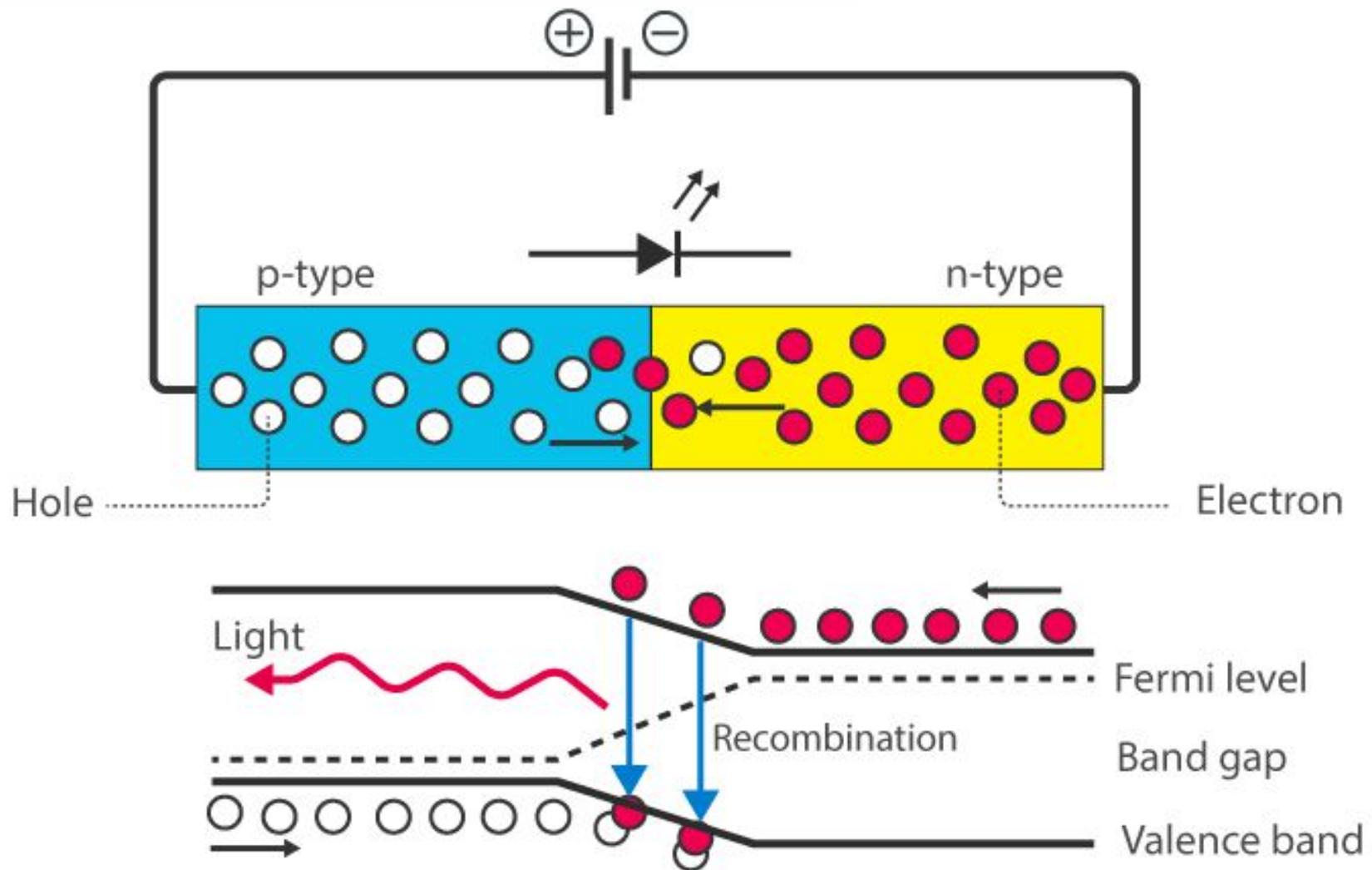


A-Level Physics

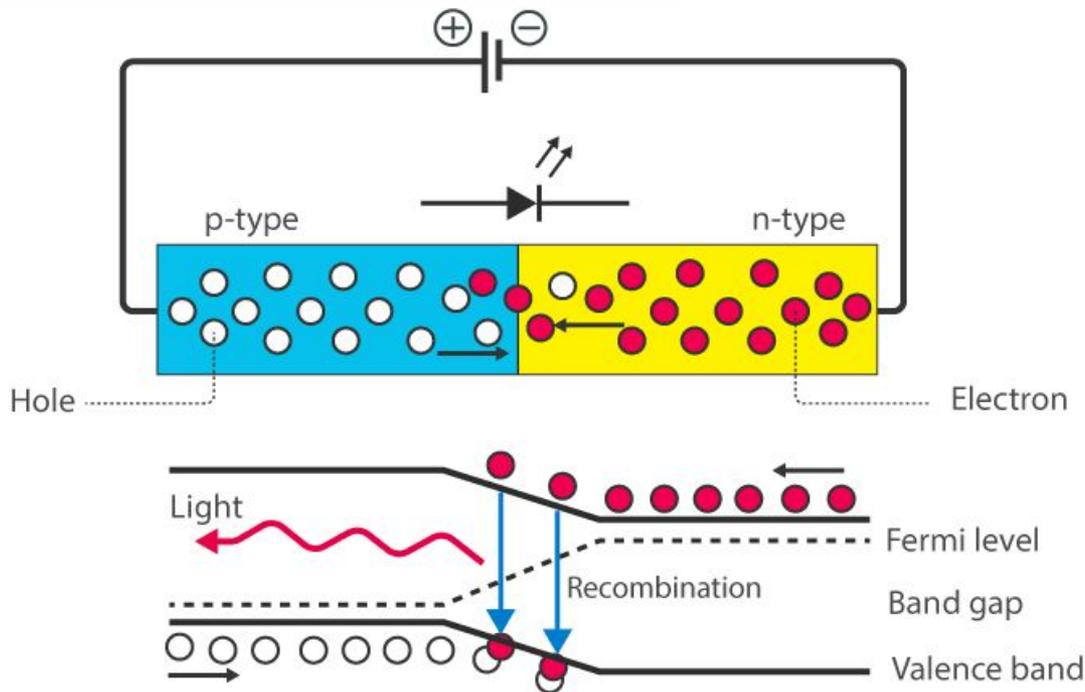
Taster Lesson

Calculating the speed of light using light emitting diodes (LEDs)

WORKING PRINCIPLE OF LED



WORKING PRINCIPLE OF LED



The minimum energy given by an electron moving across the p-n junction is given by:

$$eV$$

Where e is the charge on an electron, $1.6 \times 10^{-19} \text{C}$

V is the potential difference through which the electron moves.

© Byjus.com

The energy the electron gives out is in the form of light. The energy of a photon of light is given by hc/λ

h = Planck's constant 6.63×10^{-34}

λ = the wavelength of light from the LED.

C = Speed of light $3.0 \times 10^8 \text{ m/s}$

Since energy is conserved, we can see that

$$eV = hc/\lambda$$

This means that plotting a graph of V against $1/\lambda$ will produce a straight line with the gradient, m , being

$$m = hc/e$$

Rearranging the equation $m = hc/e$ to make c the subject.

$$c = \frac{me}{h}$$

Now carry out the practical work following the worksheet to calculate the speed of light.