

Sheet 7:

Exercise 1:

$$a) \beta = \frac{2\pi}{\lambda} \sqrt{\frac{\epsilon_1 \epsilon_2}{\epsilon_1 + \epsilon_2}} = \frac{2\pi}{\lambda} \sqrt{\frac{-11,7 + 1,31}{-10,7 + 1,31}}$$

$$= \frac{2\pi}{\lambda} 0,0055$$

$$\Rightarrow l = \frac{1}{2 \operatorname{Im}(\beta)} = 18,8 \mu\text{m}$$

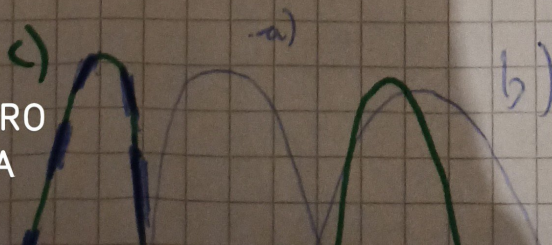
$$b) l = 5,27 \mu\text{m}$$

$$c) \beta = \frac{2\pi}{\lambda} \sqrt{\frac{(\epsilon_{2R} + i\epsilon_{2I})\epsilon_1}{\epsilon_1 + \epsilon_{2R} + i\epsilon_{2I}}} = \frac{2\pi}{\lambda} \frac{(\epsilon_1 \epsilon_{2R} (\epsilon_1 + \epsilon_{2R}) + \epsilon_{2I}^2 \epsilon_1 + i(\epsilon_1 \epsilon_{2I} (\epsilon_1 + \epsilon_{2R}) - \epsilon_1 \epsilon_{2R} \epsilon_{2I}))}{(\epsilon_1 + \epsilon_{2R})^2 + \epsilon_{2I}^2}}$$

$$\text{denn } l \text{ groß} \Rightarrow \frac{\epsilon_1 \epsilon_{2R} (\epsilon_1 + \epsilon_{2R}) + \epsilon_{2I}^2 \epsilon_1}{\epsilon_1 \epsilon_{2I} (\epsilon_1 + \epsilon_{2R}) + \epsilon_1 \epsilon_{2R} \epsilon_{2I}} \ll 1$$

z.B. wenn $\epsilon_{2I} \ll \epsilon_{2R}$ (Absorptionskoeffizient sehr klein)

Exercise 2:



~~$\frac{2}{3}(x^2 - 2^3)$~~

