Answer on Question #75514-Physics Optics

An object of size 2 cm is placed 54 cm from a screen. A convex lens of focal length 12 cm is placed between the two such that the image of the object forms on the screen. Find the two possible positions of the lens.

Solution

$$v - u = 54$$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\frac{1}{12} = \frac{1}{u + 54} - \frac{1}{u}$$

$$u^2 + 54u + 648 = 0$$

$$u_1 = -36\ cm$$

$$u_2 = -18\ cm$$

The two possible positions of the lens are

$$v_1 = 54 - 36 = 18\ cm$$

$$v_2 = 54 - 18 = 36\ cm$$