7 Experiments are conducted to investigate the photoelectric effect.

For Examiner's Use

(a) It is found that, on exposure of a metal surface to light, either electrons are emitted immediately or they are not emitted at all.

Suggest why this observation does not support a wave theory of light.

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.....

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.....[3]

(b) Data for the wavelength λ of the radiation incident on the metal surface and the maximum kinetic energy E_K of the emitted electrons are shown in Fig. 7.1.

λ/nm	$E_K/10^{-19}$J
650	–
240	4.44

Fig. 7.1

(i) Without any calculation, suggest why no value is given for E_K for radiation of wavelength 650 nm.

.....

.....[1]

(ii) Use data from Fig. 7.1 to determine the work function energy of the surface.

work function energy = ... J [3]

(c) Radiation of wavelength 240 nm gives rise to a maximum photoelectric current I. The intensity of the incident radiation is maintained constant and the wavelength is now reduced.

For Examiner's Use

State and explain the effect of this change on

(i) the maximum kinetic energy of the photoelectrons,

.....

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.....[2]

(ii) the maximum photoelectric current I.

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.....[2]