

- 4 Fig. 4.1 shows a dipper vibrating at a constant frequency on the surface of a pond. Ripples spread out as progressive transverse waves with circular wavefronts. Assume that the energy of the wave is spread over the entire circumference of the ripple and that no energy is lost in the propagation of the ripple.

Two identical plastic balls placed on the water surface at points P and Q are observed to move up and down. The distance between points P and Q is shorter than one wavelength.

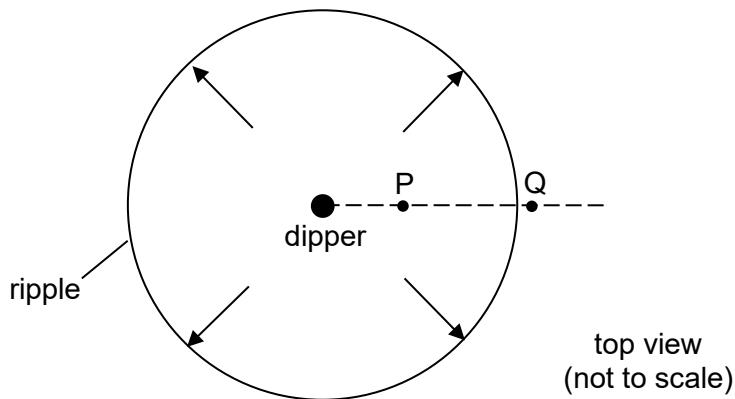


Fig. 4.1

The variation of the displacements of points P and Q with time is shown in Fig. 4.2. The solid line represents point P and the dotted line point Q.

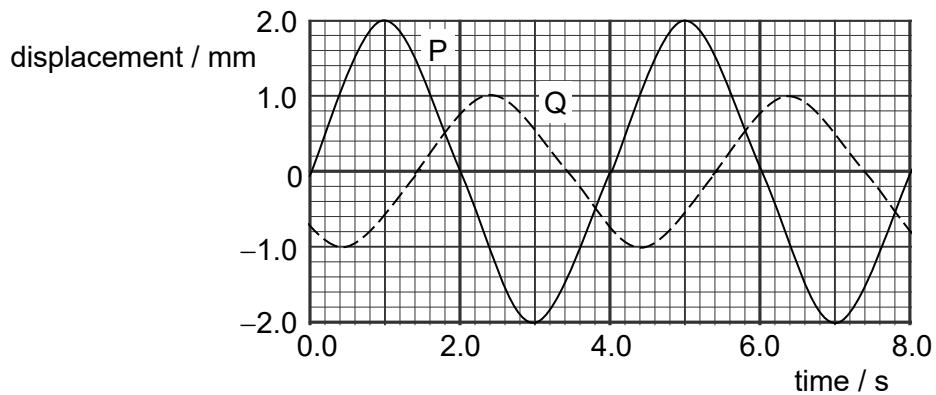


Fig. 4.2

(a) Explain what is meant by a *progressive transverse wave*.

progressive

.....

transverse

..... [2]

- (b) Using Fig. 4.2, show that the phase difference between the waves reaching points P and Q is 2.2 rad.

[2]

- (c) The distance of point P from the dipper is 150 mm.

Using Fig. 4.2, show that the distance of point Q from the dipper is 600 mm.

[2]

- (d) Using answers in (b) and (c), determine the wavelength of the ripples.

wavelength = mm [2]