Exercises 15

Optics (700)

150 points

1. An engineer wishes to image an object $0.01m$ in height that is $0.20m$ in front of a lens and have its image appear on a screen $0.40m$ behind the lens. What focal length lens should they use? How large will the image be?

150 points

2. The engineer now wants to image another different object onto a CCD camera. The pixel pitch of the camera is $10\mu m$ and it has 512×512 pixels. If the object is $0.75m$ in height and $4m$ away from the lens what focal length lens should they use to ensure the object fills 90% of field of view?

200 points

3. If two lenses are placed next to each other and the first has a power of 40 diaopters and the second has a power of 10 diaopters. What is the focal length of the system?

200 points

4. An optical system consists of two lenses. The first has a focal length of $60mm$ and the second has a focal length of $70mm$. If they are separated by $200mm$ find the position of the image after the second lens if the object is placed $200mm$ in front of the first lens.