

ALL - Questions Please

## Wave properties

- 6 Refer back to the wave pulse in Figure 3 of question 3 above. Sketch the pulse shape you would expect to see at  $t = 1.0$  s after the pulse is reflected at X. Label the point X clearly on your diagram.
- 7 Diffraction is a property of all waves, but is only a significant effect when the wavelength of the diffracted waves is about the same size as the aperture. Explain why the diffraction of sound is easily observed in everyday life but the diffraction of light is not.
- 8 Here is one method of measuring the focal length of a lens. A small light source is mounted at the centre of a white screen. This is placed in front of a thin lens behind which is a plane mirror, as shown in Figure 4. When the source is at a distance of the focal length, 150 mm in this case, from the lens, a focused image of the light source is formed on the screen close to the source.

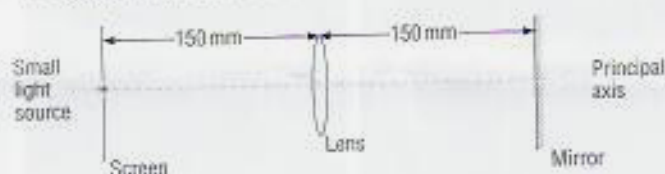


Figure 4

The distance from the focal point to the lens is called the focal length of the lens. Light from the focal point passing through the lens is refracted into a parallel beam. Copy the diagram. On it, sketch two wavefronts of the light from the small source (i) between the source and the lens at distances of 50 mm and 100 mm from the source and (ii) between the lens and mirror at 50 mm and 100 mm from the mirror. Add three rays of light which pass from the source to the mirror. Your diagram should be such that the reflected paths of all rays are the same as the outgoing ones.