Transmission Co-efficient :-

The Transmission Co-efficient (τ) is mathematically, defined as, $\tau_E = \frac{E_{0t}}{E_{0i}} = \left[\frac{2\eta_2}{\eta_1+\eta_2}\right]$ ——— (1)

Similarly, $\tau_E = \left[\frac{2\eta_2}{(\eta_1+\eta_2)}\right] = \frac{2\sqrt{\frac{\mu_0}{\epsilon_2}}}{\sqrt{\frac{\mu_0}{\epsilon_2}}+\frac{\mu_0}{\epsilon_1}}$ ——— (2)

$$\tau_E = \frac{2\sqrt{1/\epsilon_2}}{\sqrt{\frac{1}{\epsilon_2}}+\sqrt{\frac{1}{\epsilon_1}}} = \frac{2\sqrt{\epsilon_1}}{\sqrt{\epsilon_1}+\sqrt{\epsilon_2}} \quad \text{——— (2)}$$

Also, $\frac{H_{0r}}{H_i} = \left(\frac{\eta_1-\eta_2}{\eta_1+\eta_2}\right)$

$$\Delta_H = \frac{\sqrt{\mu_0/\epsilon_1}-\sqrt{\mu_0/\epsilon_2}}{\sqrt{\frac{\mu_0}{\epsilon_1}}+\sqrt{\mu_0/\epsilon_2}} = \frac{\sqrt{1/\epsilon_1}-\sqrt{1/\epsilon_2}}{\sqrt{1/\epsilon_1}+\sqrt{1/\epsilon_2}}$$

$$\therefore \Delta_H = \frac{\sqrt{\epsilon_2}-\sqrt{\epsilon_1}}{\sqrt{\epsilon_1}+\sqrt{\epsilon_2}} \quad \text{——— (3)}$$

Similarly,

$$\tau_H = \frac{H_{0r}}{H_{0i}} = \left[\frac{2\eta_1}{\eta_1+\eta_2}\right]$$

$$\text{or, } \tau_H = \frac{2\sqrt{\mu_0/\epsilon_1}}{\sqrt{\frac{\mu_0}{\epsilon_2}}+\sqrt{\frac{\mu_0}{\epsilon_1}}}$$

$$\therefore \tau_H = \frac{2\sqrt{\epsilon_2}}{\sqrt{\epsilon_1}+\sqrt{\epsilon_2}} \quad \text{——— (4)}$$

This is the required expression for the transmission co-efficient. It is used to describes the amplitude, intensity or total power of a transmitted wave relative to an incident waves.