4 bii) The poles of the discrete time process are given by:

$$\det(zI - A_d) = 0$$

$$\begin{bmatrix} z & 0 & 0 \\ 0 & z & 0 \\ 0 & 0 & z \end{bmatrix} - \begin{bmatrix} 1 & 0 & 0 \\ 7T & 1 & 0 \\ 0 & T & 1 \end{bmatrix} = \begin{bmatrix} z-1 & 0 & 0 \\ -7T & z-1 & 0 \\ 0 & -T & z-1 \end{bmatrix}$$

$$\det = (z-1)\left[(z-1)(z-1) - 0\right] + 0\left[+7T^2 - 0\right] + 0\left[0 + 7T(z-1)\right]$$

$$= (z-1)(z-1)(z-1)$$

Q. E. D.