

Questions

Q1.

Answer the question with a cross in the box you think is correct ☐. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☐.

A string is stretched between two fixed points and set into oscillation.

The frequency of the vibrating string is **not** dependent on

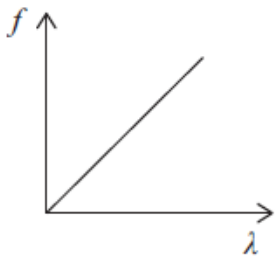
- ☐ **A** the amplitude of the string's vibration.
- ☐ **B** the length of the string.
- ☐ **C** the mass per unit length of the string.
- ☐ **D** the tension in the string.

(Total for question = 1 mark)

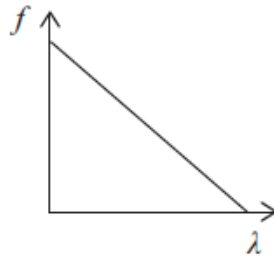
Q2.

Answer the question with a cross in the box you think is correct (☐). If you change your mind about an answer, put a line through the box (☒) and then mark your new answer with a cross (☐).

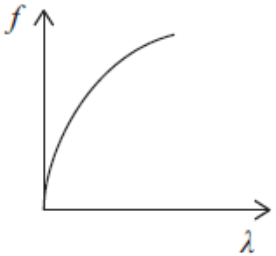
Which of the following graphs represents the relationship between the frequency f and wavelength λ of photons?



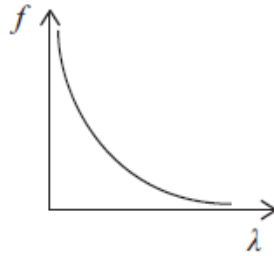
☐ A



☐ B



☐ C



☐ D

(Total for question = 1 mark)

Q3.

Answer the question with a cross in the box you think is correct ☐. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☐.

When longitudinal waves pass through a material, compressions and rarefactions are formed.

Which of the following statements is correct?

- ☐ **A** Compressions are points where the displacement of particles is a maximum.
- ☐ **B** Compressions are points where the pressure is a minimum.
- ☐ **C** Rarefactions are points where the displacement of particles is a minimum.
- ☐ **D** Rarefactions are points where the pressure is a minimum.

(Total for question = 1 mark)

Q4.

Answer the question with a cross in the box you think is correct ☐. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☐.

The time period of a wave decreases.

Which of the following properties of the wave increases?

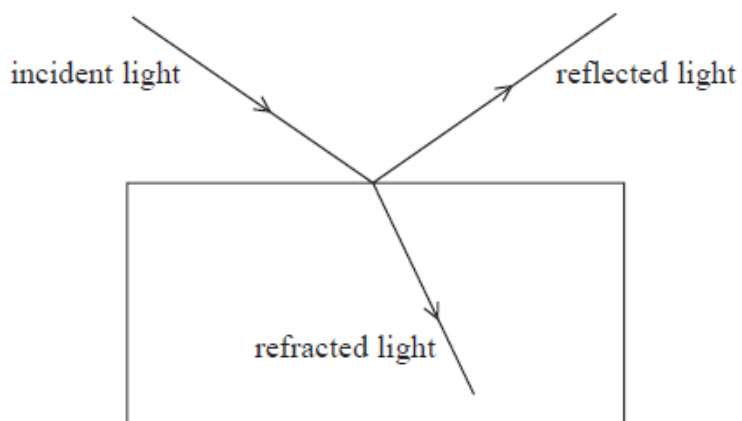
- ☒ **A** amplitude
- ☒ **B** frequency
- ☒ **C** speed
- ☒ **D** wavelength

(Total for question = 1 mark)

Q5.

Answer the question with a cross in the box you think is correct ☐. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☐.

Monochromatic light is incident on a rectangular glass block. Some of the light is reflected and some of the light is refracted, as shown.



Which of the following properties does **not** decrease when the light is refracted?

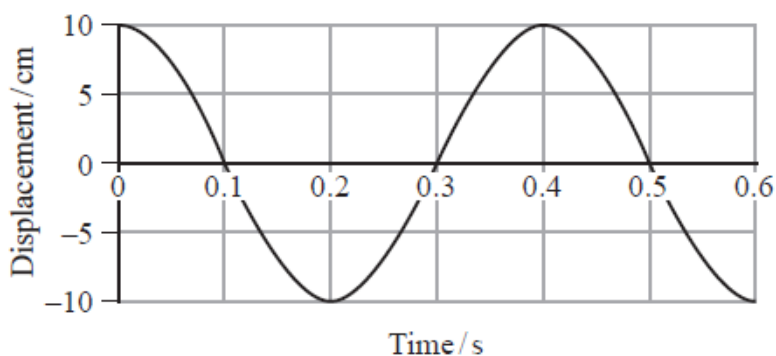
- ☒ **A** frequency
- ☒ **B** intensity
- ☒ **C** speed

☐ **D** wavelength

(Total for question = 1 mark)

Q6.

