

- 1 Fig 1.1 shows a displacement-distance graph for two sound waves A and B, of the same frequency and amplitude. Wave A is travelling to the right and wave B is travelling to the left.

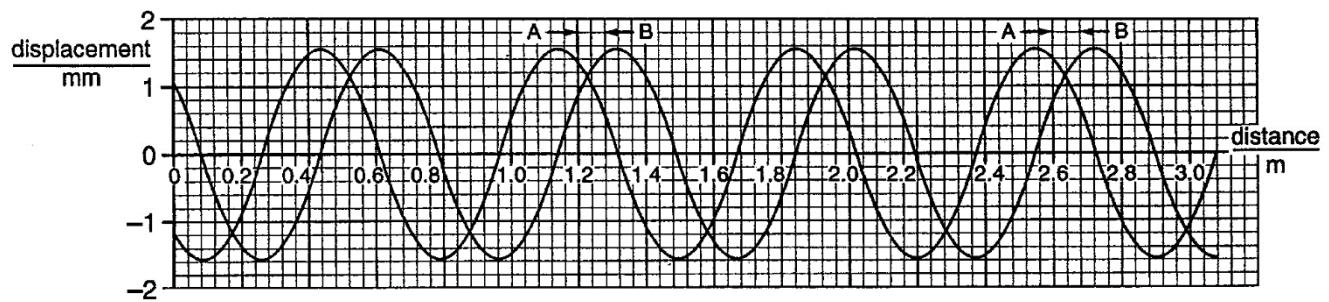


Fig 1.1

- (a) (i) From the graph, deduce the phase difference between the two waves at the instant shown.

$$\text{phase difference} = \dots \text{rad} [1]$$

- (ii) The period of each wave is T .

Determine the maximum displacement of the resultant of the two waves

1. at the instant shown,

$$\text{maximum displacement} = \dots \text{mm} [1]$$

2. at the instant shown $+ \frac{T}{8}$,

$$\text{maximum displacement} = \dots \text{mm} [1]$$

3. at the instant shown $+ \frac{3T}{8}$.

$$\text{maximum displacement} = \dots \text{mm} [1]$$

- (b)** Two microwaves sources S_1 and S_2 are located as shown in Fig 1.2. The sources are producing waves that are in phase and of wavelength λ . The distance between S_1 and S_2 is 3.5λ . Points lying on the line joining P and Q are equidistant from S_1 and S_2 .

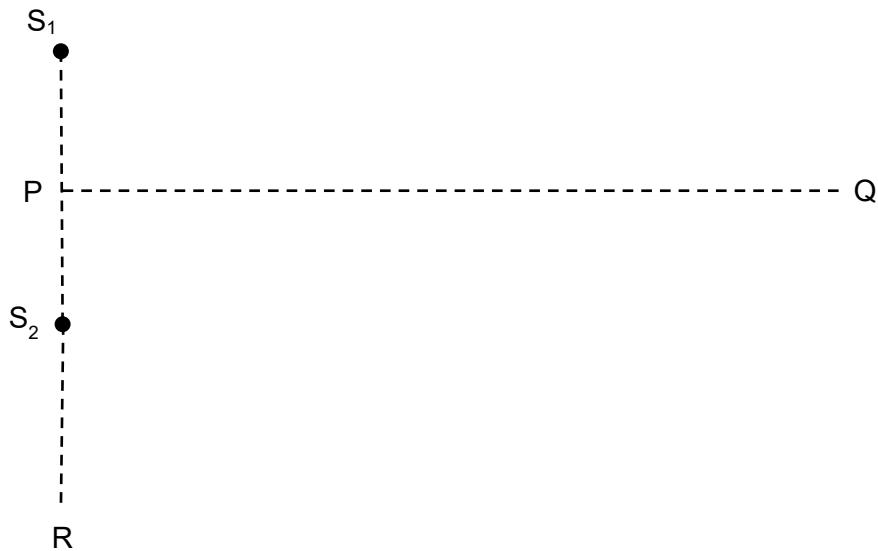


Fig 1.2

Assume that any drop in intensity of the wave, from each source, with distance is negligible.

State and explain whether a maximum or minimum is detected by a microwave sensor as it is moved along the line joining

- (i)** S_1 and S_2 ,

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.....
..... [2]

- (ii)** P and Q,

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..... [2]

(iii) S₂ and R.

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.....
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[2]

[Total: 10]