

PiXL Independence – Level 1
Multiple Choice Questions
GCSE Physics – Waves in matter

INSTRUCTIONS

Score: /20

- **Read the question carefully.**
- **Circle the correct letter.**
- **Answer all questions.**

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1. Which ONE of the following types of waves is NOT an example of a mechanical wave?
 - a. Sound waves
 - b. Light waves
 - c. Water waves
 - d. Seismic waves

 2. Select the correct definition from the list below for a transverse wave.
 - a. The oscillations of a transverse wave are perpendicular to the direction in which the waves transfer energy.
 - b. The oscillations of a transverse wave are parallel to the direction in which the waves transfer energy.
 - c. The oscillations of a transverse wave are at 45° to the direction in which the waves transfer energy.
 - d. The oscillations of a transverse wave are in the same direction in which the waves transfer energy.

 3. Which of the following statements about longitudinal waves is FALSE?
 - a. Sound waves are an example of a longitudinal wave.
 - b. A slinky spring can be used to demonstrate how longitudinal waves travel.
 - c. Longitudinal waves have areas of compression and rarefaction.
 - d. All electromagnetic waves are longitudinal waves.

 4. What is the relationship between amplitude and energy?
 - a. The bigger the amplitude of the waves, the more energy the waves carry.
 - b. The smaller the amplitude of the waves, the more energy the waves carry.
 - c. Amplitude and energy are not related, they have no effect on each other.
 - d. Doubling the amplitude of the waves, reduces the amount of energy the wave carries by half.

 5. If the time period of a wave is 4 secs, what is the frequency of the wave?
 - a. 4 Hz
 - b. 25 Hz
 - c. 0.25 Hz
 - d. 40 Hz

6. Identify the correct equation to calculate wave speed.
- $v = \frac{f}{\lambda}$
 - $v = F \cdot \lambda$
 - $v = \frac{\lambda}{F}$
 - $v = f \cdot \lambda$
7. Sound waves in air travel at an approximate speed of ...
- 34 m/s
 - 340 m/s
 - 3400 m/s
 - 3×10^8 m/s
8. Which piece of apparatus would be most suitable for investigating waves?
- A beaker of water.
 - A mirror.
 - A Ripple tank.
 - A flat piece of wood.
9. Refraction occurs at a boundary between two mediums because...
- the speed and wavelength of the waves change.
 - the speed of the waves change.
 - the speed and amplitude of the waves change.
 - the wavelength and the amplitude of the waves change.
10. Sound waves cannot travel through...
- matter.
 - solids.
 - a vacuum.
 - a gas.
11. A reflected sound wave is known as ...
- a repeat.
 - an echo.
 - a return.
 - a reverberation.
12. The frequency range of human hearing is...
- 200 – 20,000 Hz
 - 20 – 2,000,000 Hz
 - 200 – 200, 000 Hz
 - 20 – 20,000 Hz
13. Dolphins can use sonar to detect objects in the sea. How far away is the object from the dolphin if the sonar takes 1 sec to be returned? Sound travels at 1484 m/s in sea water.
- 742 m
 - 1484 m
 - 2968 m
 - 371 m

14. Ultrasound waves are used for medical scans because they are partly reflected at a boundary between...
- air and body tissue.
 - body tissue and bone only.
 - body tissues of the same type.
 - two different types of body tissue.
15. Which ONE of the following is NOT an advantage of using ultrasound?
- Ultrasound is non-ionising.
 - Ultrasound can be used to scan organs.
 - Ultrasound can be used to scan soft tissues.
 - Ultrasound can detect chemical changes within the body's tissues.
16. Ultrasound waves are sound waves of a frequency...
- above 2 kHz.
 - above 20 kHz.
 - above 20 MHz.
 - above 200 kHz.
17. Which ONE of the following statements about seismic waves is correct?
- Primary seismic waves and secondary seismic waves are longitudinal waves.
 - Primary seismic waves and secondary seismic waves are transverse waves.
 - Primary seismic waves are longitudinal waves and secondary seismic waves are transverse waves.
 - Primary seismic waves are transverse waves and secondary seismic waves are longitudinal waves.
18. Earthquakes are recorded by detectors on the surface of the Earth called...
- accelerometers.
 - seismometers.
 - Quake-alarms.
 - motion detector.
19. Seismic P waves are useful for investigating the inner structure of the Earth because they...
- travel slower than S waves.
 - are reflected by solid rock.
 - are refracted by different densities of rock.
 - cannot travel through liquids.
20. The frequency of a sound wave is 440 oscillations every second. Calculate the time period of the tuning fork.
- 2.5×10^{-3} s
 - 440 s
 - 4.4×10^{-3} s
 - 2.5 s

PiXL Independence – Level 2

5 questions, 5 sentences, 5 words

GCSE Physics – Waves in matter

INSTRUCTIONS

- For each statement, use either the suggested website or your own text book to write a 5-point summary. In examinations, answers frequently require more than 1 key word for the mark, so aim to include a few key words.
- It is important to stick to 5 sentences. It is the process of selecting the most relevant information and summarizing it, that will help you remember it.
- Write concisely and do not elaborate unnecessarily, as it is harder to remember and revise facts from a big long paragraph.
- Finally, identify 5 key words that you may have difficulty remembering and include a brief definition. You might like to include a clip art style picture to help you remember it.

Example:

QUESTION:	What is the difference between a longitudinal and a transverse wave?			
Sources:	Website – 1. https://www.mytutor.co.uk/answers/4229/GCSE/Physics/What+is+the+difference+between+Transverse+and+Longitudinal+waves%253F 2. http://www.acs.psu.edu/drussell/Demos/waves/wavemotion.html			
	1. Oscillations of a transverse wave are perpendicular to the direction in which the waves transfer energy. 2. All electromagnetic waves are transverse. 3. Oscillations of longitudinal waves are parallel to the direction in which the waves transfer energy. 4. Sound waves are longitudinal. 5. Mechanical waves can be transverse or longitudinal.			
Transverse wave	Perpendicular – at 90°	Oscillations - vibrations	Parallel – in the same plane as.	Mechanical waves

QUESTION 1:	Explain the difference between a longitudinal and a transverse wave. Draw a diagram of both types of wave and label the main features.
Sources:	Website – 1. https://www.youtube.com/watch?v=iT4KAc0Ag1E 2. http://practicalphysics.org/pulses-and-continuous-waves-slinky-spring.html

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QUESTION 2:	Describe an experiment to investigate waves using a ripple tank.
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Sources:	Website – 1. https://www.youtube.com/watch?v=55z1xL_CBb8 2. http://crodriguez.s3-website-us-east-1.amazonaws.com/Handouts/Physics/Ripple%20Tank%20Lab.pdf
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QUESTION 3:	Describe an experiment investigating waves on a string.
Sources:	Website – <ol style="list-style-type: none">1. https://phet.colorado.edu/en/simulation/wave-on-a-string2. https://www.pearsonschooolsandfecolleges.co.uk/AssetsLibrary/SECTORS/Secondary/PDFs/OCR_AS_Phy_TS_CD_SW.pdf

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QUESTION 4:	How does the ear work and what frequency range can the ear detect?
Sources:	Website – 1. http://kidshealth.org/en/kids/ears.html 2. https://www.youtube.com/watch?v=EEvwwGui2Ac

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QUESTION 5:	Draw and label a wave. Write definitions for each label you add.
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Sources:	Website – <ol style="list-style-type: none">1. http://www.physicsclassroom.com/class/waves/Lesson-2/The-Anatomy-of-a-Wave2. https://scienceaid.net/physics/waves/properties.html
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