

- 5 (a) (i) Explain what is meant by a *photon*.

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[1]

- (ii) Show that the photon energy of light of wavelength 350 nm is 5.68×10^{-19} J. [1]

- (iii) State the value of the ratio

$$\frac{\text{energy of photon of light of wavelength 700 nm}}{\text{energy of photon of light of wavelength 350 nm}}$$

ratio = [1]

- (b) Two beams of monochromatic light have similar intensities. The light in one beam has wavelength 350 nm and the light in the other beam has wavelength 700 nm.

The two beams are incident separately on three different metal surfaces. The work function of each of these surfaces is shown in Fig. 5.1.

metal	work function / eV
tungsten	4.49
magnesium	3.68
potassium	2.26

Fig. 5.1

- (i) Explain what is meant by the *work function* of the surface.

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[2]

- (ii) State which combination, if any, of monochromatic light and metal surface could give rise to photo-electric emission. Give a quantitative explanation of your answer.

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[3]