Eduqas Physics – Component 3

Module 4: Photons

This topic covers the properties of photons and the photoelectric effect. Learners study the electromagnetic spectrum and how to produce line emission and line absorption spectra from atoms. The wave-like behaviour of particles is studied using electron diffraction and de Broglie's relationship is applied to both particles of matter and to photons.

You should be able to demonstrate and show your understanding of:	Progress and understanding:			
	1	2	3	4
The fact that light can be shown to consist of discrete packets (photons) of energy				
How the photoelectric effect can be demonstrated				
How a vacuum photocell can be used to measure the maximum kinetic energy, $E_{k\,\max}$, of emitted electrons in ev and hence in J				
The graph of $E_{k\,\max}$ against frequency of illuminating radiation				
How a photon picture of light leads to Einstein's equation, $E_{k\,\max} = hf - \Phi$, and how this equation correlates with the graph of $E_{k\,\max}$ against frequency				
The fact that the visible spectrum runs approximately from 700 nm (red end) to 400 nm (violet end) and the orders of magnitude of the wavelengths of the other named regions of the electromagnetic spectrum				
Typical photon energies for these radiations				
How to produce line emission and line absorption spectra from atoms				
The appearance of such spectra as seen in a diffraction grating				
Simple atomic energy level diagrams, together with the photon hypothesis, line emission and line absorption spectra				
How to determine ionisation energies from an energy level diagram				
The demonstration of electron diffraction and that particles have a wave-like aspect				
The use of the relationship $p = \frac{h}{\lambda}$ for both particles of matter and photons				

You should be able to demonstrate and show your understanding of:	Progress and understanding:			
	1	2	3	4
The calculation of radiation pressure on a surface absorbing or reflecting photons				
SPECIFIED PRACTICAL WORK				
Determination of h using LEDs				