Q1.

(1) $m = 2$, $p = 1$

(2) $Z_t = \begin{pmatrix} y_t \\ x_t \end{pmatrix}$, $v_t = \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{pmatrix}$

$$\Rightarrow \begin{pmatrix} y_t \\ x_t \end{pmatrix} = F \cdot \begin{pmatrix} y_{t-1} \\ x_{t-1} \end{pmatrix} + \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{pmatrix}$$

$2\times1 \quad = \quad a\times b \quad 2\times1 \qquad 2\times1$

By 행렬곱의 성질, $a = b = 2$ OR

F는 $mp \times mp$ 행렬이므로, $a = b = 2$

(3) By (2), $F = \begin{pmatrix} 3/4 & 5/8 \\ -1/6 & 1/12 \end{pmatrix}$.

let $f(T) = \det(F - T\cdot I) = 0$

$$\Rightarrow f(T) = \det \begin{pmatrix} 3/4 - T & 5/8 \\ -1/6 & 1/12 - T \end{pmatrix} = \left(\frac{1}{2} - T\right)\left(\frac{1}{3} - T\right) = 0$$

$\Leftrightarrow T = \frac{1}{2}, \frac{1}{3}$ ∵ eigen value

∴ 정상적이다 //

Q2.

O, O, X, O, X, O, O