Name Solution Version 2
ID

Quiz 2: EE320.. Points, as indicated in each question, are suggestive time in minutes within which student should finish that question.

Question 1: Consider a market equilibrium model. The two equations for market demand and supply are given below.

$$q^d = a - bP - cY$$
$$q^s = d + eP + fT$$

where P is price per unit of output, Y is the level of income, T is the rate of technological change. All the parameters are strictly positive.

1. (7 points) Write the system of equations in the matrix form, and state the condition that is needed to ensure the uniqueness of the solution.

$q^d = q^s = q \rightarrow \begin{aligned} q + bp &= a - cy \\ q - ep &= d + fT \end{aligned} \Rightarrow \underbrace{\begin{bmatrix} 1 & b \\ 1 & -e \end{bmatrix}}_{A} \underbrace{\begin{bmatrix} q \\ P \end{bmatrix}}_{x} = \underbrace{\begin{bmatrix} a-cy \\ d+fT \end{bmatrix}}_{D}$

$\therefore |A| = -(e+b)$

$\therefore |A| \neq 0 \Rightarrow -(e+b) \neq 0$. This is ensured from the assumption above that all parameters are positive.

2. (8 points) Solve for the equilibrium quantity and price by using the Cramer's rule.

$$q = \frac{\begin{vmatrix} a-cy & b \\ d+fT & -e \end{vmatrix}}{|A|} = \frac{(a-cy) + b(d+fT)}{e+b} \quad \#$$

$$P = \frac{\begin{vmatrix} 1 & a-cy \\ 1 & d+fT \end{vmatrix}}{|A|} = \frac{(a-cy) - (d+fT)}{e+b} \quad \#$$