

4 (a) State the meaning of

(i) *coherence*,

.....  
..... [1]

(ii) *monochromatic*.

.....  
..... [1]

(b) Coherent, monochromatic light from two narrow slits a distance 0.38 mm apart causes an interference pattern on a screen 1.20 m from the slits, as illustrated in Fig. 4.1.

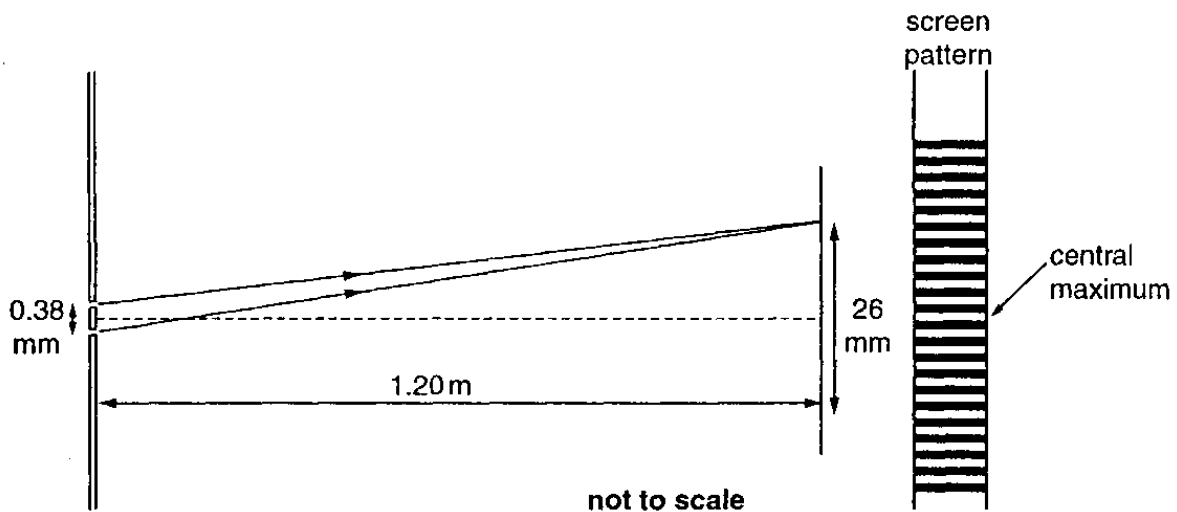


Fig. 4.1

(i) Explain how interference fringes are formed on the screen.

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.....  
.....  
.....  
.....  
..... [3]

- (ii) The distance from the sixth bright fringe on one side of the pattern to the sixth bright fringe on the other side of the pattern is found to be 26 mm.

Calculate the wavelength of the light.

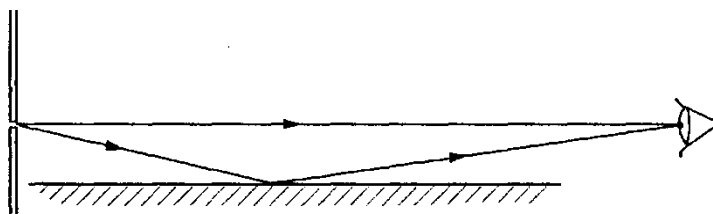
wavelength = ..... m [3]

- (iii) State the experimental advantage gained by determining the fringe width in the way that was used in (b)(ii).

.....

..... [1]

- (c) Another way of obtaining fringes similar to those described in (b) is illustrated in Fig. 4.2.



**Fig. 4.2**

A single slit is viewed both directly and by reflection from a mirror surface. Explain why this system produces a fringe pattern.

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..... [2]

[Total: 11]

