KAPITEL 7

7.1 C och A

7.2

a) A $\underline{o}$ C

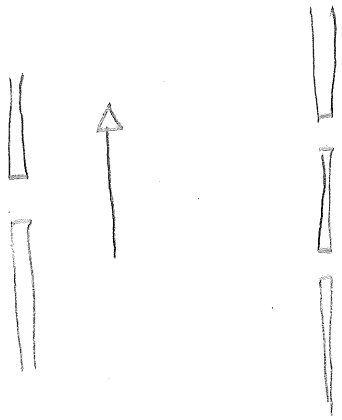
b) B $\underline{o}$ C

c) A $\underline{o}$ B

Glaset förskjuter 1,5 λ

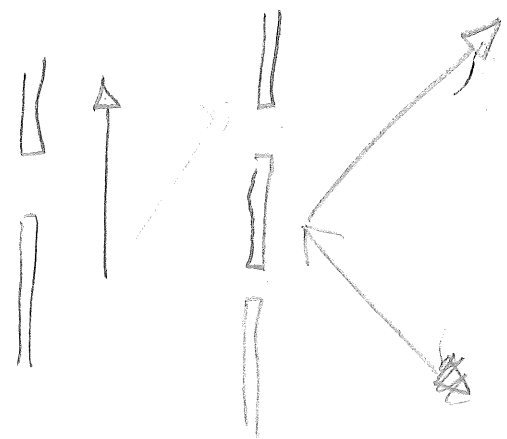
7.3

a)



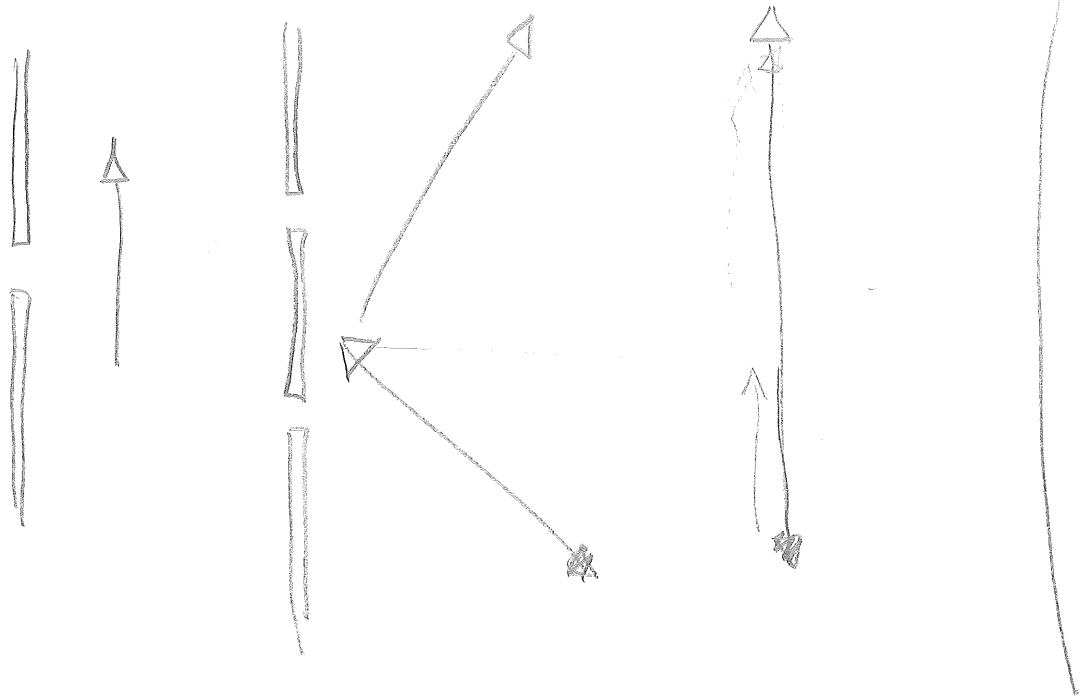
Allt ljus har samma kommer det sortf. interferera (likadant)

b)

