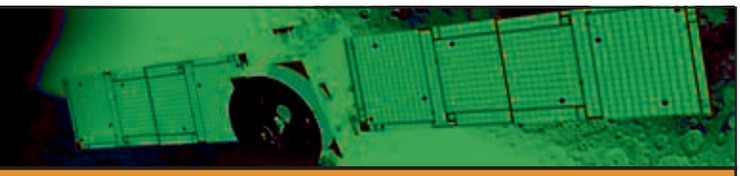

Particles, Waves and Quanta: Music and communication – Comprehension

Set	Number	Solution
Comp4	1	A vibrating string produces a note a listener can hear by causing the air around it to vibrate, these vibrations are then transmitted through the air.
	2	To create a sound a musical instrument has to make the air move (vibrate), to do this it needs to transfer kinetic energy to the air, if the instrument is to transfer energy it has to have some itself.
	3	$f \propto \sqrt{T}$ so as T increases so does f.
	4	In a transverse wave, the vibration of the medium is perpendicular to the direction of propagation. In a longitudinal wave the vibration is in the same plane as the direction of propagation.
	5	P waves are longitudinal and can travel through solids and liquids.
	6a	The bottom graph
	6b	The top graph – in 5 ms there are 4 peaks, frequency = number waves / time = 4/0.005 = 800 Hz
	6c	The bottom graph, in 5 ms there is 1 wave, frequency = 1/0.005 = 200 Hz $\lambda = v / f = 340 \text{ m s}^{-1} / 200 \text{ Hz} = 1.7 \text{ m}$