Light: Reflection, Refraction and Lenses

Waves · 4 questions · step-by-step answers at the end

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USEFUL EQUATIONS

$n = \sin i / \sin r \quad \sin c = 1 / n$

Questions

Show your working in the space under each question.

1. A ray hits a plane mirror at 30° to the mirror surface. What is the angle of reflection?

2. A ray enters a glass block at an angle of incidence of 40° and refracts at 25°. Find the refractive index and the critical angle.

3. A magnifying glass makes a 3 cm insect look 12 cm long. What is the magnification, and is the image real or virtual?

4. How does an optical fibre keep light inside?

Step-by-step answers

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1. The angle of incidence is 90° − 30° = 60°, so the angle of reflection is **60°**.

2. 1. n = sin 40°/sin 25° = 0.643/0.423 = **1.52**.
2. sin c = 1/1.52 = 0.658, so c = **41°**.
Answer: n = 1.52; c = 41°

3. 12/3 = **4**; the image is **virtual** and upright.

4. Light hits the wall at more than the critical angle and is **totally internally reflected**, again and again.