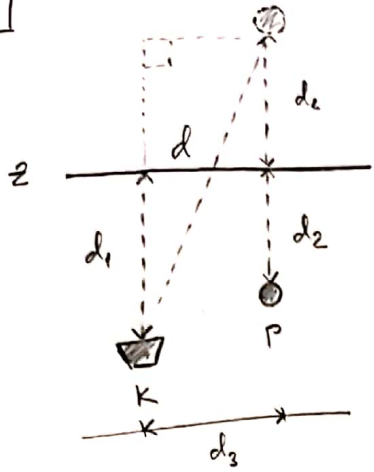


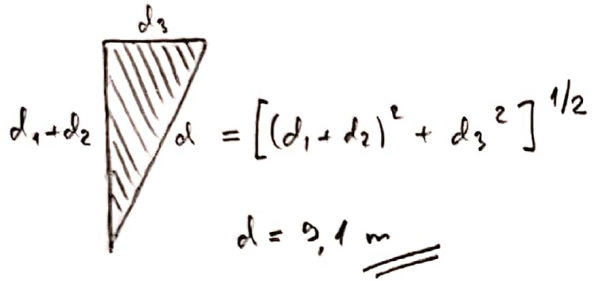
1



$d_3 = 5 \text{ m}$   
 $d_1 = 4,3 \text{ m}$  (KAMERA - ZRCALO)  
 $d_2 = 3,3 \text{ m}$  (PTICA - ZRCALO)  


---

 $d = ?$



2

$R_s = 6,96 \cdot 10^8 \text{ m}$   
 $D_s = 1,5 \cdot 10^{-3} \text{ m} = b \rightarrow$  UDAJENOST OD SUNCA DO ZEMLJE!  
 $f = 0,2 \text{ m}$

DESNADEGA TANKE LECE: (a - UDAJENOST SLIKE, b - UDAJENOST PREDMETA)

$\frac{1}{a} + \frac{1}{b} = \frac{1}{f}$  ,  $\frac{1}{b} \rightarrow 0$  JER b VRLO VELIK

$f \approx a$  (1)

UVECANJE:

$m = \frac{a}{b} = \frac{f}{b}$

$m = \frac{d_s}{d_p} \rightarrow$  PROMER SLIKE  
 $\rightarrow$  PROMER PREDMETA

$\Rightarrow \frac{d_s}{d_p} = \frac{f}{b}$

$d_s = d_p \cdot \frac{f}{b}$

$\downarrow$   
 PREDMET SE SUNCE  
 PA SE  $d_p = 2 \cdot R_s$

$d_s = 2R_s \cdot \frac{f}{b}$

$d_s = 1,86 \cdot 10^{-3} \text{ m} = 1,86 \text{ mm}$

$$\boxed{3} \quad d = 40 \text{ cm}$$

$$h_o = 2h_I$$

$$\underline{\quad}$$
$$a = ?$$

$$f = ?$$

SLIKA JE REALNA

$\Rightarrow$  LEĆA JE KONVEKSNJA

$m < 0$  (NEGATIVNA)

$$m = -\frac{1}{2} \rightarrow \text{SLIKA JE DUPLO MANJA}$$

$$m = -\frac{a}{b} = -\frac{1}{2} \Rightarrow b = 2a \quad (2)$$

(2)  $\rightarrow$  (1)

$$a + 2a = d \Rightarrow a = \frac{d}{3} = \frac{40}{3} \quad (3)$$

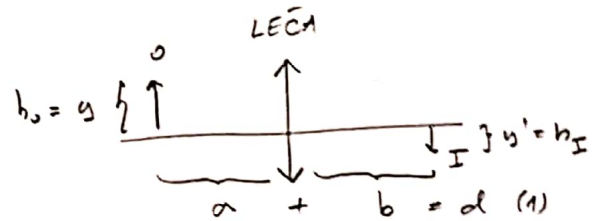
$$a = 13,34 \text{ cm} //$$

$$\frac{1}{a} + \frac{1}{b} = \frac{1}{f}$$

$$\frac{b+a}{ab} = \frac{1}{f} \Rightarrow f = \frac{ab}{a+b} \quad (4)$$

(2)  $\rightarrow$  (4)

$$f = \frac{a \cdot 2a}{a + 2a} = \frac{2a^2}{3a} = \frac{2 \cdot \left(\frac{40}{3}\right)^2}{3 \cdot \frac{40}{3}} = 8,89 \text{ cm} //$$



4)  $v_1 = 2L$  } ODREĐENO  
 $v_2 = 4L$  } 18 SKICE  $\lambda = 620 \text{ nm}$

$\Delta v = v_2 - v_1 = 2L \rightarrow$  RAZLIKA JE JEDNAKA DODATKOM PUTU KOJI  
 PREDJE  $v_2$  U ODNOSU NA  $v_1$

- RAZLIKA U FAZI ZNAČI  $\delta = 180^\circ = \pi$

↳ TO POSTIŽEMO TAJO DA  $v_2$  "KASNI" NEKA VALNE DULJINE ZA  $v_1$  (1. PUT)

$\rightarrow \Delta v = \frac{\lambda}{2}$

a)  $2L = \frac{\lambda}{2} \Rightarrow \underline{L = \frac{\lambda}{4} = \frac{620}{4} = 155 \text{ nm}}$

b) SADA SU ZRCALI UDALJENA ZA  $L = 155 \text{ nm}$

- DESTRUKTIVNA INTERFERENCIJA DOGODIT ĆE SE PONOV AKO

$v_2$  "KASNI"  $\frac{3}{2}\lambda$  ZA  $v_1$

$\Rightarrow \frac{3\lambda}{2} = 2L'$

$\underline{L - L' = \frac{3\lambda}{4} - \frac{\lambda}{4} = \frac{\lambda}{2} = \frac{620}{2} = 310 \text{ nm}}$

