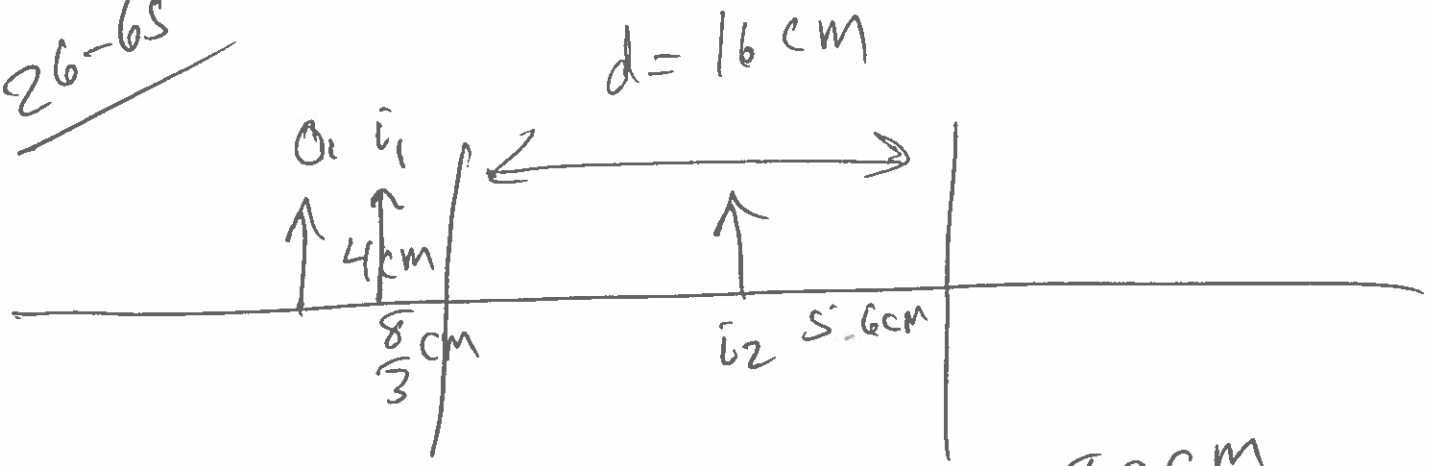
26-65



$f_1 = -8.0\ cm$ $\quad f_2 = -8.0\ cm$

$O_1 = 4.0\ cm \quad i_1 = ?$

$$\frac{1}{i_1} = \frac{1}{f_1} - \frac{1}{O_1} = \frac{1}{-8.0\ cm} - \frac{1}{4.0\ cm}$$

$$\frac{1}{i_1} = \frac{-1-2}{8.0\ cm} = \frac{-3}{8.0\ cm}$$

$$i_1 = \frac{-8.0}{3}\ cm$$

$$O_2 = d - D_1 = 16\ cm - \left(-\frac{8}{3}\ cm\right)$$

$$O_2 = \frac{56}{3}\ cm$$

$$\frac{1}{i_2} = \frac{1}{f_2} - \frac{1}{o_2} = \frac{1}{-8.0\,cm} - \frac{3}{56\,cm}$$

