8 **(a)** State the formula for the de Broglie wavelength λ of a moving particle.

State the meaning of any other symbol used.

.....

.....

..... [2]

(b) Electrons accelerate through a potential difference, pass through a thin crystal and are then incident on a fluorescent screen.

The pattern in Fig. 8.1 is observed on the fluorescent screen.

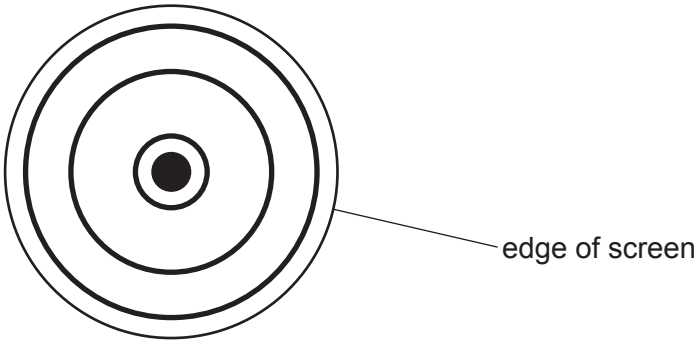

Fig. 8.1 not to scale

(i) State the name of the phenomenon shown by the electrons at the crystal.

..... [1]

(ii) State what this phenomenon shows about the nature of electrons.

.....

..... [1]

(iii) Suggest why the thin crystal causes the phenomenon in **(b)(i)**.

.....

..... [1]

(iv) The electron is accelerated through a different potential difference. The new pattern observed on the screen is shown in Fig. 8.2.

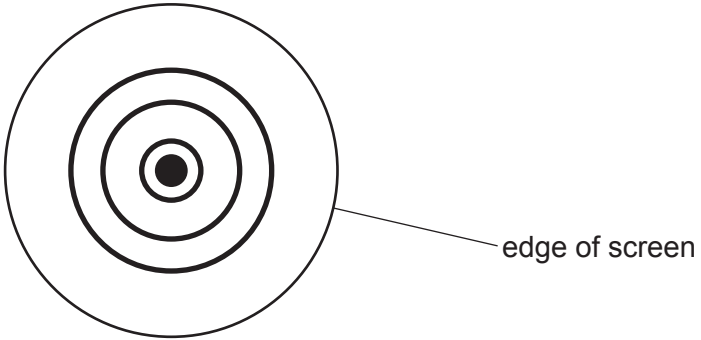

Fig. 8.2 not to scale

State and explain the change that has been made to the potential difference to create the pattern shown in Fig. 8.2.

.....

.....

.....

..... [2]

[Total: 7]