

9 (a) State what is meant by the photoelectric effect.

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..... [2]

(b) The photoelectric effect is investigated using two clean metal plates. One plate is made from metal X and the other is made from metal Y.

Metal X has work function energy ϕ . Metal Y has work function energy 2ϕ .
Metal X has threshold frequency F .

State expressions, in terms of either or both of ϕ and F , for

(i) the threshold frequency of metal Y

threshold frequency = [1]

(ii) the Planck constant.

Planck constant = [1]

(c) The maximum kinetic energy E_K of photoelectrons is determined for each of the plates in (b) for different frequencies f of incident radiation.

On Fig. 9.1, sketch the variation of E_K with f for each plate. Label your lines X and Y to identify which line relates to which plate.

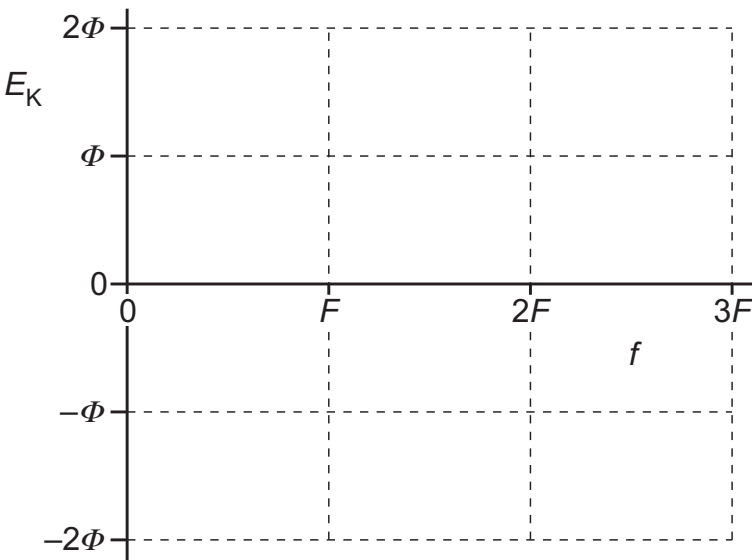


Fig. 9.1

[4]

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