

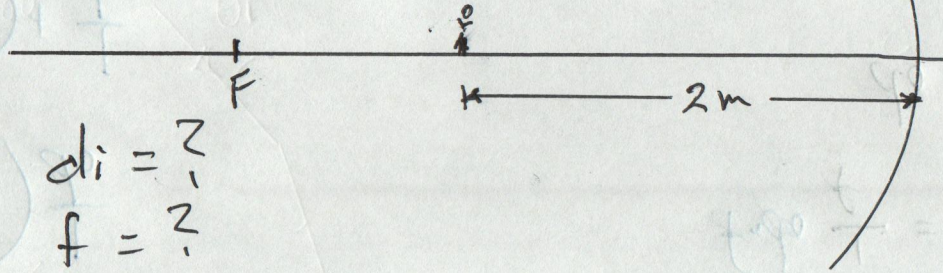
P. 70
11.

$$M = 3$$
$$d_o = 2m$$

HRHS Physics

June 9, 2020

①



$$d_i = ?$$
$$f = ?$$
$$R = ?$$

$$M = \frac{h_i}{h_o} = \frac{-d_i}{d_o}$$

$$\frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_o}$$

$$f = \frac{R}{2}$$

$$d_i = -M d_o = -(3)(2m) = -6m$$

$$f = \left(\frac{1}{d_i} + \frac{1}{d_o} \right)^{-1} = \left(\frac{1}{-6m} + \frac{1}{2m} \right)^{-1}$$

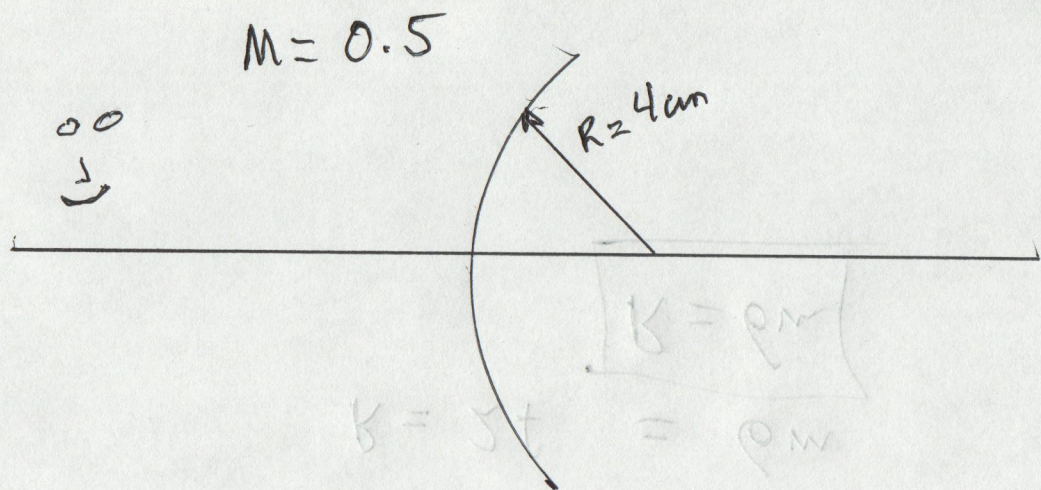
$$f = 3m$$

$$R = 2f = 6m$$

$$\boxed{R = 6m}$$

$W = 0.2$

⑤



$$M = \frac{h_i}{h_o} = -\frac{d_i}{d_o}$$

$$\frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_o}$$

$$f = \frac{R}{2}$$

$$f = \frac{4\text{cm}}{2} = 2\text{cm}$$

$$d_o = ?$$

$$\frac{1}{d_o} = \frac{1}{f} - \frac{1}{d_i} \quad d_o = \left(\frac{1}{f} - \frac{1}{d_i} \right)^{-1}$$

$$d_i = -M d_o \quad \frac{1}{f} = \frac{1}{-M d_o} + \frac{1}{d_o} = \left(\frac{1}{-M} + 1 \right) \frac{1}{d_o}$$

$$\left(\frac{1}{-M} + 1 \right) \frac{1}{d_o}$$

$$\frac{1}{f} = \left(1 - \frac{1}{M} \right) \frac{1}{d_o} \cdot f d_o$$

$$d_o = \left(1 - \frac{1}{M} \right) f$$

$$= \left(\frac{1}{-M} + 1 \right) \frac{1}{d_o}$$

$$= \frac{1}{-M d_o} + \frac{1}{d_o}$$

$$d_o = \left(1 - \frac{1}{0.5} \right) (2\text{cm}) \quad d_o = -2\text{cm}$$

$$\frac{1}{f} = \left(\frac{1}{-m} + 1 \right) \frac{1}{d_o}$$

$$\frac{1}{f} = \left(\frac{1}{-m} \left(\frac{-1}{-1} \right) + 1 \right) \frac{1}{d_o}$$

