6 **(a)** Apparatus used to produce interference fringes is shown in Fig. 6.1. The apparatus is not drawn to scale.
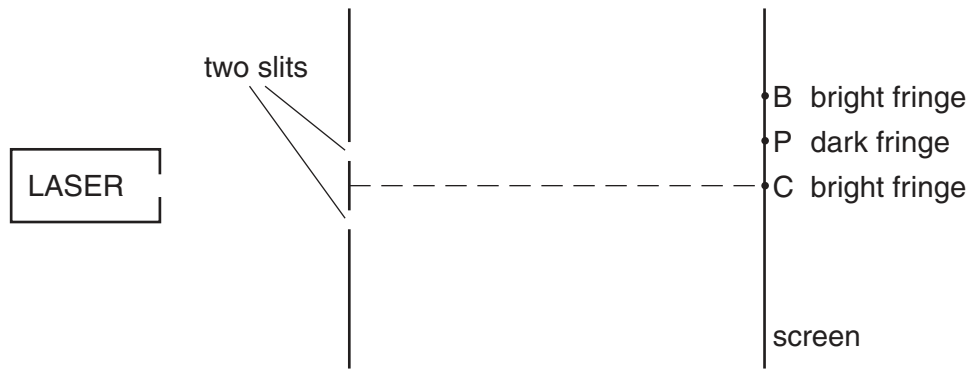
two slits

LASER

B bright fringe
P dark fringe
C bright fringe

screen

Fig. 6.1 (not to scale)

Laser light is incident on two slits. The laser provides light of a single wavelength. The light from the two slits produces a fringe pattern on the screen. A bright fringe is produced at C and the next bright fringe is at B. A dark fringe is produced at P.

(i) Explain why one laser and two slits are used, instead of two lasers, to produce a visible fringe pattern on the screen.

....

.... [1]

(ii) State the phase difference between the waves that meet at

1. B .... [1]

2. P .... [1]

(iii) **1.** State the *principle of superposition*.

....

....

.... [2]

2. Use the principle of superposition to explain the dark fringe at P.

....

.... [1]

(b) In Fig. 6.1 the distance from the two slits to the screen is 1.8 m. The distance CP is 2.3 mm and the distance between the slits is 0.25 mm.

Calculate the wavelength of the light provided by the laser.

wavelength = ... nm [3]

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