

Assessment Question Set 1

Assume $c = 3 \times 10^8 \text{m/s}$ and $n_{\text{air}} = 1$ for all questions. Give answers to two decimal places.

1. By answering T for true and F for false only, identify the following correct and incorrect statements.

When an object is viewed in a plane mirror.....

- | | |
|--|---|
| A. The image is real and enlarged | F |
| B. The image is real and laterally inverted | F |
| C. The image is virtual and laterally inverted | T |
| D. The image is virtual and upside down. | F |

2. A light ray is incident on a plane mirror at an angle of 40° . If the mirror is rotated by 25° reducing the angle of incidence, what will be the new angle of reflection? 15°

3. In glass, light has a velocity of $1.97 \times 10^8 \text{m/s}$. Calculate the refractive index of glass. 1.52

4. The refractive index of water is 1.33. How fast would light travel in water?
 $2.26 \times 10^8 \text{m/s}$

5. Light travels from air to diamond. Is the refracted ray

- A. Bent towards normal?
B. Bent away from normal?

6. Light travels from glass to air. Is the refracted angle

- A. Greater than
B. The same as
C. Less than

the angle of incidence?

7. A laser beam travels from air to clear plastic. The angle of incidence is 47° and the angle of refraction is 29.84° . Calculate the refractive index of the plastic.
 1.47

8. The refractive index of acrylic plastic is 1.47. If a light ray travels from air to an acrylic block and has an angle of refraction of 35° , calculate the angle of incidence. 57.48°

9. A light ray travels from a medium of refractive index n_1 to a second medium of refractive index 1.52. The angle of incidence is 35° and the angle of refraction 30° . Calculate the refractive index of medium 1. 1.33

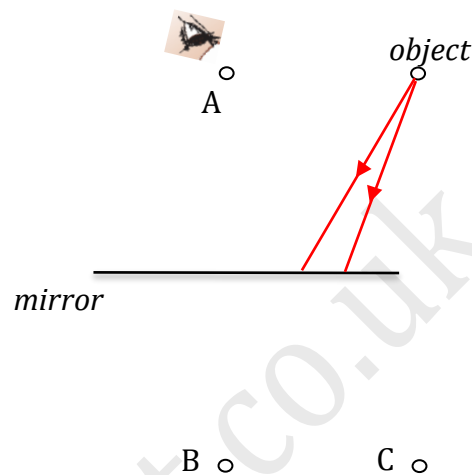
10. A light ray travels through a diamond and encounters the diamond-air interface. Calculate the critical angle above which TIR occurs if the diamond has a refractive index of 2.42. 24.41°

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Assessment Question Set 2

Assume $c = 3 \times 10^8 \text{ m/s}$ and $n_{\text{air}} = 1$ for all questions. Give answers to two decimal places.

1. Consider the diagram showing an object being observed in a plane mirror. Is the image located at position A, B or C? **C**



2. A light ray is reflected from a mirror at 40° as measured from the horizontal surface plane of the mirror. The angle of incidence was

- A. 40°
- B. 50°**
- C. 60°
- D. 30°

3. Light travelling in motor oil has a velocity of $2.14 \times 10^8 \text{ m/s}$. What is the refractive index of motor oil? **1.4**

4. The refractive index of diamond is 2.42. Calculate the velocity of light in diamond. **$1.24 \times 10^8 \text{ m/s}$**

5. Light travels from air to glass. Is the angle of refraction

- A. Greater than
- B. The same as
- C. Less than**

the angle of incidence?

6. A light ray travels from air to water. The angle of incidence is 35° and the angle of refraction is 25.54° . Calculate the refractive index of the water.

1.33

7. The refractive index of acrylic plastic is 1.47. If a light ray travels from air to an acrylic block and has an angle of incidence of 42° , calculate the angle of refraction. 27.08°

8. A light ray travels across an interface from water to glass. Water has a refractive index of 1.33, and glass 1.52. If the angle of refraction was 28° , calculate the angle of incidence at the water-glass interface. 32.45°

9. A light ray travelling from oil to glass strikes the oil-glass interface at an angle of 43° . If the refractive index of the oil is 1.4 and the refractive index of the glass is 1.52, calculate the angle of refraction. 38.91°

10. A light ray travels through water of index 1.33 and is incident at the interface between water and a second transparent medium at an incident angle of 52° . If the ray then travels along the interface between the water and the second medium, what is the refractive index of the second medium? 1.05