1. For the incident wave being $A_1 \cos(\omega t - kx)$ if the reflection ratio is $1/2$, what is the transmission ratio ?

2. Find out the mean flux carried out by

$$y = A \cos(\omega t - kx) + B \cos(\omega t + kx)$$

over one oscillation cycle.

3. Match the waves (incident + reflected with the transmitted one) and their flux at the junction for $y_1 = A_1 \cos(\omega t - kx)$. Write down the conditions of matching. Write the mean flux ratios $r = \frac{\langle \mathcal{I}_R \rangle}{\langle \mathcal{I}_I \rangle}$ and $t = \frac{\langle \mathcal{I}_T \rangle}{\langle \mathcal{I}_I \rangle}$.

4. Check if in a superposition

$$\vec{E} = \vec{E}_1 e^{i(\vec{k}_1 \cdot \vec{r} - \omega_1 t)} + \vec{E}_2 e^{i(\vec{k}_2 \cdot \vec{r} - \omega_2 t)}$$

the propagation direction is orthogonal to the electric field