

WJEC England Physics A Level

SP C3 08 : Photons

Practical notes



1. Determination of h using LEDs

Equipment:

- Variable power supply (direct current, dc)
- Resistor
- Voltmeter
- Leads
- Varying LEDs of known wavelengths

Method:

1. Set up the circuit as shown.
2. Slowly increase the voltage until the light just shows. This is the striking voltage. Record it.
3. Replace the LED with the next one and repeat.
4. Repeat for all LEDs, recording the wavelength and corresponding V_{min} .
5. Plot a graph of V_{min} against $1/\lambda$.
6. Draw a line of best fit. The gradient will be equal to e/hc .
 - a. e = electronic charge, 1.6×10^{-19}
 - b. c = speed of light, 3×10^8
7. Calculate h by dividing the gradient by c/e .

Your calculated value of Planck's constant should be approximately $6.63 \times 10^{-34} \text{ m}^2 \text{ kg/s}$. Compare your calculation to the accepted value.