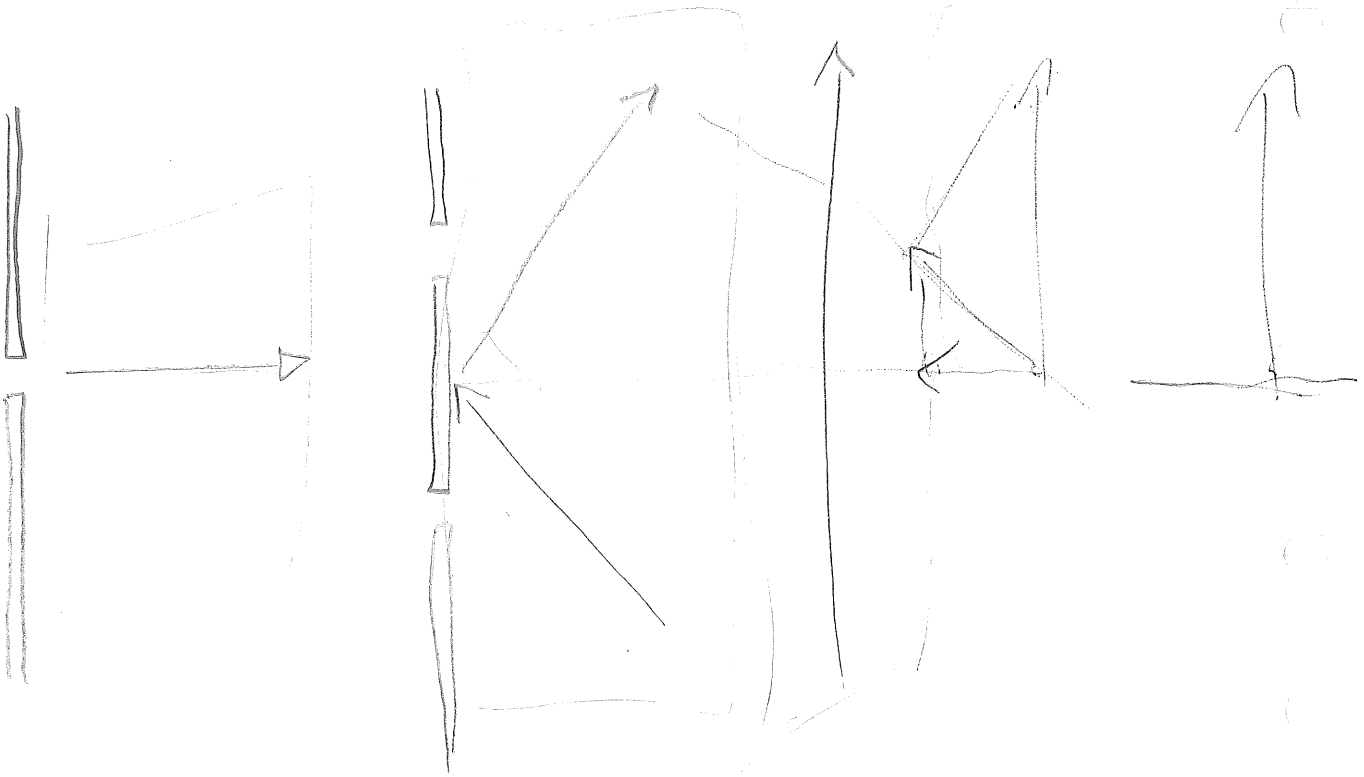


Ingen interferens.

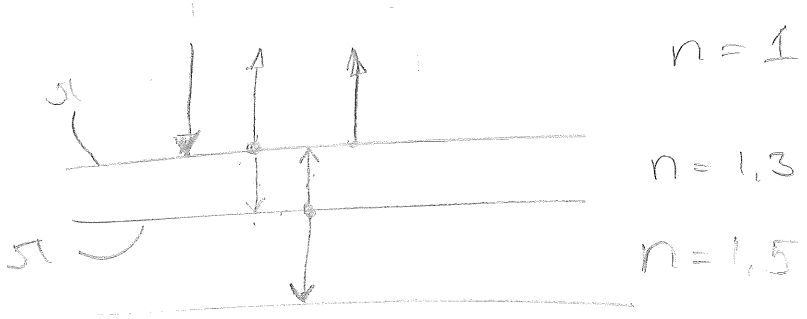
c)



d)



7.4



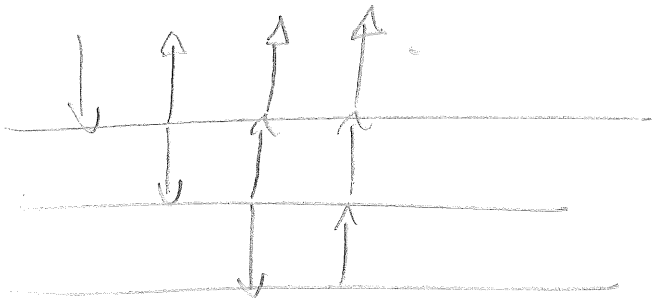
$$2 \cdot d \cdot 1{,}3 = \frac{\lambda}{2} + n \cdot \lambda = \lambda \left(\frac{1}{2} + n \right)$$

