4 A beam of monochromatic light of wavelength 633 nm is incident normally on a double slit. A screen is placed parallel to the plane of the double slit at a distance 98.0 cm from the slits. P is the point on the screen that is equidistant from the two slits, as illustrated in Fig. 4.1.

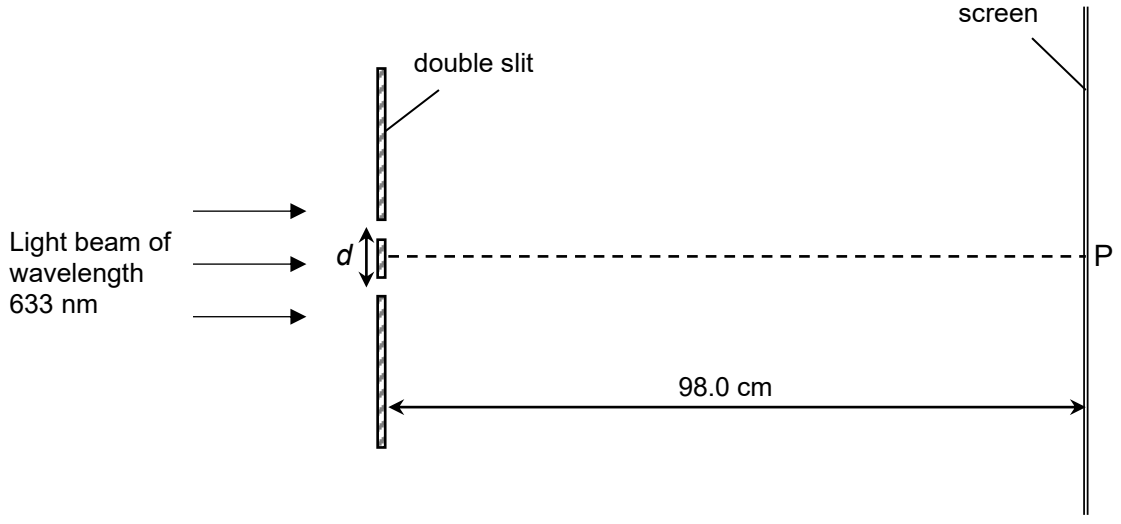

Fig. 4.1 (not to scale)

Fig. 4.2 shows the variation with distance from P of the intensity I of the light on the screen.

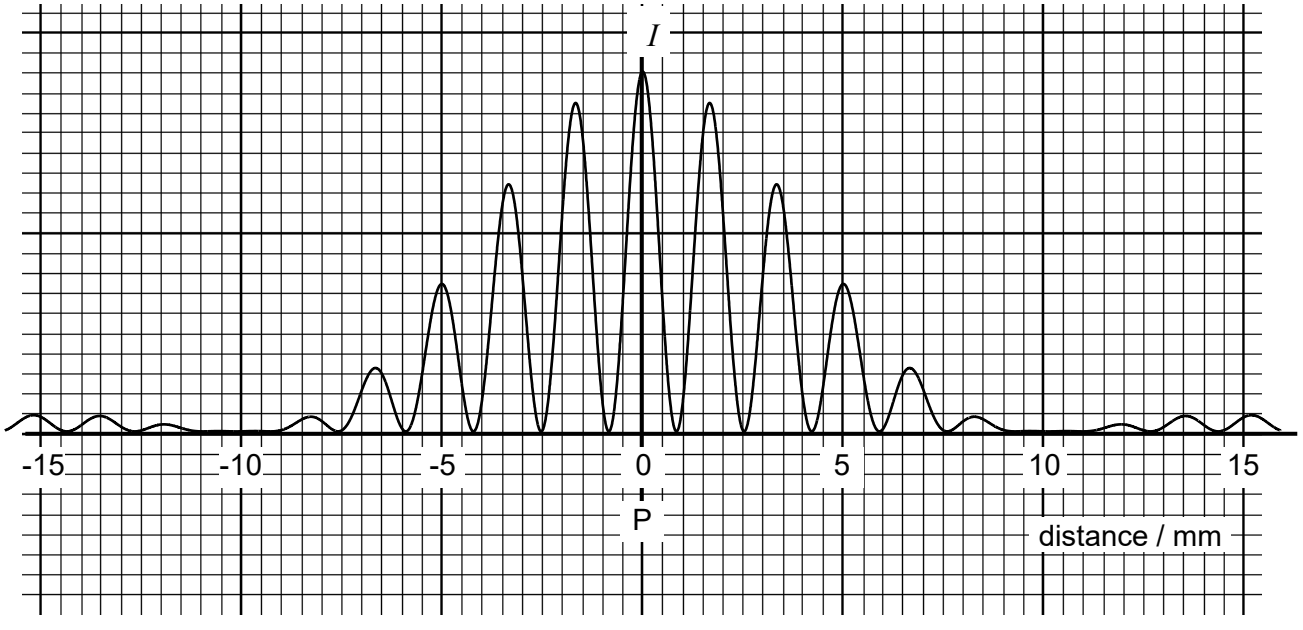

Fig. 4.2

(a) Using Fig. 4.2, show that the slit separation d is 3.7×10^{-4} m.

[2]

(b) Estimate the slit width b of each slit.

b = ……..… m [2]

(c) State with a reason the change to be made to the double slit to achieve each of the following interference patterns on the screen.

(i) The interference pattern spreads out more on the screen.

……..

……..

……. [2]

(ii) The bright fringes have nearly uniform intensity across the pattern.

……..

……..

……. [2]

[Total: 8 marks]