1.1

No. Because, there are 3 endogenous variables, but the question only provides us 2 equations. Therefore we need one more equation which is an equilibrium condition, $Y = C + I$.

1.2

$$Y - C - I = 0$$
$$C - 0.3Y = C_0 - k_1 r$$
$$I - 0.2Y = I_0 - k_2 r$$

$$\begin{bmatrix} 1 & -1 & -1 \\ -0.3 & 1 & 0 \\ -0.2 & 0 & 1 \end{bmatrix} \begin{bmatrix} Y \\ C \\ I \end{bmatrix} = \begin{bmatrix} 0 \\ C_0 - k_1 r \\ I_0 - k_2 r \end{bmatrix}$$

1.3

The solution is unique when det(A) $\neq 0$.

$$\begin{vmatrix} 1 & -1 & -1 \\ -0.3 & 1 & 0 \\ -0.2 & 0 & 1 \end{vmatrix} = 1 + 0 + 0 - 0.2 - 0.3 = 1 - 0.5 = 0.5$$

1.4

$$C = \frac{\begin{vmatrix} 1 & 0 & -1 \\ -0.3 & C_0 - k_1 r & 0 \\ -0.2 & I_0 - k_2 r & 1 \end{vmatrix}}{det(A)}$$

$$= \frac{(C_0 - k_1 r) + 0.3(I_0 - k_2 r) - 0.2(C_0 - k_1 r)}{0.5}$$

$$= \frac{0.8(C_0 - k_1 r) + 0.3(I_0 - k_2 r)}{0.5}$$

$$= 1.6(C_0 - k_1 r) + 0.6(I_0 - k_2 r)$$