6 **(a)** When ultraviolet radiation of a specific frequency is incident on a metal surface, electrons are emitted with a range of kinetic energies up to a maximum value.

Explain why the emitted electrons have a range of kinetic energies up to a maximum value.

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……..

……..

……..

……..

…….. [3]

(b) The maximum kinetic energy E_{MAX} of electrons emitted from a metal surface is measured for different wavelengths λ of the electromagnetic radiation. The variation of E_{MAX} with $\frac{1}{\lambda}$ is shown in the Fig. 6.1.

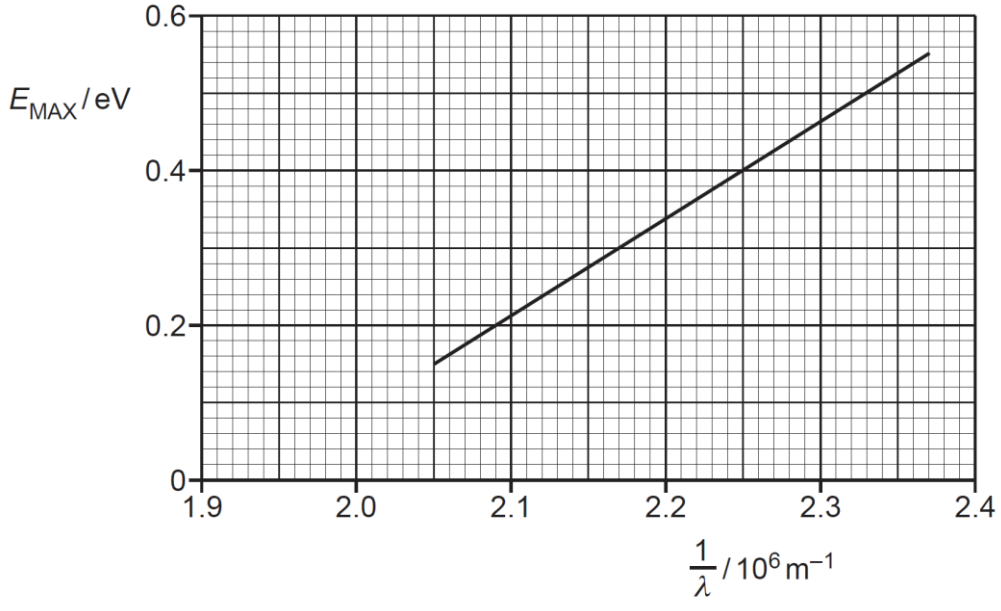

Fig. 6.1

Use the graph to:

(i) determine the threshold frequency f_o of the metal.

f_o = ... Hz [2]

[Turn over

(ii) determine a value for the Planck constant h. Explain your working clearly.

h = ... J s [3]

(c) The electromagnetic radiation is now incident on a metal with a larger work function energy than the metal in **(b)**.

On Fig 6.1, sketch the variation with $\frac{1}{\lambda}$ of $E_{MAX.}$ [1]

(d) Infrared radiation of the same intensity is now incident on the same metal surface used in **(b)**.

Explain why no electrons are emitted from the metal surface.

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.....

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..... [2]

[Total: 11]