4 Microwaves of the same wavelength and amplitude are emitted in phase from two point sources X and Y, as shown in Fig. 4.1.

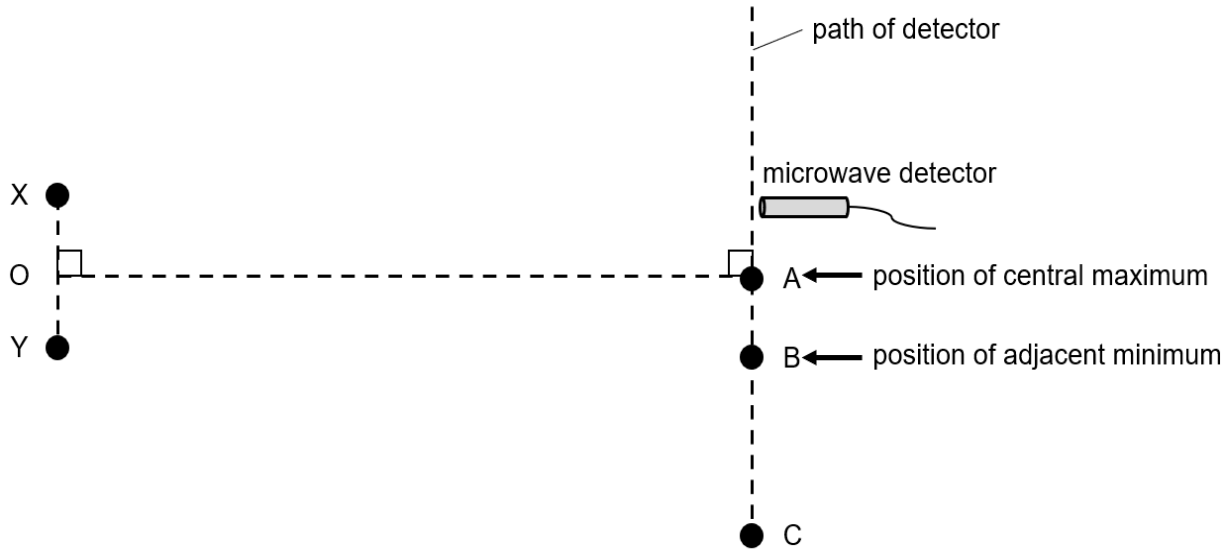

Fig. 4.1 (not to scale)

(a) State and explain along which of the lines XY and OA do the microwaves superpose to produce a stationary wave.

.....

.....[2]

(b) A microwave detector is moved along a line from A to C. The microwave detector gives a maximum intensity reading at A and the first minimum reading at B. The microwaves have a wavelength of 4.0 cm.

For the waves arriving at B, determine the path difference.

path difference = ... m [1]

(c) Describe the effect, if any, on the intensity of the microwave detected at A and B when the following changes are made, separately to the sources X and Y:

(i) when the amplitude of both source X and Y is doubled.

.....

.....

.....[2]

(ii) when the amplitude of one of the sources is halved.

.....

.....

.....[2]

(iii) when the sources are now anti-phase.

.....

.....[1]

[Total: 8]