

627.

Problem 44.40 (RHK)

The focal length of a small camera is 50 mm and the focusing range extends from 1.2 m out to infinity. We have to find the range of movement necessary between lens and film.

Solution:

When light from infinity is focussed on the film, the separation between the lens and the film is the focal length f , which is 50 mm. For focussing an object at a distance of 1.2 m from the lens, let the distance between the lens and the film be i m. From the thin lens formula, we have

$$\frac{1}{1.20 \text{ m}} + \frac{1}{i} = \frac{1}{0.05 \text{ m}},$$

or

$$i = \frac{0.05 \times 1.2}{1.15} \text{ m} = 0.05217 \text{ m} = 52.2 \text{ mm}.$$

Therefore, the range of movement necessary between lens and film for focussing range from 1.2 m to infinity

by a camera of focal length 50 mm will be 52.2 mm to 50 mm.

