**Physics 2220**
**Spring 2004**
**George A. Williams**

# SIXTH MIDTERM

**4**

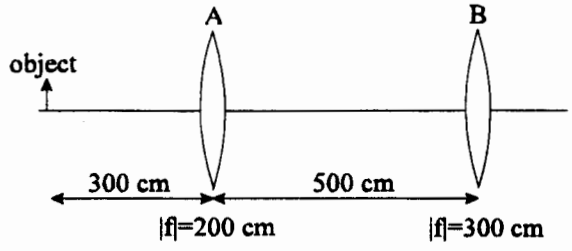
Name:_____

Discussion Instructor (circle): Billeter Blake Gillman Herring

Student ID #:_____

**SHOW ALL WORK!!!!!**
**REPORT ALL NUMBERS TO THREE SIGNIFICANT FIGURES!**
**Use the conversion constants and data given on the front page.**

Given the lens set-up shown, you supply the sign of the focal length from the drawing.




(a) Calculate the position of the final image measured from lens B. (+ to the right; - to the left.)
(b) Calculate the magnification of the system.
(c) Is the final image real or virtual? State your reasoning.
(d) Is the final image erect or inverted? State your reasoning.

(a) for lens A. $\frac{1}{f_A} = \frac{1}{l_1} + \frac{1}{l_1'}$ 3'

$f_A = 200\,cm$

$l_1 = 300\,cm$

$\therefore l_1' = 600\,cm$ 2'

for lens B. $\frac{1}{f_B} = \frac{1}{l_2} + \frac{1}{l_2'}$ 3'

$f_B = +300\,cm$

$l_2 = -100\,cm$

$l_2' = 75\,cm$ 2'

(b) $M = M_1 \times M_2$ 2'

$M_1 = \frac{-l_1'}{l_1}$ 2'

$M_2 = \frac{-l_2'}{l_2}$

$M = \frac{l_1' l_2'}{l_1 l_2} = \frac{600 \times 75}{300 \times (-100)} = -1.5$ 1'

(c) The image is real. because $l_2' > 0$
3' 2'

(d) The image is inverted, because $M < 0$
3' 2'