... 1.25 (2)

b) $x(t) = e^{j(\pi t - 1)}$

$e^{j(\pi t-1)} = \cos(\pi t-1) + j\sin(\pi t-1)$

$\cos(\pi t-1) + j\sin(\pi t-1) = \cos(\pi(t+T)-1) + j\sin(\pi(t+T)-1) \Leftrightarrow \begin{cases} \cos(\pi t-1) = \cos(\pi t+\pi T-1) \\ \sin(\pi t-1) = \sin(\pi t+\pi T-1) \end{cases} \Leftrightarrow$

$\Leftrightarrow \begin{cases} \pm \arccos(\cos(\pi t-1)) = \pm \arccos(\cos(\pi t+\pi T-1)) + 2m\pi \\ \frac{\pi}{2} \pm (\frac{\pi}{2} - \arcsin(\sin(\pi t-1))) = \frac{\pi}{2} \pm (\frac{\pi}{2} - \arcsin(\sin(\pi t+\pi T-1))) + 2m\pi \end{cases} \Leftrightarrow$

$\Leftrightarrow \begin{cases} \pm(\pi t-1) \mp (\pi t+\pi T-1) = 2n\pi \\ \pm(\frac{\pi}{2} - \pi t-1) \mp (\frac{\pi}{2} - \pi t+\pi T-1) = 2m\pi \end{cases} \Leftrightarrow$

$\Leftrightarrow$

$T = 2n \Rightarrow T_0 = 2$

$\Leftrightarrow \begin{cases} \pi t-1-\pi t-\pi T+1 = 2n\pi \Leftrightarrow \pi T = 2n\pi \Leftrightarrow \\ \text{or} \\ \pi t-1+\pi t+\pi T-1 = 2n\pi \Leftrightarrow 2\pi t-2+\pi T = 2n\pi \Leftrightarrow T = \frac{2n\pi-2\pi t+2}{\pi} \leftarrow \text{not conclusive} \\ * \text{other combinations are already equivalent} \end{cases}$

and

$\begin{cases} \frac{\pi}{2} - \pi t-1 - \frac{\pi}{2} + \pi t - \pi T + 1 = 2m\pi \Leftrightarrow \pi T = 2m\pi \Leftrightarrow T = 2m \Rightarrow T_0 = 2 \\ \text{or} \\ \frac{\pi}{2} - \pi t-1 + \frac{\pi}{2} - \pi t + \pi T - 1 = 2m\pi \Leftrightarrow \pi - 2\pi t - 2 + \pi T = 2m\pi \Leftrightarrow T = \frac{2m\pi - \pi + 2\pi t + 2}{\pi} \leftarrow \text{not conclusive} \end{cases}$

Periodic with $T_0 = 2$

d) $x(t) = \mathcal{E}v\{\cos(4\pi t)\cdot u(t)\} = \frac{\cos(4\pi t)\cdot u(t) + \cos(4\pi t)\cdot u(-t)}{2} = \frac{\cos(4\pi t)\cdot u(t) + \cos(4\pi t)\cdot u(-t)}{2} = \frac{\cos(4\pi t)}{2}$

$x(t) = x(t+T) \Leftrightarrow \frac{\cos(4\pi t)}{2} = \frac{\cos(4\pi(t+T))}{2} \Leftrightarrow \pm 4\pi t = \pm 4\pi(t+T) + 2\pi n \Leftrightarrow$

$\Leftrightarrow \pm 4\pi t \mp 4\pi(t+T) = 2\pi n \Leftrightarrow \begin{cases} 4\pi t - 4\pi t - 4\pi T = 2\pi n \Leftrightarrow 4\pi T = 2\pi n \Leftrightarrow T = \frac{n}{2} \Rightarrow T_0 = \frac{1}{2} \\ \text{or} \\ 4\pi t + 4\pi t + 4\pi T = 2\pi n \Leftrightarrow 8\pi t + 4\pi T = 2\pi n \Leftrightarrow T = \frac{2\pi n - 8\pi t}{4\pi} \leftarrow \text{not conclusive} \end{cases}$

Periodic with $T_0 = \frac{1}{2}$