

- 7 (a) State what is meant by the de Broglie wavelength.

..... [1]

- (b) Fig. 7.1 shows a glass tube in which electrons are accelerated through a high p.d. to form a beam that is incident on a thin graphite crystal.

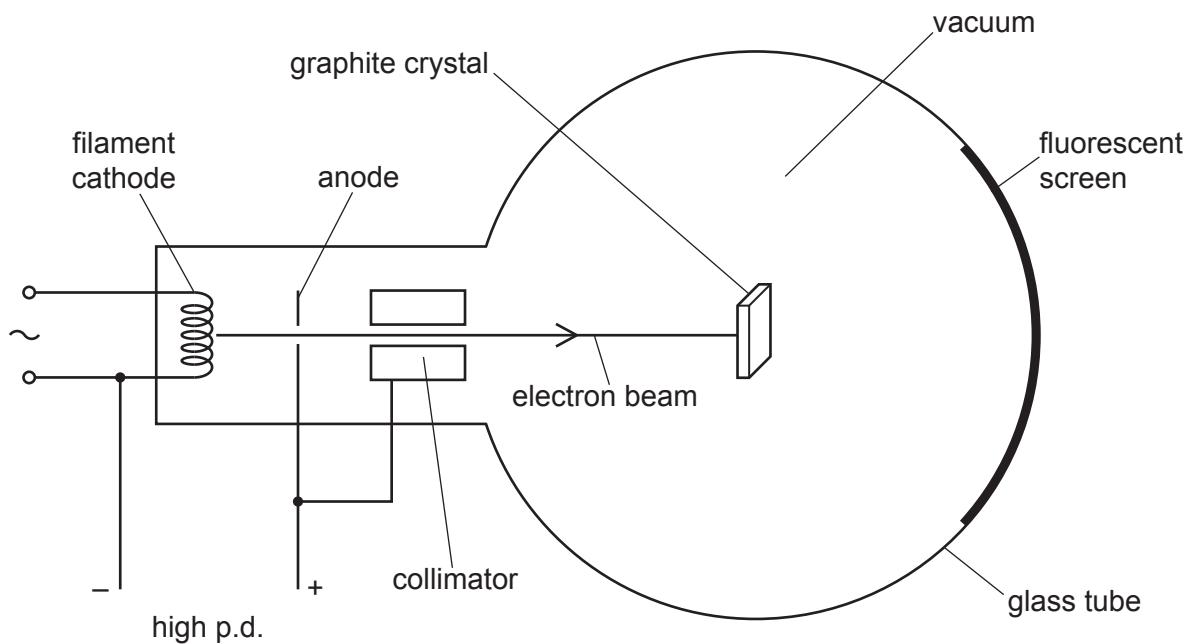


Fig. 7.1 (not to scale)

After passing through the graphite crystal, the electrons reach the fluorescent screen. The screen glows where the electrons strike it.

Fig. 7.2 shows the fluorescent screen viewed end-on, from the right-hand side of Fig. 7.1.

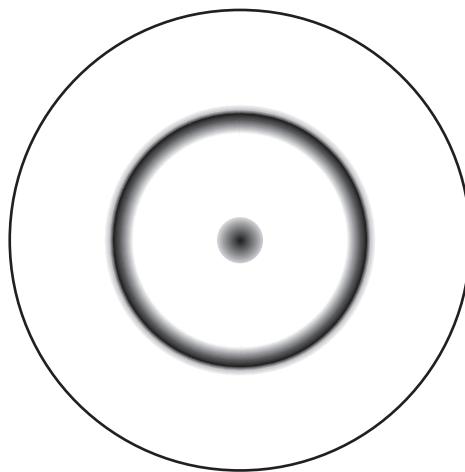


Fig. 7.2

- (i) State the name of the phenomenon demonstrated by the pattern shown in Fig. 7.2.

..... [1]

- (ii) Explain what can be concluded from the pattern in Fig. 7.2 about the nature of electrons.

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..... [2]

- (c) The electrons in (b) are now accelerated through a greater potential difference between the cathode and the anode.

- (i) On Fig. 7.3, sketch the pattern that is now seen on the fluorescent screen in Fig. 7.1.

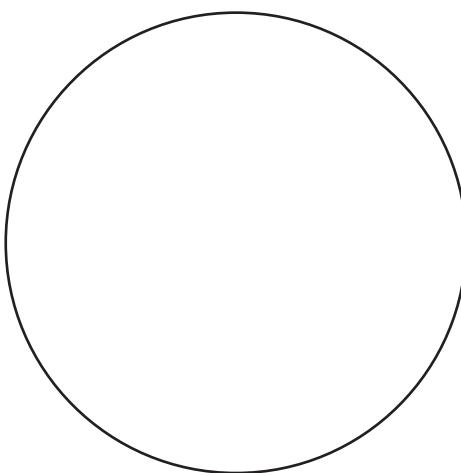


Fig. 7.3

[2]

- (ii) Explain, with reference to de Broglie wavelength, the change in the pattern on the fluorescent screen.

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..... [3]