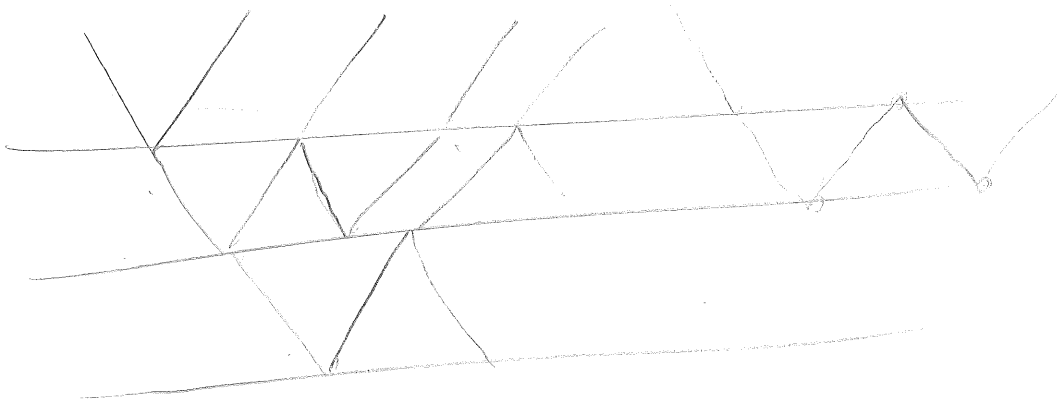
$$\begin{cases} 2d \cdot 1{,}3 = 525 \left(\frac{1}{2} + n \right) \\ 2d \cdot 1{,}3 = 675 \left(\frac{1}{2} + (n+1) \right) \end{cases}$$

$d = 0{,}21 \mu m$

7.5

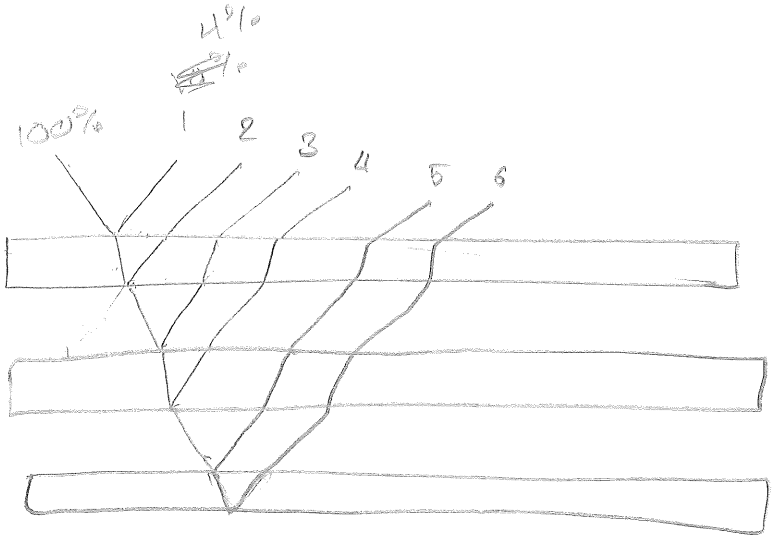
a)





7.5

a)



