**Safety Bay SHS**

**Physics - Unit 2**

**Waves Test**

**Name: Total Marks /50**

Note: Show working for all mathematical answers.

**Question 1:**

Three students are using a piece of string to make a standing wave. The following graph shows the wavelength of part of the string at one particular instance.   
  
a) What is the amplitude and wavelength of the wave the string creates.   
(2 marks)

Amplitude \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Wavelength \_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) If the wave is travelling at 4.00 ms-1, what is the period of the wave?   
**(3 marks)**

**Question 2:**

Complete the following: **(3 marks)**

1. In a region of stationary waves, nodes indicate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ vibration of particles.
2. The number of waves in a given time. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. The distance between two crests on a displacement / time graph is called the \_\_\_\_\_\_\_\_\_\_.

**Question 3:**

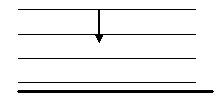
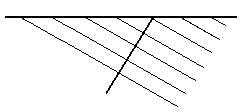
Waves can travel as longitudinal waves or transverse waves. Fully explain the difference giving one example of each. **(3 marks)**

**Question 4:**

State the Law of Reflection **(1 mark)**

**Question 5:**

Complete the following diagrams for reflection of waves at harbour wall and refraction of sound of bell above water. **(3 marks)**

 Air

water

Harbour Wall Bell

**Question 6:**

One trope in movies is the Opera singer who sings a very high and loud note at the finale of the song that all the glass in the room shatters. What phenomena is this called and explain how this could actually happen. **(3 marks)**

**Question 7:**

An organ pipe X, with both ends open, sounds its fundamental frequency of 330 Hz. The pipe is filled with dry air at 25 ⁰C.

1. On the diagram below, draw a wave envelope representing the particle displacement in the pipe when it is sounding at its fundamental frequency? **(2 marks)**
2. Calculate the length of this organ pipe. **(4 marks)**
3. On the diagrams below, draw wave envelopes for the first two harmonics produced by this pipe. Number each of the harmonics in the space provided. **(3 marks)**
4. On hot days, musical instruments like an organ can sound slightly out of tune. Suggest a reason for this. **(2 marks)**

**Question 8:**

A Kreepy Krauly on a pool made waves form on the surface. 25 waves are produced in 5.0 seconds

covering a distance of 10m. Find   
  
a) Frequency **(1 mark)**  
  
  
  
b) Wavelength **(1 mark)**  
  
  
  
  
c) Speed **(1 mark)**

**Question 9:**

The two speakers below are producing a 680 Hz note. Assume the speed of sound in air is 340 ms-1. Point P is 10.00 m from speaker A and 12.75 m from speaker B.

**P**

A 10.00 m

B 12.75 m

Determine if there is a node or anti-node at point P and what would be hear at this point. You must justify your answer to receive any marks. The wave position next to the speakers is an anti-node. A diagram may assist your answer. **(4 marks)**

**Question 10:**

Animals that use echolocation such as bats and dolphins use very high frequencies to locate objects

1. Explain how echolocation works and how it allows bats and dolphins to find things. **(2 marks)**
2. Why are the sounds are at very high pitch instead of low pitch **(2 marks)**

**Question 11:**

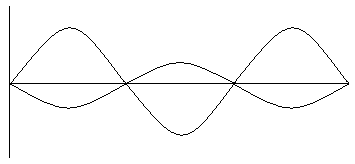
A teacher plays two very similar tones from the audio frequency oscillator. The notes were 440Hz and 442Hz. This produced a loud sound followed by a soft sound which then is followed by a loud sound and keeps repeating.

a) What is this phenomenon called? **(1 mark)**  
  
  
  
b) Calculate the frequency of the repeating loud, soft sound? **(2 marks)**  
  
  
  
  
  
c) Can you explain why the sound gets loud and then gets soft? **(2 marks)**

**Question 12:**

A student has set up two waves on a dual beam CRO. She then adds them together.

Draw the resultant wave below. **(2 marks)**



**Question 13:**

Diamonds are cut in a particular shape to become very shiny. Explain why cutting diamonds this way makes very particularly shiny. Use diagrams to explain. **(3 marks)**