EE2190 Quiz 5, Spring 2004

Show your work for full credit. Express ALL answers in MKS (meters, kilograms, seconds).

1. Describe (erect or inverted, real or virtual, minified or magnified) and locate the image (relative to the vertex of the mirror) of an object 50 cm away from a convex spherical mirror with $f = -40$ cm.

\[
\frac{1}{s_o} + \frac{1}{s_i} = \frac{1}{f}
\]

\[
\frac{1}{s_o} + \frac{1}{s_i} = -\frac{1}{4}
\]

\[
\Rightarrow \quad s_i = -0.22 \text{ m}
\]

\[
\therefore \quad \text{Virtual (} s_i < 0 \text{)} \quad \text{erect (} M_T = -\frac{s_i}{s_o} > 0 \text{)} \quad \text{minified}
\]

2. At what distance in front of a concave spherical mirror with focal length of 10 cm would an object have to be placed in order to produce an erect image which is 1.5 times as large?

\[
M_T = -\frac{s_i}{s_o} \quad \Rightarrow \quad s_i = -1.5 s_o
\]

\[
\frac{1}{s} = \frac{1}{s_o} + \frac{1}{s_i} \quad \Rightarrow \quad s_o = \frac{3.3 \text{ cm}}{0.033 \text{ m}}
\]