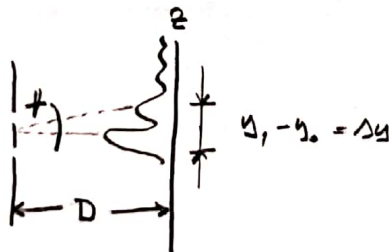
5)

$D = 50 \text{ cm} = 500 \text{ mm}$

$m = 1$

$d = 100 \mu\text{m}$

$\theta, y_1 = ?$



a)  $\theta_1 = \sin^{-1} \frac{m\lambda}{d} = \frac{1 \cdot \lambda}{100\lambda} = 0,01 \text{ rad}$

b)  $y_1 = D \tan \theta_1 = 500 \cdot \tan(0,01) = 5 \text{ mm}$

$\Delta y = y_1 - y_0 = 5 \text{ mm} - 0 = 5 \text{ mm}$

$$\boxed{6} \quad d = 2m$$

$$\lambda = 0,5m$$


---


$$N = ?$$

UVIDET MAKSIMUMA  $d \sin \theta = m \lambda$

$$\Rightarrow \theta = 0,25m$$

- TRAŽIMO  $m$  ZA KOJE JE  $|0,25m| \leq 1$

- TO SU  $0, \pm 1, \pm 2, \pm 3, \pm 4$

- ZA SVAKU OD  $m$ -OVA POSTOJE DVA VEŠTAČKA KUTANJA  $\theta$ , OSIM ZA  $+4$ ;  $-4$

$\Rightarrow$  16 RAZLIČITIM  $\theta$  UKUPNO I 2NOG TOGA

$\theta = -50^\circ$      $\theta = +50^\circ$

16 MAKSIMUMA!

$$\boxed{7} \quad \theta = 90^\circ \quad r_A = 100 + r_B \quad \lambda_A = \lambda_B = 400m$$

$$\theta = ?$$

- INICIJALNO, A PRED PRED B ZA  $90^\circ$ , ŠTO JE  $\frac{1}{4} \lambda$  (1)

- KO, IZVOR A UDALJEN JE ZA 100m VIŠE OD IZVORA B, DAKLE  $\frac{100m}{400m} = \frac{1}{4} \lambda$  (2)

(1) = (2)

KONAČNA RAZLIKA U FAZI  $\theta = 0$ !

$$\boxed{8} \quad N = 792$$

$$d = 0,233 \cdot 10^{-3}m$$


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$$\lambda = ?$$

- ROKAK JEDNE TRUKE ODGOVARA PROMJENI U OPTIČKOM PUTU OD JEDNE VALNE DULJINE  $\rightarrow$  KADA SE ZRCALO  $M_2$  POMAKNE ZA  $d$ , OPTIČKI PUT SE PROMJENI ZA  $2d$ , BUDUĆI DA SVJETLOST PROĐE DVA PUTA DULJINE TRUKE

- MEKA JE  $N$  BROJ PROMJENA TRUKE  $\Rightarrow 2d = N \lambda$

$$\lambda = \frac{2d}{N} = \frac{2 \cdot 0,233 \cdot 10^{-3}}{792} = 5,88 \cdot 10^{-2}m$$

9

RABLIKA RUTEVA KOJE PREDU PRAVA 1 i 2

$$\Delta x = 7d - 2d = 5d$$

PA BI DOŠLO DO PUNAICA U FAZI  $5d = \frac{\lambda}{2} \Rightarrow d = \frac{\lambda}{10} = 50 \text{ nm}$

10

$$m_1 = 1 \quad \Delta y = 0,35 \text{ mm}$$

$$m_2 = 5 \quad D = 40 \text{ cm}$$

$$\lambda = 550 \text{ nm}$$

$$a = ?$$

$$\Delta y = D \Delta \sin \theta = \Delta \frac{m \lambda}{a} = \frac{D \lambda}{a} \Delta m = \frac{D \lambda}{a} (m_2 - m_1)$$

$$\Rightarrow a = \frac{D \lambda (m_2 - m_1)}{\Delta y} = 2,15 \cdot 10^{-3} \text{ m}$$

11

$$\lambda = 525 \text{ nm} \quad a = 1 \text{ mm}$$

$$D = 3 \text{ m} \quad \Delta y = ?$$

$$m = 1, 2$$

UVJET MINIMUMA  $a \sin \theta = m \lambda$

$$1. \left\{ \begin{aligned} \theta_1 &= \sin^{-1} \frac{1 \cdot \lambda}{a} = 5,89 \cdot 10^{-4} \text{ rad} \\ y_1 &= D \tan \theta_1 = 1,76 \cdot 10^{-3} \text{ m} \end{aligned} \right.$$

$$2. \left\{ \begin{aligned} \theta_2 &= \sin^{-1} \frac{2 \cdot \lambda}{a} = 1,178 \cdot 10^{-3} \text{ rad} \\ y_2 &= D \tan \theta_2 = 3,524 \cdot 10^{-3} \text{ m} \end{aligned} \right.$$

$$\Delta y = y_2 - y_1 = 1,77 \cdot 10^{-3} \text{ m}$$