5 Two point sources, A and B, produce coherent electromagnetic waves. The waves from A and B are emitted in phase and have wavelength λ, as shown in Fig. 5.1.

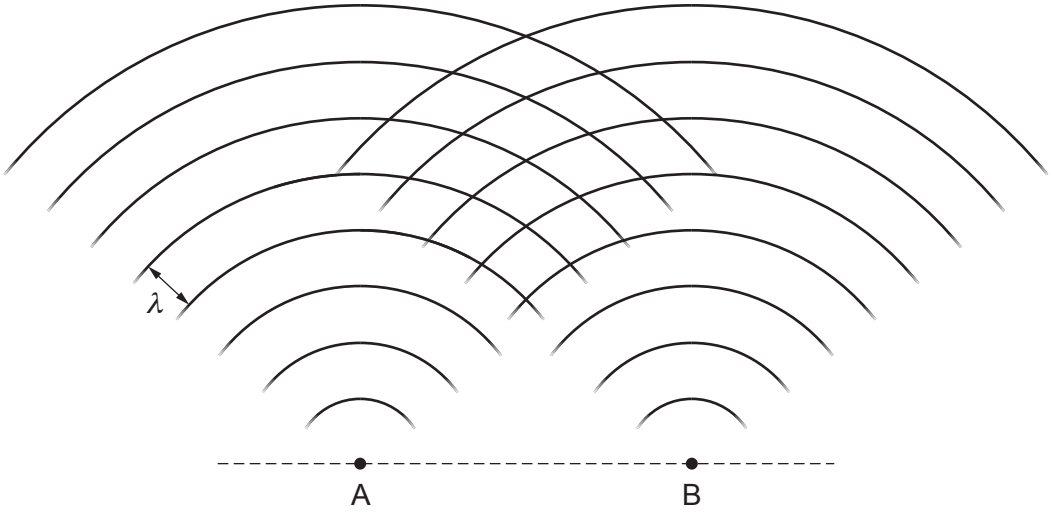

Fig. 5.1 (not to scale)

The lines on Fig. 5.1 represent wavefronts. All the points on a wavefront are in phase.

(a) On Fig. 5.1, mark with a cross (×):

(i) the position of an interference maximum (label this cross Y) [1]

(ii) the position of an interference minimum (label this cross Z). [1]

(b) The waves in air have a wavelength of 2.9×10^{-5} m.

An interference pattern is detected along a line parallel to AB and at a perpendicular distance of 140 m from AB. The spacing between adjacent interference maxima is 1.2 cm.

(i) Calculate the separation a of the sources A and B.

a = ... m [3]

(ii) State the principal region of the electromagnetic spectrum to which the waves belong.

..... [1]

[Total: 6]