617.

Problem 44.23 (RHK)

An illuminated slide is mounted 44 cm *from a screen. We have to find how far a lens of focal length* 11 cm *has to be placed in order to obtain a focussed image on the screen.*

Solution:

Let the distance of the lens from the screen when a sharp image of the object is formed on the screen be x cm. As the image is real and is formed on the R-side of the lens, the image distance will be positive and will be equal to x, that is $i = x$. The object distance, o, will be $(44 - x)$ cm. Substituting the values of o, i, $f\ (= 11\ \text{cm})$ in the thin lens formula

$$\frac{1}{o} + \frac{1}{i} = \frac{1}{f},$$

we get the equation

$$\frac{1}{44-x}+\frac{1}{x}=\frac{1}{11},$$

or

$$x^2-44x+22^2=0,$$

or

$$\left(x-22\right)^2=0,$$

and

$x=22$ cm.