5 Coherent light is incident normally on a double slit, as shown in Fig. 5.1.

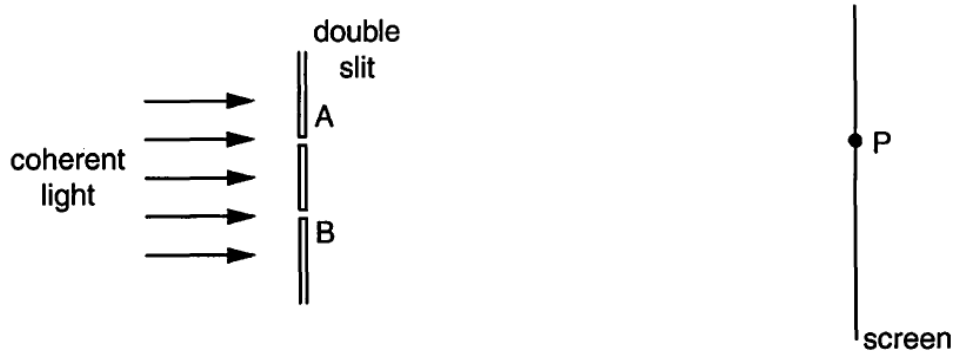

Fig. 5.1 (not to scale)

Light passes through the two slits A and B and is incident on a screen.

The variation with time *t* of the displacement *x* of the light arriving at point P on the screen is shown in Fig. 5.2.

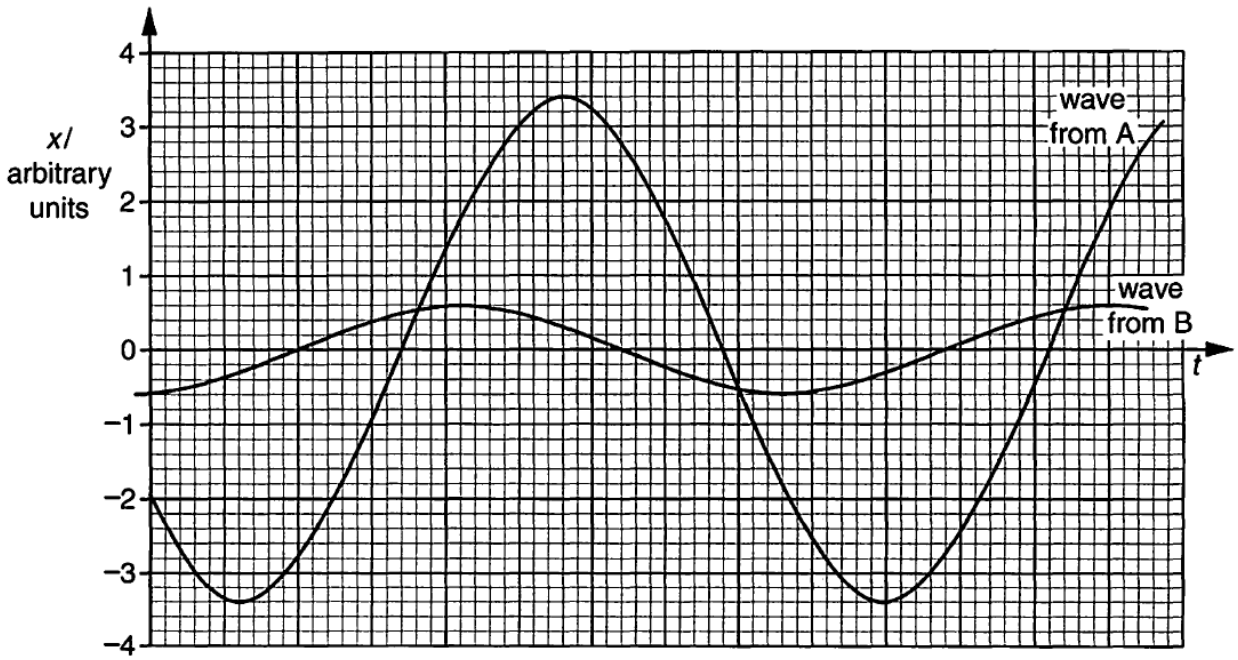

Fig. 5.2

(a) Use Fig. 5.2 to determine the phase difference between the waves from slit A and from slit B that arrive at point P.

phase difference = ……° [2]

(b) Dark fringes and bright fringes are both formed on the screen.

Use Fig. 5.2 to determine, for the bright fringe and the dark fringe closest to point P, the ratio

$$\frac{\text{intensity of light at the bright fringe}}{\text{intensity of light at the dark fringe}}.$$

ratio = …… [3]

(c) In an attempt to produce brighter fringes, the student widens each of the two slits, keeping their separation constant. Fringes are no longer observed.

Suggest why the fringes are no longer observed.

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……

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…….. [2]

[Total: 7]