

- 5 (a) State the relationship between the intensity and the amplitude of a wave.

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[1]

- (b) Microwaves of the same amplitude and wavelength are emitted in phase from two sources P and Q. The sources are arranged as shown in Fig. 5.1.

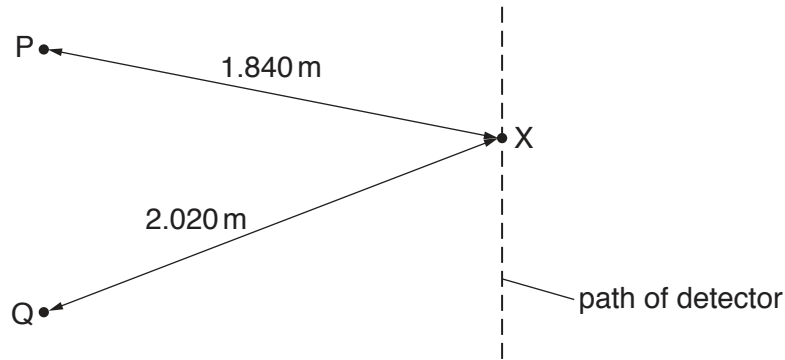


Fig. 5.1

A microwave detector is moved along a path that is parallel to the line joining P and Q. A series of intensity maxima and intensity minima are detected.

When the detector is at a point X, the distance PX is 1.840 m and the distance QX is 2.020 m. The microwaves have a wavelength of 6.0 cm.

- (i) Calculate the frequency of the microwaves.

frequency = Hz [2]

- (ii) Describe and explain the intensity of the microwaves detected at X.

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[3]

(iii) Describe the effect on the interference pattern along the path of the detector due to each of the following separate changes.

1. The wavelength of the microwaves decreases.

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2. The phase difference between the microwaves emitted from the sources changes to 180° .

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[2]

[Total: 8]