$$\frac{1}{f} = \left(\frac{-1}{m} + 1 \right) \frac{1}{d_o}$$

$$\frac{1}{f} = \left(1 - \frac{1}{m} \right) \frac{1}{d_o}$$

$$(f d_o) \frac{1}{f} = \left(1 - \frac{1}{m} \right) \frac{1}{d_o} (f d_o)$$

$$d_o = \left(1 - \frac{1}{m} \right) f$$

$$N_s = 1.5d$$

$$N_s = \frac{2 \cdot \theta \cdot d_o}{V_s \cdot 2 \cdot m \cdot \theta}$$

$$N_s = 5$$

$$\theta = 10^\circ, \theta' = 30^\circ$$

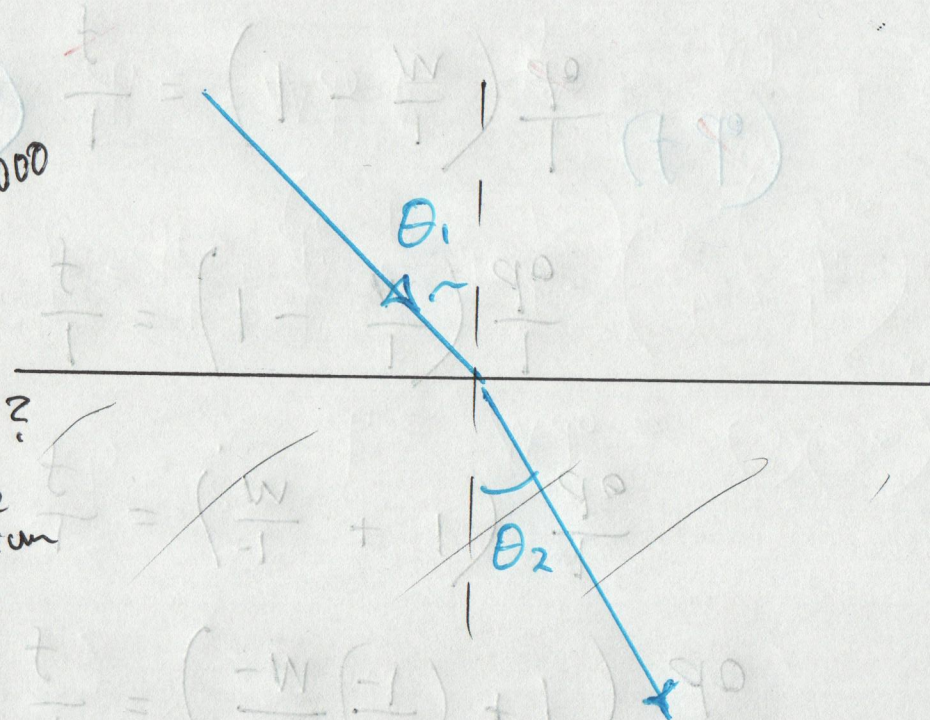
Velocity of Light in a medium (not vacuum)

$$v = \frac{c}{n}$$

P. 86
a.

$n_1 = 1.000$

$n_2 = ?$
Some medium



$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

a) ~~40°~~
 $\theta_1 = 40^\circ, \theta_2 = 30^\circ$

~~$n_2 = ?$~~ $n_2 = ?$

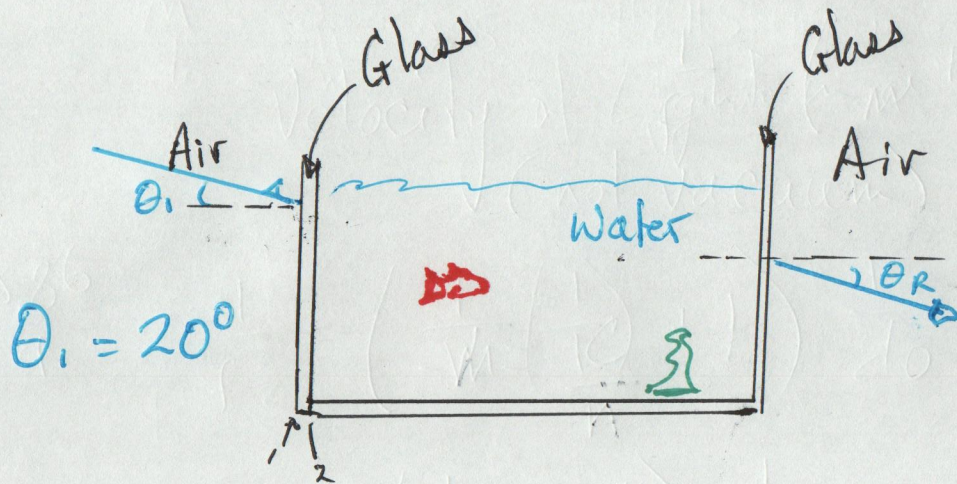
$$n_2 = \frac{n_1 \sin \theta_1}{\sin \theta_2}$$

$$= \frac{(1.000) \sin 40^\circ}{\sin 30^\circ}$$

$n_2 = 1.29$

- b) 2.4
- c) 1.27

p. 86
10



Interfaces

- ① Air \rightarrow Glass $n_1 = 1.000, 1.50$
- ② ~~Water \rightarrow~~ Glass \rightarrow Water $1.50 \rightarrow 1.33$
- ③ ~~Water \rightarrow~~ Water \rightarrow Glass $1.33 \rightarrow 1.50$
- ④ Glass \rightarrow Air $1.50 \rightarrow 1.000$

$$\textcircled{1} \sin \theta_2 = \frac{n_1 \sin \theta_1}{n_2}$$

$$\theta_2 = \arcsin\left(\frac{n_1 \sin \theta_1}{n_2}\right)$$

$$= \arcsin\left(\frac{1.000 \sin 20^\circ}{1.50}\right)$$

$$\theta_2 = 13.1801^\circ$$

$$\textcircled{2} \theta_2 = 14.9015^\circ$$

$$\textcircled{3} 13.1801^\circ$$

$$\textcircled{4} \theta_R = 20^\circ$$

5