Refraction Quiz Answer Key PDF

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Which of the following phenomena involve refraction? (Select all that apply)

A. Rainbows ✓

B. Mirages ✓

C. Echoes

D. Optical illusions in water ✓

What happens when light passes through a medium with a higher refractive index? (Select all that apply)

A. It bends towards the normal ✓

B. It bends away from the normal

C. It slows down ✓

D. It speeds up

In which medium does light travel the fastest?

A. Water

B. Glass

C. Air ✓

D. Diamond

What factors can affect the refractive index of a material? (Select all that apply)

A. Temperature ✓

B. Pressure ✓

C. Wavelength of light ✓

D. Color of the material

Explain how a prism disperses white light into a spectrum of colors.

When white light passes through a prism, it is refracted at different angles due to the varying speeds of different wavelengths of light in the prism material, resulting in the separation of light into its constituent colors, forming a spectrum.

How does the refractive index of a medium affect the speed of light traveling through it?

The speed of light in a medium is inversely proportional to its refractive index, meaning that as the refractive index increases, the speed of light decreases.

Which law describes the relationship between the angles of incidence and refraction?

A. Newton's Law
B. Snell's Law ✓
C. Hooke's Law
D. Ohm's Law

What happens to light when it passes from air into water?

A. It speeds up
B. It slows down ✓
C. It stops
D. It continues at the same speed

What is the term for the angle at which total internal reflection occurs?

A. Incidence Angle
B. Reflection Angle
C. Critical Angle ✓
D. Refraction Angle

Which phenomenon is responsible for the splitting of white light into a spectrum of colors through a prism?

A. Reflection
B. Diffraction
C. Dispersion ✓

D. Polarization

What type of lens converges light rays to a focal point?

A. Diverging lens
B. Converging lens ✓
C. Bi-focal lens
D. Concave lens

Which of the following are applications of refraction? (Select all that apply)

A. Lenses in eyeglasses ✓
B. Fiber optics ✓
C. Solar panels
D. Prisms ✓

Discuss how temperature and pressure can influence the refractive index of a gas.

The refractive index of a gas decreases with increasing temperature and increases with increasing pressure.

What is the significance of the critical angle in fiber optics technology?

The critical angle is significant in fiber optics technology as it determines the angle at which light must strike the core-cladding interface to ensure total internal reflection, thereby allowing light to be transmitted efficiently through the fiber.

Why does a straw appear bent when placed in a glass of water?

The straw appears bent due to the refraction of light as it passes from air into water.

Describe the role of refraction in the functioning of eyeglasses.

Eyeglasses function by using lenses that refract light to compensate for vision problems, such as nearsightedness or farsightedness, ensuring that images are focused properly on the retina.

Which of the following statements about Snell's Law are true? (Select all that apply)

A. It relates the angles of incidence and refraction ✓
B. It applies only to light traveling in a vacuum
C. It involves the refractive indices of two media ✓
D. It can be used to calculate the speed of light in a medium ✓

Which of the following materials has the highest refractive index?

A. Air
B. Water
C. Diamond ✓
D. Glass

Which of the following are true about total internal reflection? (Select all that apply)

A. It occurs when light travels from a denser to a less dense medium ✓
B. It requires the angle of incidence to be greater than the critical angle ✓
C. It results in light being completely reflected within the denser medium ✓
D. It can occur when light travels from air to water

What is refraction?

A. The bending of light as it passes through a medium ✓
B. The reflection of light off a surface
C. The absorption of light by a material
D. The scattering of light in different directions