

Waves and Light Assignment

NAME _____

1. a) State the meaning of “the period of a pendulum”. /1
b) State the units for period. /1
2. Draw a transverse 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. a) Describe what happens when two waves meet and experience *interference*. /2
b) State the three conditions required for interference to create a standing wave. /2
c) 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 pitch coming towards you and lower going away. /3
10. a) Draw the electromagnetic spectrum, from radio waves to gamma rays. /4
b) State or label the end of the spectrum which has:
i) longer wavelength
ii) higher frequency
iii) more energy /3
11. Explain the effect of density on the opaqueness of an object. /2
12. Paper reflects almost all colours of light. State why we are unable to see our reflection by looking down on a page. /1
13. 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° /2
14. (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 /40