

Waves Answers – NAT 5

1) a) The particles vibrate at right angles to the direction of motion of the waves.

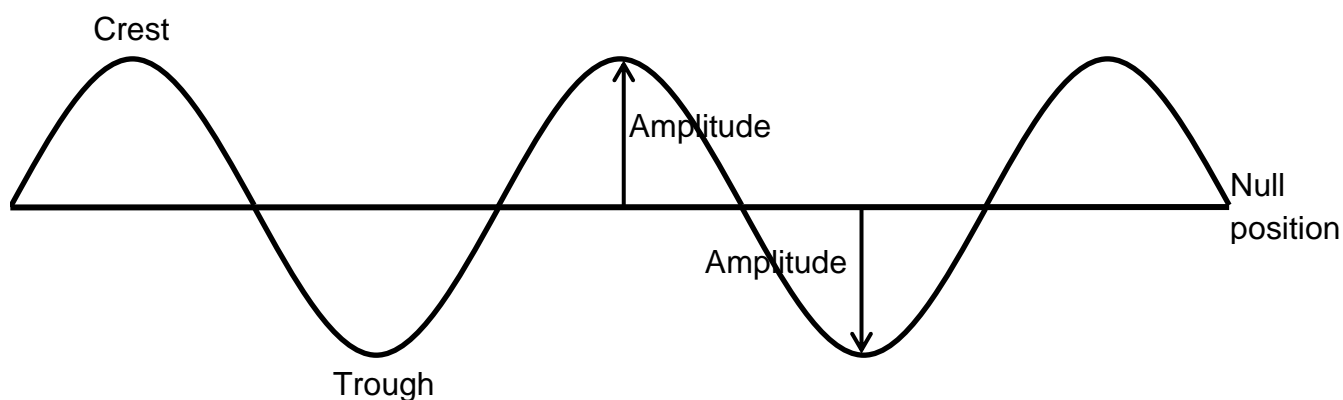
b) 8 waves in the e-m spectrum and water waves.

2) a) The particles vibrate back and forth along the direction of motion of the waves.

b) Sound waves.

3) **Waveform P – Transverse** and **Waveform Q - Longitudinal**

4)



5) a) Amplitude – Height of the wave from the equilibrium position.

b) Wave speed – The distance travelled by a wave per second.

c) Frequency – The number of waves that pass a point per second.

d) Wavelength – The length of one wave.

e) Period – The time taken for a wave to repeat itself. (Time taken to produce one wave)

6) 0.25Hz

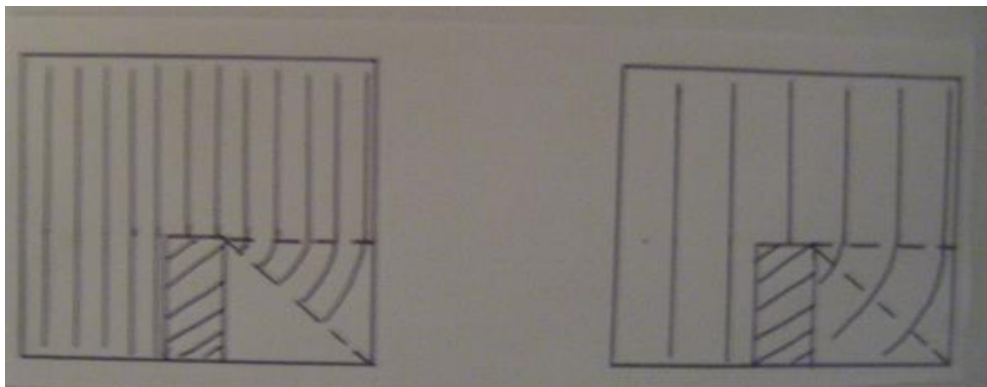
7) 50m.

- 8) a) Wavelength = 0.75m
b) Frequency = 0.2Hz
c) Period = 5 seconds
d) Speed of the waves = 0.15ms^{-1}

- 9) a) i) 2Hz
ii) 0.5 seconds
iii) 1.2m
b) 0.36m

- 10) a) 40m.
b) i) 8ms^{-1}
ii) 0.2Hz
c) i) Amplitude increases.
ii) Wavelength decreases.
iii) Frequency increases.
iv) As the wavelength decreases the frequency increases and vice-versa.

- 11) a) Diffraction.
b) i) Wave A
ii) Wave B
c)



- d) The longer the wavelength the greater the diffraction (bending effect).
The longer waves will be able to bend behind the barrier but the shorter waves will not. This creates a shadow area behind the barrier for short waves.

12) a) Electromagnetic Spectrum

b) They are travel with a speed of $3 \times 10^8 \text{ms}^{-1}$.

c) Visible light.

13) 0.33m

14) a) P – X-Rays, Q – Visible light and R – Microwaves.

b) Gamma Rays.

c) i) A thermometer or photographic film.

ii) To heat up damaged muscle tissue to quicken up the healing process.

d) i) Photographic film or fluorescent materials.

ii) In the winter time there is a lack of UV light. The body absorbs vitamin D3 from the UV light from the sun with can cause a vitamin deficiency in the winter .

iii) Low exposure – Can treat skin conditions such as acne.

High exposure – Can lead to **skin** cancer.

15) a) Chris.

b) Brian hears the music coming from the loudspeakers at the speed of sound in air.

Time = 0.15 seconds

Chris would hear the music from his DAB radio at $3 \times 10^8 \text{ms}^{-1}$.

Time = 0.00013 seconds.

16) a) Red, Orange, Yellow, Green, Blue, Indigo and Violet.

b) Refraction.

c) Violet.

17) a) $4.55 \times 10^{14} \text{Hz}$.

b) $4.41 \times 10^{14} \text{Hz}$.

18) a) To detect broken bones.

b) Photographic film.

c) i) CT scans or CAT scans.(Computer Axial Tomography)

ii) It will not shadow any of the areas behind the bones.

It shows greater detail and a bigger difference between similar types of tissue.