School of Liberal Arts
Economics
ETE - Aug 2023

Time : 3 Hours   Marks : 50

SEM III - A080303T - Mathematical Economics
Your answer should be specific to the question asked
Draw neat labeled diagrams wherever necessary

1. Illustrate global maxima and global minima.   K1 CO1 (2)

2. Suppose g(x) and h(x) both are the functions then Illustrate Product rule of derivative.   K2 CO2 (2)

3. Differentiate the following equations   K3 CO3 (2)
$$Q = 36KL - K^2 - L^2$$
$$z = x^3 + 5xy^2 + y^3$$

4. Given that $TR = 80q - 2q^2$, derive a function for MR.   K4 CO4 (2)

5. Calculate the Determinant   K4 CO5 (2)

$$A = \begin{bmatrix} 2 & 3 & 5 \\ 3 & 1 & 2 \\ 1 & 4 & 3 \end{bmatrix}$$

6. Define Saddle point.   K3 CO1 (5)

7. Find (a) the minors and (b) cofactors for the elements of the third row, given   K4 CO2 (5)
$$\begin{bmatrix} 9 & 11 & 4 \\ 3 & 2 & 7 \\ 6 & 10 & 4 \end{bmatrix}$$

8. Suppose the function you want to maximise is given as $\pi(q) = -1/2q^2 + 70q - 300$. Obtain the q that maximises $\pi(q)$.   K6 CO6 (6)

9. (a) Find the critical points (b) Test whether the function is at a relative maximum or minimum.   K4 CO3 (8)
$$z = 2y^3 - x^3 + 147x - 54y + 12$$

10. Use Cramer's rule to solve given equations.   K5 CO4 (8)

$$11p_1 - p_2 - p_3 = 31$$
$$-p_1 + 6p_2 - 2p_3 = 26$$
$$-p_1 - 2p_2 + 7p_3 = 24$$

11. Use matrix algebra to solve for the unknown variables x_1, x_2 and x_3 given that   K6 CO5 (8)
$$10x_1 + 3x_2 + 6x_3 = 76$$
$$4x_1 + 5x_3 = 41$$
$$5x_1 + 2x_2 + 2x_3 = 34$$