### Physics worksheet – Transverse and longitudinal waves

**Q1** State the difference between a transverse wave and a longitudinal wave.

**Q2** Write T for transverse and L for longitudinal next to each of the following waves.

<table>
<thead>
<tr>
<th>microwaves</th>
<th>surface water waves</th>
<th>light</th>
<th>gamma rays</th>
<th>sound waves in the air</th>
<th>X-rays</th>
</tr>
</thead>
<tbody>
<tr>
<td>waves in a rope</td>
<td>sound waves in water</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Q3** The following picture has a scale of 1:20. It shows a section of a long rope with a wave travelling to the right. From the picture and with the help of a ruler find (i) the amplitude and (ii) the wavelength of the wave.

![Wave on a rope](image)

**Q4** The following pictures have a scale of 1:20. The first picture shows a section of a stretched slinky spring. The second picture shows a wave travelling to the right in that section. From the pictures and with the help of a ruler estimate (i) the amplitude and (ii) the wavelength of the wave.

![Wave on a slinky](image)

**Q5** Refer to the wave in Q3. Draw a graph of particle (of the rope) displacement vs distance from the origin. Take the left end of the section as the origin.

**Q6** Refer to the wave in Q4. Draw a graph of particle (of the slinky spring) displacement vs distance from the origin. Take the left end of the section as the origin.

**Q7** The wave in Q3 has a period of 0.5 s. Calculate the frequency and the speed of the wave.

**Q8** The wave in Q4 has a frequency of 0.8 Hz. Calculate the period and the speed of the wave.

**Q9** The picture of the wave in Q3 was taken at \( t = 0 \) s. Draw a graph of particle displacement vs distance from the origin for the wave at \( t = 0.125 \) s.

**Q10** The picture of the wave in Q4 was taken at \( t = 0 \) s. Draw a graph of particle displacement vs distance from the origin for the wave at \( t = 0.625 \) s.

**Q11** The picture of the wave in Q3 was taken at \( t = 0 \) s. Draw a graph of displacement of particle P vs time from \( t = 0 \) to \( t = 1 \) s.

**Q12** The picture of the wave in Q4 was taken at \( t = 0 \) s. Draw a graph of displacement of loop Q vs time from \( t = 0 \) to \( t = 2.5 \) s.