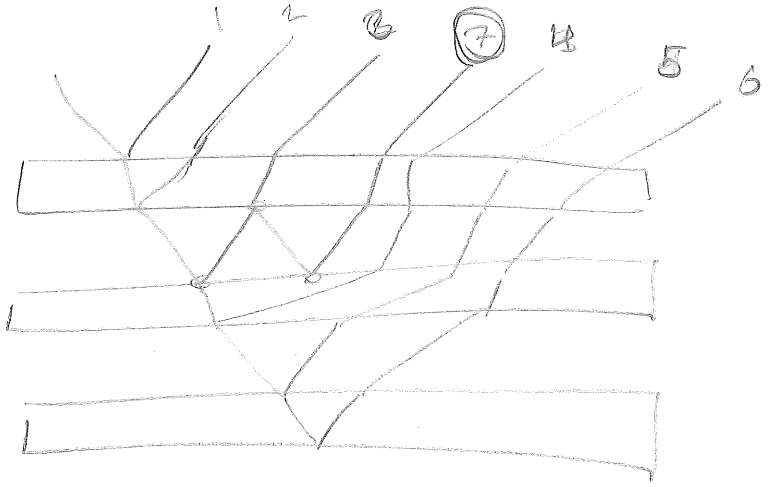
n = 1,5

Tre

b) Hur mkt är glasets reflektans? 4%

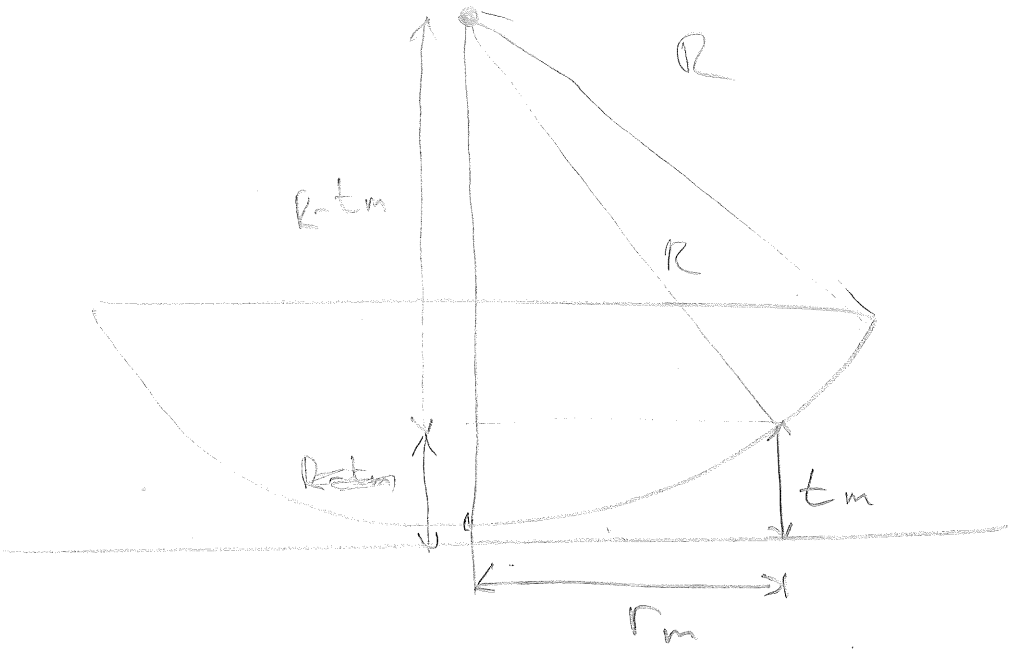
33% svagare

c)



En extra studs mellan glasen. Vilka glas?

7.6



$$R = \frac{r_m^2 + t_m^2}{2 t_m}$$

$$2 n_t t_m + \Delta r = m \lambda \quad \text{(bright)}$$

$$\Rightarrow t_m = \frac{m\lambda - \Delta r}{2 n_t} = 22\ \mu m$$

$\lambda = 633 nm$

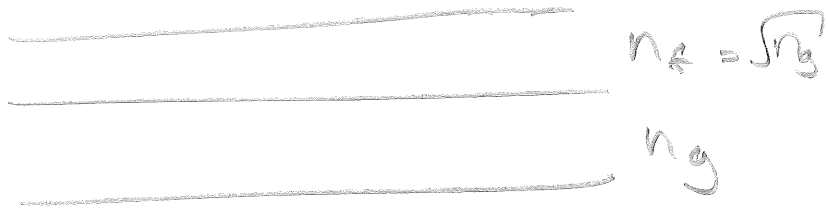
$m = 5^{th}$

$n_t = 1,0$

$\Delta r = 633/2$

$$\Rightarrow \boxed{R = 6,78 m}$$

7.7

a) 

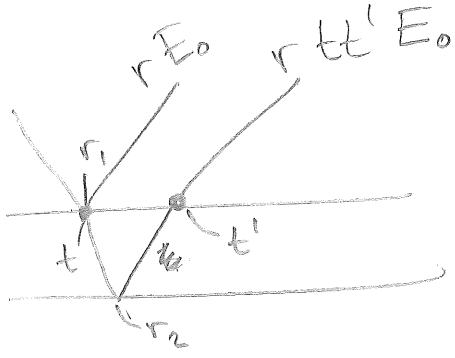
$$n_f = \sqrt{n_g} = \sqrt{1{,}54} = \boxed{1{,}24}$$

$$n_f \cdot d = \frac{\lambda_0}{4} = \frac{550\,nm}{4} = 112{,}5\,nm$$

$$\Rightarrow \boxed{d = 110\,nm}$$

b) $$r = \frac{n_1 - n_2}{n_1 + n_2} = \boxed{-0{,}055}$$

5% reflektans med fasskifte

c) 

