3 **(a)** Distinguish between *longitudinal* waves and *transverse* waves.

....

....

....

.... [2]

(b) State a phenomenon associated with transverse waves that is not observed with longitudinal waves.

.... [1]

(c) A point source of sound radiates energy uniformly in all directions. At a particular frequency, the intensity of sound 1.5 m away from the source is 1.2×10^{-5} W m^{-2}, corresponding to an amplitude of oscillation of the air molecules of 84 μm. A microphone with a receiving area of 1.3×10^{-3} m^2 is placed 6.0 m away from the source.

Assuming that the sound is propagated without energy loss, determine

(i) the intensity of the sound at the microphone,

intensity = ... W m^{-2} [2]

(ii) the power of the sound incident on the microphone,

power = ... W   [1]

(iii) the amplitude of vibration of the air molecules at the microphone.

amplitude   = ... μm   [2]