

22 The electronvolt and momentum — Part 2 — Answers

Answers

Work through these after trying the questions yourself.

22.1 The energy an electron gains crossing a 1 V potential difference.

22.2 1.60×10^{-19} J.

22.3 Multiply.

22.4 Energy = 3.0 eV = $3.0 \times 1.60 \times 10^{-19} = 4.8 \times 10^{-19}$ J.

22.5 $p = h/\lambda$.

22.6 More. $p = h/\lambda$, so a smaller wavelength λ gives a larger momentum p .

22.7 A photon's momentum comes from its wave nature ($p = h/\lambda$), not from mass, so a massless particle can still have momentum. One real effect: light pushes on objects (radiation pressure) — it can drive a solar sail and blows a comet's tail away from the Sun.