

**Waves and Light Assignment**

1. a) State the meaning of “the period of a pendulum”. /1  
b) State the units for period. /1
2. Draw a wave and label a trough, crest, amplitude and wavelength. /2
3. a) Write a definition for frequency. /1  
b) What units is it measured in? /1
4. a) Draw two waves – one with high frequency and one with low frequency. Make sure they have the same amplitude. /1  
b) State which wave has a larger wavelength. /1  
c) Hence state the effect of decreasing the frequency on the wavelength of the wave. /1
5. a) Draw a longitudinal wave. /1  
b) Describe how the wavelength of a wave is measured. /1  
c) Describe the motion of a single air particle involved in a sound wave. /1
6. A nurse counts 76 heartbeats in one minute. Determine the period and frequency of the heart’s oscillations. /3
7. Calculate the speed of waves in water that are 0.4 m apart and have a frequency of 2 Hz. /2
8. Draw a standing wave which has 4 nodes. /2
9. You are standing on the footpath and a car goes past at great speed. Explain, using the concept of the Doppler effect, why its engine sounds higher coming towards you and lower going away. /3
10. Describe what happens when two waves meet and experience *interference*. /2
11. a) Draw the electromagnetic spectrum, from radio waves to gamma rays. /4  
b) State which end of the spectrum has more energy. /1
12. Explain the effect of density on the opaqueness of an object. /2
13. Paper reflects almost all colours of light. State why we are unable to see our reflection by looking down on a page. /1
14. Use Snell's law to calculate the angle of refraction for a ray of light passing from air (refractive index 1.00) to water (refractive index 1.33) if the angle of incidence is  $28.0^\circ$  /2
15. (a) Explain why a toy train which is orange under white light appears black under blue light. /2  
(b) State the colour it would appear to be under green light. /1

TOTAL /37