Stokes relation

$$tt' = 1 - r^2$$

$$E_{tot} = r_1 E_0 - r_2(1 - r_1^2) E_0$$

enär fasförskj

Exo 2

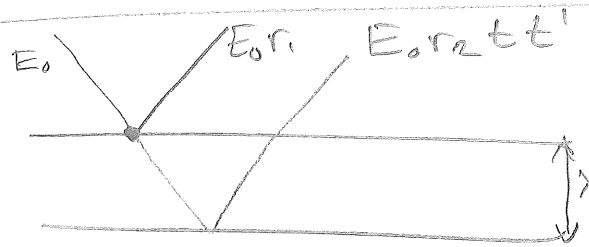
$$I_{tot} = E_0^2 \left(r_1 - r_2 (1 - r_1^2) \right)^2 = 1$$

$$r_1 = \frac{1 - 1{,}38}{1 + 1{,}38} = 0{,}16$$

$$r_2 = \frac{1{,}38 - 1{,}54}{1{,}38 + 1{,}54} = 0{,}05$$

$$R = \frac{I_{tot}}{I_0} = \boxed{0{,}11}$$

c)



1,0

$n = 2{,}1$

$n = 1{,}5$

$$E_{tot} = E_0 \left(r_1 + r_2 (1 - r_1^2) \right)$$

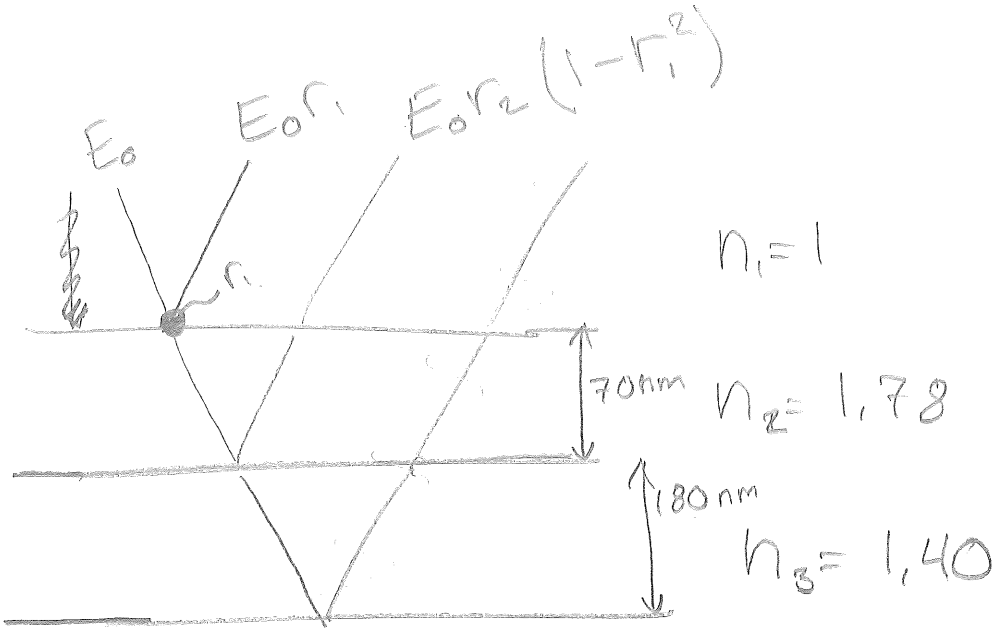
$$r_1 = \frac{1 - 2{,}1}{1 + 2{,}1} = 0{,}3548$$

$$I_{tot} = E_0^2 \, 0{,}24$$

$$r_2 = \frac{2{,}1 - 1{,}5}{2{,}1 + 1{,}5} = 0{,}17$$

$$\boxed{R = 0{,}25}$$

7.8



$$n_2 \cdot 2 \cdot 70 = \left(m + \frac{1}{2}\right)\lambda$$

$$\lambda = \frac{140 \cdot 1,78}{1/2} = \boxed{498,4\,nm}$$