

7 (a) (i) State what is meant by the *photoelectric effect*.

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[1]

(ii) Use the theory of particulate nature of electromagnetic radiation to explain why there is a threshold frequency for the photoelectric effect.

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[3]

(b) A polished sheet of magnesium in a vacuum is illuminated by ultraviolet radiation.

For emission of electrons to occur, the frequency of the ultraviolet radiation must be at least  $8.8 \times 10^{14}$  Hz.

(i) Calculate the work function energy of magnesium.

work function energy = ..... J [2]

17

- (ii) For ultraviolet radiation with a frequency of  $11 \times 10^{14}$  Hz, calculate the maximum speed of the emitted electrons.

maximum speed = ..... m s<sup>-1</sup> [3]

[Total: 01]