4 **(a)** a progressive wave, state what is meant by

(i) the *period*,

.....

.....[1]

(ii) the *wavelength*.

.....

.....[1]

(b) Fig. 4.1 shows the variation with time *t* of the displacement *x* of two progressive waves P and Q passing the same point.

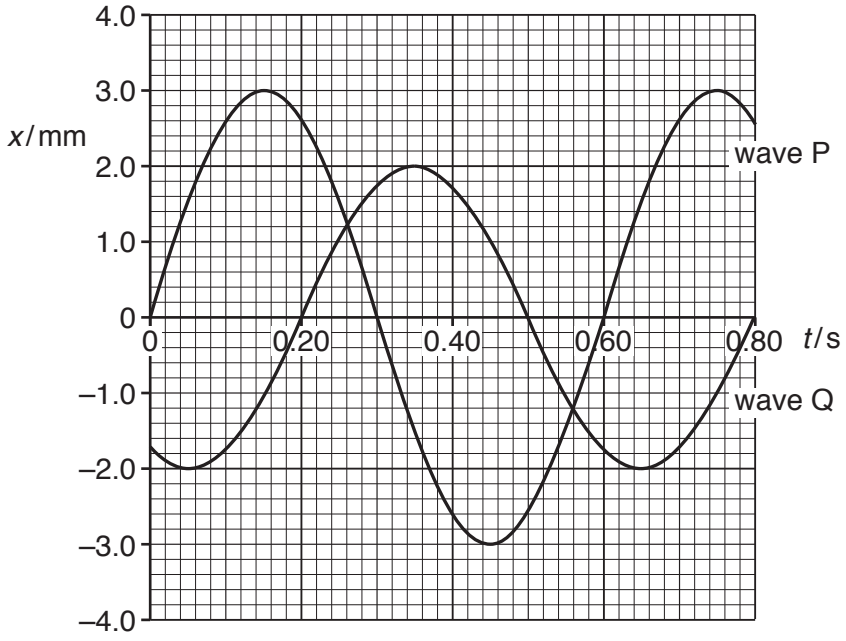

Fig. 4.1

The speed of the waves is 20 cm s^{-1}.

(i) Calculate the wavelength of the waves.

wavelength = ... cm [2]

(ii) Determine the phase difference between the two waves.

phase difference = ... ° [1]

(iii) Calculate the ratio

$$\frac{\text{intensity of wave Q}}{\text{intensity of wave P}}.$$

ratio = ... [2]

(iv) The two waves superpose as they pass the same point. Fig. 4.1 to determine the resultant displacement at time $t = 0.45\,\text{s}$.

displacement = ... mm [1]

[Total: 8]