1. Which model describes light as a stream of particles?

a) Ray model
b) Wave model
c) Particle model
d) Photon model

Answer: c) Particle model

Explanation: The particle model of light describes light as a stream of particles called photons, each carrying energy and momentum.

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2. In which medium does light propagate through a cylindrical dielectric rod?

a) Vacuum
b) Air
c) Dielectric material
d) Metal

Answer: c) Dielectric material

Explanation: Light propagates through a cylindrical dielectric rod, such as glass or plastic, due to the differences in refractive indices between the core and cladding.

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3. What model of light propagation considers light as bending and reflecting according to the laws of reflection and refraction?

a) Ray model
b) Particle model
c) Quantum model
d) Wave model

Answer: a) Ray model

Explanation: The ray model of light propagation considers light as bending and reflecting according to the laws of reflection and refraction without considering the wave nature of light.

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4. Which model of light propagation treats light as an electromagnetic wave?

a) Particle model
b) Photon model
c) Wave model
d) Ray model

Answer: c) Wave model

Explanation: The wave model of light propagation treats light as an electromagnetic wave, where it exhibits phenomena such as interference, diffraction, and polarization.

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5. What determines the different types of optical fibers?

a) Core material
b) Cladding material
c) Numerical aperture
d) All of the above

Answer: d) All of the above

Explanation: The different types of optical fibers are determined by various factors including the core material, cladding material, and numerical aperture, which affect their optical properties and applications.

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6. Modal analysis of a fiber optic system involves studying:

a) Light-matter interaction
b) Different modes of light propagation
c) Photon absorption
d) Ray tracing

Answer: b) Different modes of light propagation

Explanation: Modal analysis of a fiber optic system involves studying the different modes of light propagation within the optical fiber, which are determined by factors such as core size, refractive index profile, and wavelength.

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7. What fundamental principle guides the structure and operation of optical fibers?

a) Newton’s laws of motion
b) Maxwell’s equations
c) Ohm’s law
d) Boyle’s law

Answer: b) Maxwell’s equations

Explanation: Maxwell’s equations describe the behavior of electromagnetic waves, including light, and are fundamental to understanding the structure and operation of optical fibers.

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8. Which optical law describes the bending of light as it passes from one medium to another?

a) Snell’s law
b) Ohm’s law

c) Kepler’s law
d) Hooke’s law

Answer: a) Snell’s law

Explanation: Snell’s law describes the bending of light as it passes from one medium to another, relating the angles of incidence and refraction to the refractive indices of the two media.

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9. What property of optical fibers allows them to guide light efficiently?

a) Total internal reflection
b) Magnetic permeability
c) Electric resistance
d) Elastic modulus

Answer: a) Total internal reflection

Explanation: Optical fibers guide light efficiently through the principle of total internal reflection, where light undergoes reflection at the core-cladding interface, ensuring minimal loss of signal.

10. What aspect of optical fibers does the numerical aperture measure?

a) Light intensity
b) Light wavelength
c) Light acceptance angle
d) Light polarization

Answer: c) Light acceptance angle

Explanation: The numerical aperture of an optical fiber measures its light acceptance angle, representing the maximum angle at which light can enter the fiber and still be guided effectively.

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