**ST. JOSEPH’S UNIVERSITY, BENGALURU -27**

Registration Number:

Date 10-12-22

**M.A (ECONOMICS) – I SEMESTER**

**SEMESTER EXAMINATION: OCTOBER 2022**

**(Examination conducted in December 2022)**

**EC 7421 – MATHEMATICAL METHODS FOR ECONOMISTS**

**Time: 2 Hours Max Marks: 50**

**This paper contains 2 printed pages and 3 parts**

**PART A: Answer any FIVE of the following 2\*5 = 10**

1. Evaluate the indefinite integral of ꭍ (5x3 + 2x2 + 3) dx.
2. Define Nash equilibrium.
3. Given A = 3 2 , find A-1.

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1. What is the use of Input-Output technique in economics?
2. Find the first five derivatives of the function: y = f(x) = 4x4 – x3 + 17x2 + 3x - 1.
3. Define the rank of a matrix.

**PART B: Answer the following 5\*2 = 10**

1. The marginal revenue function of a competitive firm is given as MR = 15 – 3x2. What would be demand curve of the firm in the market?
2. Consider a demand function q = Apαyβ, where q represents quantity demanded, p represents price, y represents income, A, α and β are constants. Determine the direct price elasticity and income elasticity of demand.

**PART C: Answer any TWO of the following 15\*2 = 30**

1. a. Use Cramer’s rule to solve the following national income model:

Y = C + I0 + G0 and C = a + bY.

b. Determine the optimum strategies for the two players X and Y and find the value of the game from the following payoff matrix:

 Player Y

Player X $\begin{matrix}3&-1&4&2\\-1&-3&-7&0\\4&-6&2&-9\end{matrix}$

 **(10 + 5) = 15**

1. a. Given the production function Q = K1/2 L1/2 and PK = Rs. 4, PL = Rs. 8 and C = Rs. 400, determine the maximum level of output subject to the cost constraint.

b. Define a Linear Programming Problem (LPP). What are the methods used to solve a LPP? **(10 + 5 ) = 15**

 11. a. A monopolist faces two demand functions P1 = 12 – q1 and P2 = 20 – 3q2 in two markets. Suppose his total cost function is: C = 3 + 2 (q1 + q2). Determine the prices the monopolist will charge in the two markets if his/her objective is to maximize profit.

b. Given Q = AKαL1-α, verify Euler’s theorem. **(10 + 5) = 15**