



QUESTION WORKBOOK

Lenses and images

Waves · Year 12

12 questions · 33 marks

PRINT EDITION

SECTION A · Warm-up

A1 State what is meant by the principal focus and the focal length of a converging lens. [2]

A2 Calculate the power of a converging lens of focal length 40 cm, giving the unit. [2]

A3 State the difference between a real image and a virtual image. [2]

SECTION B · Standard

B1 An object is placed 0.45 m from a converging lens of focal length 0.15 m. Calculate the image distance and the magnification. [3]

- B2** Describe the paths of the three standard construction rays used to locate the image formed by a thin converging lens. [3]

- B3** An object is placed 0.10 m from a converging lens of focal length 0.25 m. Calculate the image position, state the nature of the image, and give its magnification. [4]

- B4** A student covers the top half of a lens with card and predicts the top half of the image will vanish. State and explain what actually happens. [2]

- B5** A diverging lens has a power of -4.0 D. Calculate its focal length. [2]

SECTION C · Stretch

- C1** A lens forms a real image on a screen 0.60 m away when the object is 0.30 m from the lens. Calculate the focal length of the lens. [3]

- C2** A +4.0 D converging lens is placed in contact with a -1.5 D diverging lens. Calculate the power and focal length of the combination. [3]

- C3** A projector lens of focal length 5.0 cm throws a sharp image on a screen 3.0 m away. Calculate the object distance, and the magnification of the image on the screen. [4]

- C4** Explain, in terms of the images they form, why a magnifying glass must hold the object inside the focal length, and what happens to the image as the object slides out towards the focal point. [3]