A graph of displacement against time for a point on a transverse progressive wave is shown.



Which of the following statements is correct?

- ☐ **A** The amplitude of the wave is 20 cm.
- ☐ **B** The frequency of the wave is 2.5 Hz.
- ☐ **C** The period of the wave is 0.2 s.
- ☐ **D** The wavelength of the wave is 0.4 m.

(Total for question = 1 mark)

Q7.

Waves may be longitudinal or transverse.

Which of the following statements is correct?

- ☐ **A** All transverse waves travel at the same speed.
- ☐ **B** All transverse waves have vibrations that are parallel to the direction of wave travel.

- ☐ **C** Both transverse and longitudinal waves can be refracted.
- ☐ **D** No transverse waves can travel through liquids.

(Total for question = 1 mark)

Q8.

Answer the question with a cross in the box you think is correct (☒). If you change your mind about an answer, put a line through the box (☒) and then mark your new answer with a cross (☒).

When longitudinal waves pass through a material, compressions and rarefactions are formed.

Which row of the table is correct?

	Pressure at rarefaction points	Displacement at compression points
☐ A	minimum	maximum
☐ B	maximum	zero
☐ C	maximum	maximum
☐ D	minimum	zero

(Total for question = 1 mark)

Q9.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Two students are discussing longitudinal waves.

Student 1 states that at the centre of a compression the displacement of molecules is zero.

Student 2 states that at the centre of a rarefaction the displacement of molecules is zero.

Which of the students' statements are correct?

- ☐ **A** Both
- ☐ **B** Neither
- ☐ **C** Only student 1
- ☐ **D** Only student 2

(Total for question = 1 mark)

Q10.

Answer the question with a cross in the box you think is correct ☐. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☐.

Monochromatic light travels through air and enters a glass block.

Which of the following quantities does **not** change as light enters the glass block?

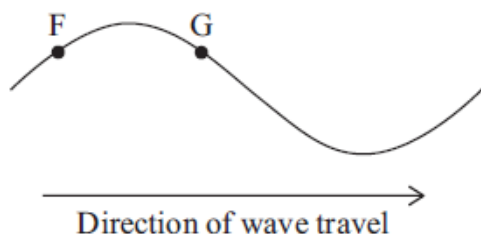
- ☐ **A** amplitude
- ☐ **B** frequency
- ☐ **C** speed
- ☐ **D** wavelength

(Total for question = 1 mark)

Q11.

Answer the question with a cross in the box you think is correct (☐). If you change your mind about an answer, put a line through the box (☒) and then mark your new answer with a cross (☐.

A wave is moving along a length of string in the direction shown.



F and G are two points on the string.

Which row of the table describes the movement of F and G as one complete wave passes?

	F	G
☐ A	Down then up	Down then up
☐ B	Down then up	Up then down
☐ C	Down, then up, then down	Up, then down, then up
☐ D	Up, then down, then up	Down, then up, then down

(Total for question = 1 mark)

Q12.

Answer the question with a cross in the box you think is correct ☐. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☐.

Which of the following pairs of quantities could be used to calculate the speed of a wave?

- ☐ A amplitude and frequency
- ☐ B amplitude and wavelength
- ☐ C period and frequency
- ☐ D period and wavelength

(Total for question = 1 mark)

Q13.

Answer the question with a cross in the box you think is correct ☐. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☐.

When a guitar string is plucked, a sound of constant frequency is heard.

The wave produced on the vibrating guitar string is

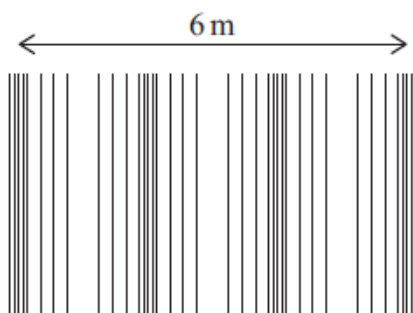
- ☐ **A** longitudinal and progressive.
- ☐ **B** longitudinal and stationary.
- ☐ **C** transverse and progressive.
- ☐ **D** transverse and stationary.

(Total for question = 1 mark)

Q14.

Answer the question with a cross in the box you think is correct (☐). If you change your mind about an answer, put a line through the box (☒) and then mark your new answer with a cross (☐.

The diagram represents a longitudinal wave.



