

34 - class 16 45
 157, 60, 63, old exam

45: $\frac{1}{s} + \frac{1}{20.4} = \frac{1}{200}$ $s = 1.02 \times 10^4 \text{ mm} = 10.2 \text{ m}$

57 $\frac{1}{s} + \frac{1}{-25} = \frac{1}{8}$ $s = 6.06$
 $M = -\frac{s'}{s} = \frac{25}{6.06} = 4.125 \rightarrow 4.125 \text{ mm}$

note: ansula mag = $\frac{25}{8} + 1 = 4.125$ \leftarrow note generally the same - eg for relaxed eye $s' = \infty$ so $M = \infty$

60 $\left. \begin{array}{l} 160 \text{ mm} \\ s' = 165 \\ s = ? \\ f = 5 \end{array} \right\}$ $\frac{1}{s} + \frac{1}{165} = \frac{1}{5} \Rightarrow s = 5.156$
 $M = -\frac{s'}{s} \frac{25}{f_e} = -\frac{165}{5.156} \frac{25}{2.6} = 308$

$\frac{\Delta h'}{f_e} = \frac{.01 \text{ cm}}{25 \text{ cm}}$ $\Delta h = \frac{s}{s'} \Delta h' \rightarrow \frac{5.156}{165} 26 \text{ mm} \frac{.01}{25} = 3.25 \times 10^{-4} \text{ mm} = .3 \mu\text{m}$

63 $\text{sep} = f_o + f_e = .65 + .011 = .661 \text{ m}$
 $\text{mag} = \frac{f_o}{f_e} = \frac{.65}{.011} = 59.1$

old exam $s': ?$ $\frac{1}{s'} + \frac{1}{s} = \frac{1}{f}$
 $s = .51$ $f = .5$ $s' = 25.5 \rightarrow s$ for eyepiece = 1.5

unaided: $\theta = \frac{1 \mu\text{m}}{25 \text{ cm}} = 4 \times 10^{-6} \text{ rad} = 2.3 \times 10^{-4} \text{ } ^\circ$
 $\frac{1}{1.5} + \frac{1}{s'} = \frac{1}{1.6}$ $s' = -24 \text{ cm}$ (approx near point)
 angle size = $1 \mu\text{m} \cdot \frac{25.5}{.51}$
 $\frac{3.33 \times 10^{-3} \text{ rad}}{1.5 \text{ cm}} = .19^\circ$

ratio of angle = $\frac{833}{1}$

image of objective is real, inverted
 image of eyepiece is virtual, upright } inverted overall