

P4
#(b)

From (a), $e_t = p_x$, $p_t = e_x$

$$\Rightarrow e_{tt} = p_{xt} = p_{tx} = e_{xx}$$

$$p_{tt} = e_{xt} = e_{tx} = p_{xx}$$

$$\Rightarrow e_{tt} - c^2 e_{xx} = 0 \quad \text{when } c=1$$

$$p_{tt} - c^2 p_{xx} = 0 \quad \text{when } c=1$$

\Rightarrow both $e(x,t)$, $p(x,t)$ satisfy
the wave equation.