

Advanced High School Physics Challenge

Physics · Answer Key · 8 Questions

1. What fundamental property is shared by all electromagnetic waves when traveling through a vacuum?

- A) They have the same frequency.
- B) They have the same amplitude.
- C) They travel at the speed of light.**
- D) They have the same wavelength.

2. The photoelectric effect demonstrates that light exhibits which of the following properties?

- A) Wave interference
- B) Diffraction
- C) Particle-like behavior**
- D) Refraction

3. What phenomenon occurs when waves, such as light or sound, spread out as they pass through an opening or around an obstacle?

- A) Refraction
- B) Reflection
- C) Diffraction**
- D) Polarization

4. Which type of radioactive decay involves the emission of an electron (beta-minus particle) from the nucleus?

- A) Alpha decay
- B) Beta decay**
- C) Gamma decay
- D) Positron emission

5. The Second Law of Thermodynamics states that in an isolated system, which quantity tends to increase over time?

- A) Internal energy
- B) Enthalpy
- C) Entropy**
- D) Gibbs free energy

6. According to Einstein's special theory of relativity, what effect does high relative speed have on time for a moving object as observed from a stationary frame of reference?

- A) Time speeds up
- B) Time slows down**
- C) Time stops
- D) Time remains constant

7. The Heisenberg Uncertainty Principle states that it is impossible to simultaneously know with perfect accuracy both the position and what other property of a particle?

- A) Temperature
- B) Charge
- C) Momentum**
- D) Spin

8. What phenomenon describes the restriction of the oscillation direction of transverse waves, typically light, to a single plane?

- A) Dispersion
- B) Scattering
- C) Polarization**
- D) Absorption