

- 4 A laser emits visible light of a single frequency in a vacuum. The light is incident normally on a double slit and then forms a pattern of bright and dark fringes on a screen, as shown in Fig. 4.1.

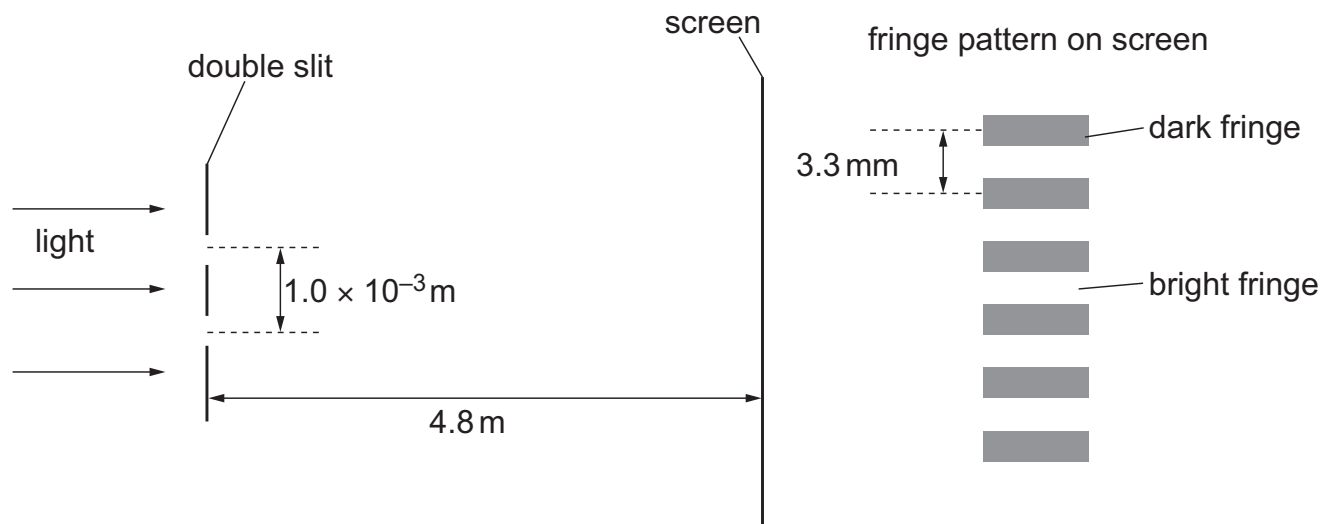


Fig. 4.1 (not to scale)

The separation of the slits is $1.0 \times 10^{-3} \text{ m}$. The distance from the slits to the screen is 4.8 m . The distance between the centres of adjacent dark fringes on the screen is 3.3 mm .

- (a) Explain how the pattern of bright and dark fringes is formed.

.....

 [3]

- (b) Calculate the frequency of the light emitted by the laser.

frequency = Hz [4]

- (c) The double slit is removed. A second laser is placed beside the first laser. The second laser produces visible light of a different frequency from that of the first laser. The beams of light from the two lasers overlap on the screen.

Explain why a steady pattern of bright and dark fringes is **not** formed on the screen.

.....
 [1]