



Newton's Corpuscular Theory of Light

Checklist statement

✓

I can compare Newton's corpuscular theory of light with Huygens' wave theory in general terms.

I can explain why Newton's corpuscular theory of light was preferred at the time.

Significance of Young's Double-Slit Experiment

Checklist statement

✓

I can explain the formation of fringes in Young's double-slit experiment in general terms.

I can explain why acceptance of Huygens' wave theory of light was delayed.

Electromagnetic Waves

Checklist statement

✓

I can describe the nature of electromagnetic waves.

I can apply $c = \frac{1}{\sqrt{\mu_0 \epsilon_0}}$, define all terms and know their standard units.

I can explain that ϵ_0 relates electric field strength to a charged object in free space.

I can explain that μ_0 relates magnetic flux density to a current-carrying wire in free space.

I can describe Hertz's discovery of radio waves, including measurements of their speed.

I can describe Fizeau's determination of the speed of light and explain its significance.

The Discovery of Photoelectricity

Checklist statement

✓

I can explain the ultraviolet catastrophe and its link to black-body radiation.

I can describe Planck's interpretation of radiation in terms of quanta.

I can explain why classical wave theory failed to explain observations of photoelectricity.

I can explain Einstein's explanation of photoelectricity and its significance for the nature of electromagnetic radiation.

Wave–Particle Duality

Checklist statement

✓

I can explain de Broglie's hypothesis relating particle momentum and wavelength.

I can apply $p = \frac{h}{\lambda}$, define all terms and know their standard units.

I can apply $\lambda = \frac{h}{\sqrt{2meV}}$, define all terms and know their standard units.

I can describe low-energy electron diffraction experiments.

I can explain qualitatively how changing electron speed affects the diffraction pattern.

Electron Microscopes

Checklist statement

✓

I can estimate the anode voltage required to produce electron wavelengths comparable to atomic dimensions.

I can describe the principle of operation of a transmission electron microscope (TEM).

I can describe the principle of operation of a scanning tunnelling microscope (STM).