$$\frac{1}{i_2} = \frac{-7-3}{56\,cm} = \frac{-10}{56\,cm}$$

$$i_2 = \frac{-56\,cm}{10} = \boxed{-5.60\,cm}$$

How Verse? $M_T = M_1 M_2$

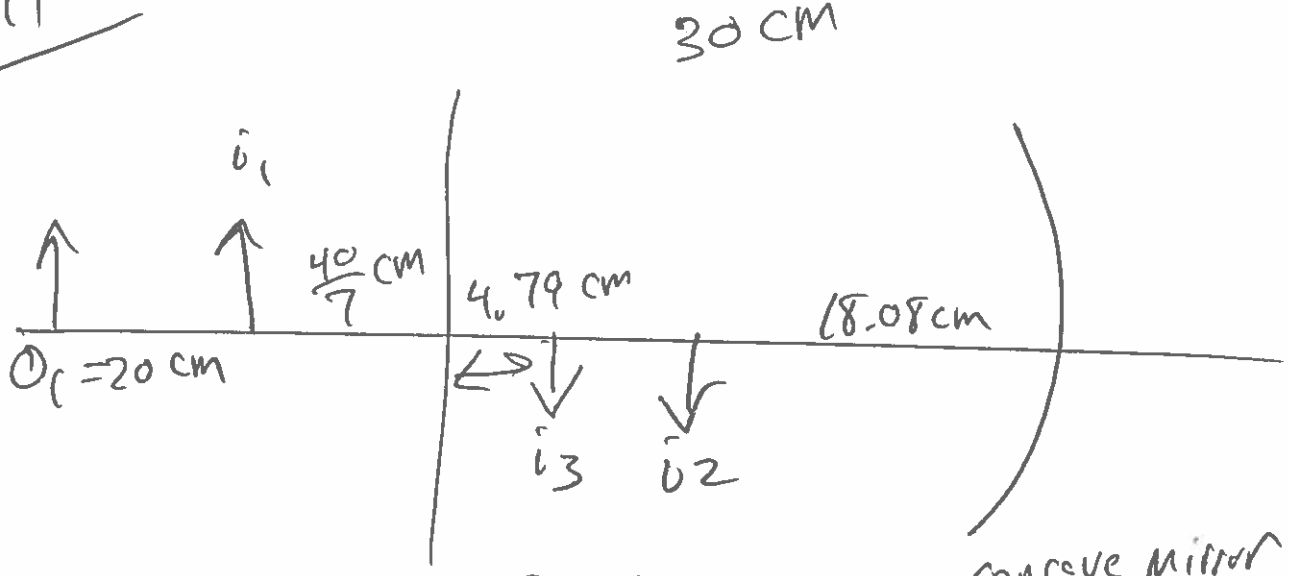
$$M_1 = \frac{-i_1}{o_1} = \frac{-(-8/3\,cm)}{4\,cm} = 2/3$$

$$M_2 = \frac{-(-56/10\,cm)}{56/3\,cm} = \frac{3}{10}$$

$$M_T = \left(\frac{2}{3}\right)\left(\frac{3}{10}\right) = \frac{2}{10} = \left(\frac{1}{5}\right)$$

Final image is virtual located 5.60cm to left of second diversing lens. It is upright and smaller ($\frac{1}{5}$ the size).

26-71



Find first image

$$\frac{1}{i_1} = \frac{1}{f_1} - \frac{1}{O_1} = \frac{1}{-8.0\text{cm}} - \frac{1}{20\text{cm}}$$

$$\frac{1}{i_1} = \frac{-5-2}{40\text{cm}} = \frac{-7}{40\text{cm}} \Rightarrow i_1 = \frac{-40\text{ cm}}{7}$$

$$O_2 = d - i_1 = 30\text{cm} - \left(\frac{-40}{7}\right)\text{cm} = \frac{210\text{cm} + 40\text{cm}}{7}$$

$$O_2 = \frac{250\text{ cm}}{7}$$

$$\frac{1}{i_2} = \frac{1}{f_2} - \frac{1}{O_2} = \frac{1}{12.0\text{cm}} - \frac{7}{250\text{cm}}$$

$$\frac{1}{i_2} = 0.0833\ cm^{-1} - 0.0280\ cm^{-1}$$

$$\frac{1}{i_2} = 0.0553\ cm^{-1}$$

$$i_2 = \frac{1}{0.0553\ cm^{-1}} = 18.08\ cm$$

$$o_3 = d - i_2 = 30\ cm - 18.08\ cm$$

$$o_3 = 11.92\ cm$$

$$\frac{1}{i_3} = \frac{1}{f_1} - \frac{1}{o_3} = \frac{1}{-8\ cm} - \frac{1}{11.92\ cm}$$

$$\frac{1}{i_3} = -0.125\ cm^{-1} - 0.0839\ cm^{-1}$$

$$\frac{1}{i_3} = -0.2089\ cm^{-1}$$

$$i_3 = \frac{-1}{0.2089\ cm^{-1}} = -4.79\ cm$$

True final image is virtual inverted located 4.79 cm on Right side of diversing lens.