

B.A. (H) ECONOMICS
SEM III - ADVANCED MATHEMATICS

12.12.2023

Max marks - 12

Time - 40 minutes

Attempt all questions.

Q1 a) Prove that $x_t = A3^t + B4^t$ is the general solution of $x_{t+2} - 7x_{t+1} + 12x_t = 0$.

b) Find the solution of $2x_t + 3x_{t+1} + 2 = 0$ with $x_0 = -1$. Also, find the equilibrium value and check whether it is stable or not? (5)

Q2 Consider an input output model with three industries A, B and C. Suppose that the production function is

$$y = \ln x_1 (x_2 + 2x_3)$$

where x_1, x_2 and x_3 are input requirements. The availability of x_1 is 1 unit and of total resources is 100 units. Also,

$$x_1^2 + x_2^2 \leq 20 \text{ and } x_1 \geq 10.$$

a. Write down the necessary conditions for production max.

b. Find all points satisfying the necessary conditions. What is the solution to the problem. (7)