. Find the consumer surplus and producer's surplus.

18. Determine whether the function $U = f(x, y, z) = -x^3 + 3xz + 2y \cdot y^2 - 3x^2$ possess a maximum or minimum value.