Which of the following is the wavelength of the wave?

- ☐ **A** 2 m
- ☐ **B** 3 m
- ☐ **C** 4 m
- ☐ **D** 6 m

(Total for question = 1 mark)

Q15.

Answer the question with a cross in the box you think is correct ☐ . If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☐ .

Waves can be represented on graphs of displacement against distance and displacement against time.

Which of the following properties can only be determined by combining information from both graphs?

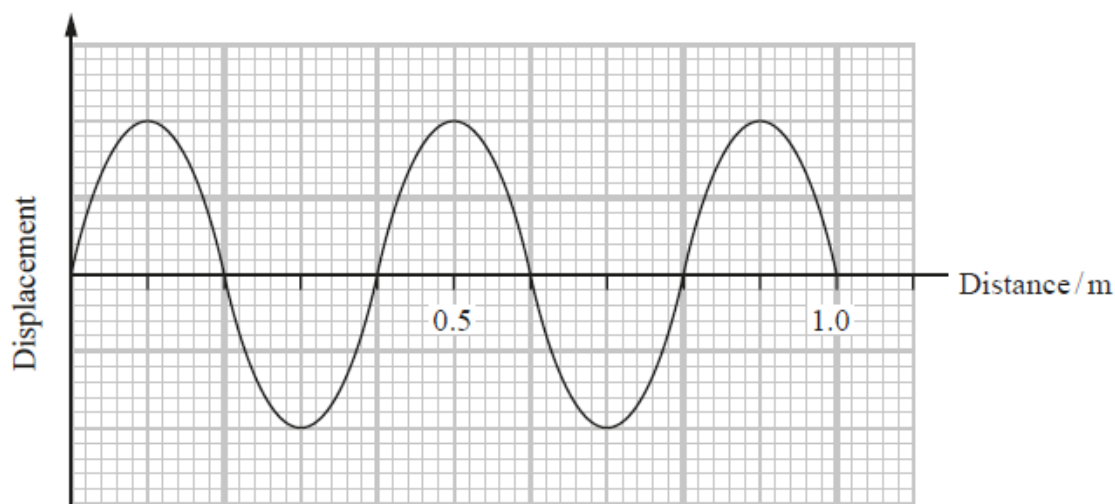
- ☐ **A** amplitude
- ☐ **B** frequency
- ☐ **C** speed
- ☐ **D** wavelength

(Total for question = 1 mark)

Q16.

Active Noise Reduction (ANR) is a system used to reduce unwanted noise. In ANR a second sound wave is produced that cancels the first. ANR is used in aircraft to reduce the noise heard from the engine.

(a) On a particular flight, the noise from the engine has a frequency of 0.85 kHz. The graph shows a possible second wave.



Determine whether this wave could be suitable to cancel the noise from the engine.

speed of sound in air = 340 m s^{-1}

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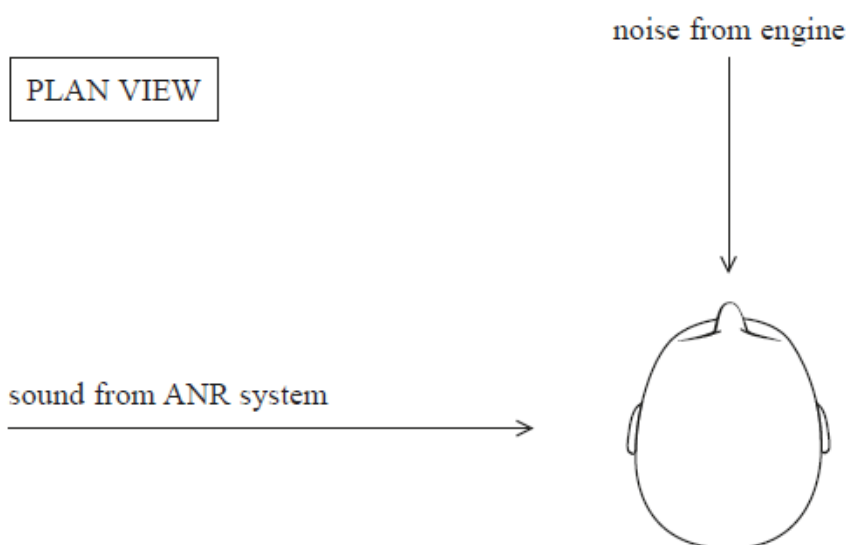
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*(b) For a particular passenger in an aircraft, the noise from the engine travels as a wave towards the passenger from the front. An ANR system creates a second sound wave that is directed towards the passenger from the side, as shown.



Explain how this can lead to the sound being cancelled for one ear but louder for the other ear.

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(Total for question = 9 marks)