

- 6 In a photoelectric experiment, an ultraviolet (UV) light source of constant intensity and single frequency is used. Two metal plates X and Y are contained in an evacuated glass container and are connected to a circuit as shown in Fig. 6.1. The UV source is placed at a distance away from X and Y.

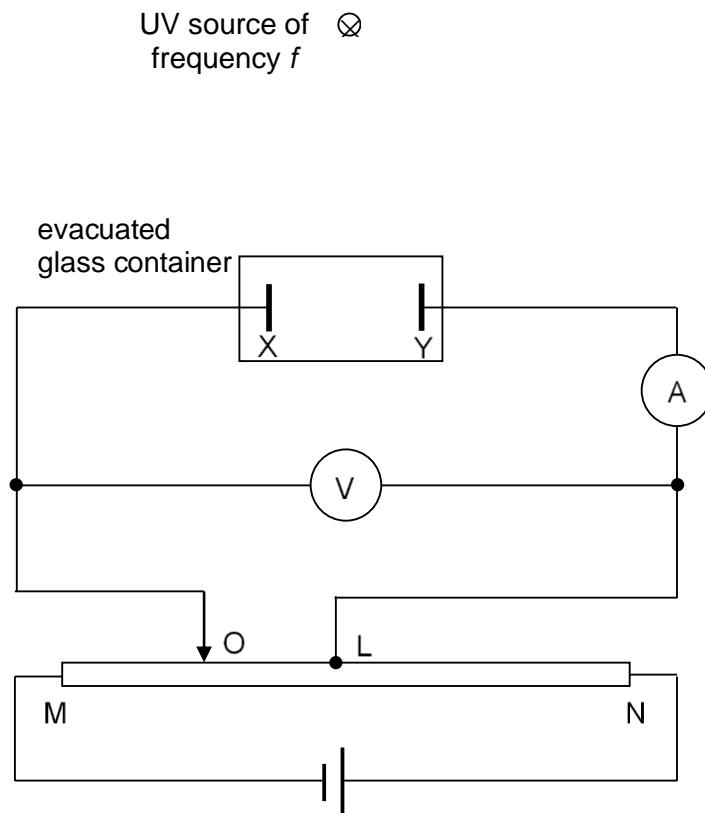


Fig. 6.1

The graph shown in Fig. 6.2 depicts the relationship between the voltmeter reading and the ammeter reading when metal plate X is the photoelectric emitter. No photoelectrons are emitted from Y.

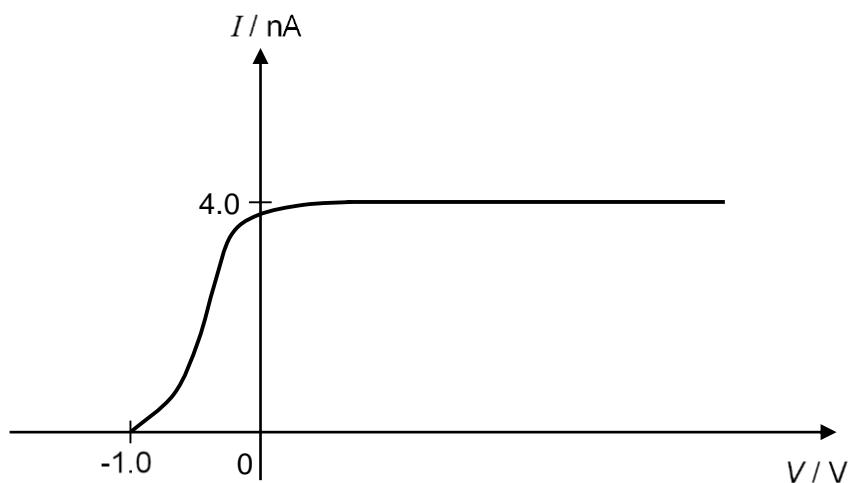


Fig. 6.2

- (a) Explain why the current remains constant for positive values of V .

[3]

- (b) Metal plate X is made of zinc with a work function of 3.8 eV. Using information from Fig. 6.2, determine the wavelength of the UV source.

wavelength = m [2]

- (c) Sketch, on Fig. 6.2, the graph when the experiment was repeated with UV light source of the same frequency but with intensity one-quartered. [2]

- (d) The UV light source was replaced with another light source of higher frequency. The graph in Fig. 6.3 was obtained when the experiment was conducted using the higher frequency light source.

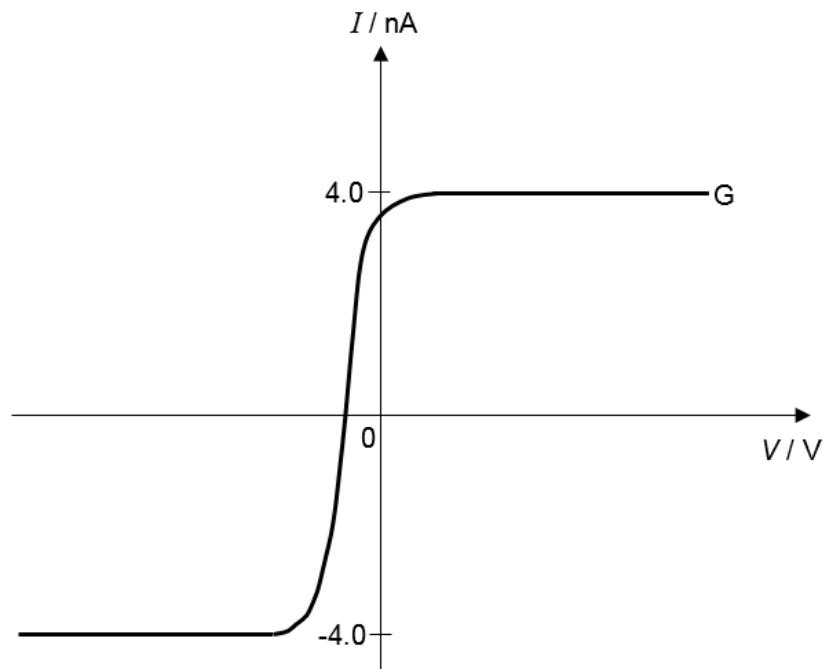


Fig. 6.3

Explain which metal plate, X or Y, has a greater work function energy.

[2]

[Total: 9]

