BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: IMSc **SEMESTER : I**
BRANCH: CQEDS **SESSION : MO/2025**

SUBJECT: ED25105 INTRODUCTION TO ECONOMICS AND ESSENTIAL MATHEMATICS
TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1	The given system of equations represents demand and supply function of Good 1 and 2. Find the equilibrium quantities and prices of both the goods. Demand functions: $Q_{d1} = 10 - 2P_1 + P_2$ $Q_{d2} = 15 + P_1 - P_2$ Supply functions: $Q_{s1} = -2 + 3P_1$ $Q_{s2} = -1 + 2P_2$	[5]	1	3
Q.2	The following system of equations represents the national-income model. $Y = C + I + G$ $C = 25 + 6Y^{1/2}$ $I = 16$ $G = 14$			
Q.2(a)	Identify the endogenous variables.	[2]	1	1
Q.2(b)	Find the equilibrium values of Y and C.	[3]	1	5
Q.3	Given are the row vectors: u'= [5 1 3], v'= [3 1 -1], w'= [7 5 8], and x' = [x_1 x_2 x_3].			
Q.3(a)	Write the column vectors u, v, w, and x.	[2]	1	2
Q.3(b)	Find the value of a) uv' b) w'x c) u'u	[3]	1	4
Q.4	Find the relative extrema of the function. Show the extrema graphically. $Y = f(X) = X^3 - 12X^2 + 36X + 8$	[5]	2	5
Q.5	Find the relative maxima and minima of Y using first and second order derivatives.			
Q.5(a)	$Y = -2X^2 + 8X + 25$	[2]	2	2
Q.5(b)	$Y = 1/3(X^3) - 3X^2 + 5X + 3$	[3]	2	2

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