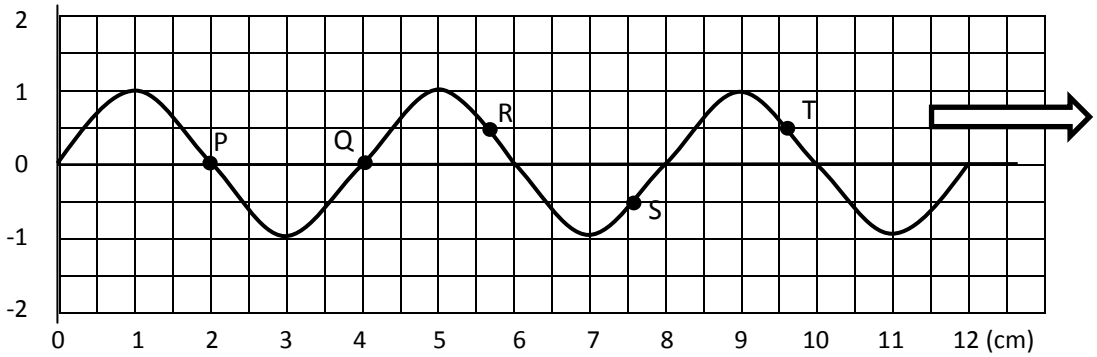
Gr 10 Science TEST Waves 1st term 2013 [total 40]

1 Multiple choice: write just the letter of the best answer.

Use the following wave form and information to answer the next four questions (1.1-1.4):
The wave form is moving left to right in the direction of the arrow at a speed of 2 cm.s^{-1} .



1.1 The amplitude and wavelength of the wave shown is:

	Amplitude	Wavelength
A	1 cm	2 cm
B	2 cm	12 cm
C	1 cm	4 cm
D	2 cm	4 cm

1.2 How is the medium moving at the point marked, Q?
(A) ↑ (B) ↓ (C) ↙ (D) not moving, it's in equilibrium position

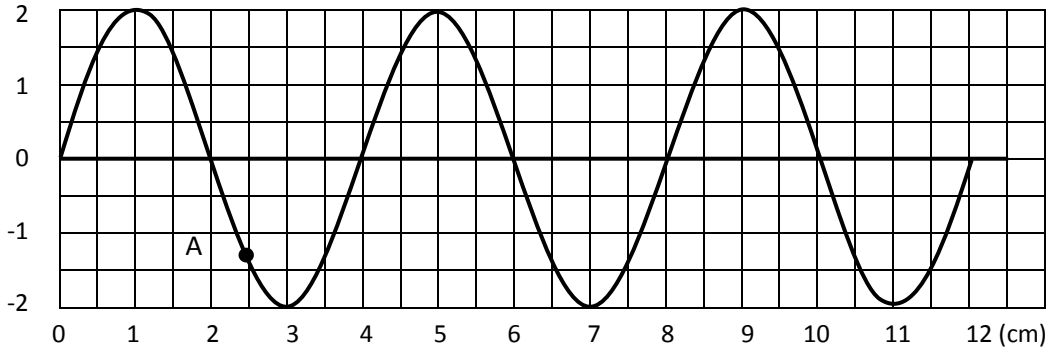
1.3 The frequency of the wave is:
(A) ½ Hz (B) 2 Hz (C) 8 Hz (D) insufficient information

1.4 The points marked that are in phase with each other are:
(A) P & Q (B) R & S (C) S & T (D) R & T

[2x4=8]

2. Given the drawing below and the scales in cm, answer the following questions:
On the grid below:

a) Draw another wave with same wavelength and half the amplitude. Label is a) (2)
b) Draw a third wave with same amplitude and twice the frequency. Label it b) (2)
c) Label another point, C, that is in phase with point, A (1)
d) label another point, D, that is exactly out of phase with point, A (1)



3. A pulse has a speed of 6 $m.s^{-1}$. How far will it travel in 5 seconds? (3)

4. A wave travels along a string at a speed of 12 $m.s^{-1}$. If the wavelength of the wave is 3 m calculate:

4.1 The frequency of the source of waves. (3)

4.2 The period of the wave. (2)

5 A transverse pulse of amplitude +15mm is travelling to the right and one of amplitude -25mm is moving to the left in the same medium.

5.1 Draw a diagram to show them approaching and then crossing each other. (2)

5.2 What type of interference occurs? (1)

5.3 What is the amplitude of the resultant when they cross? (1)

5.4 Name the principle used to determine 5.3 above. (1)

6 <u>Sound</u>

6.1 Why is space regarded as "silent"? (1)

6.2 In which does sound travel faster: air or water? (1)

6.3 What type of wave is sound? (1)

6.4 Explain the difference between high pitch and low pitch, soft and loud in terms of the properties of waves, viz amplitude, wavelength and frequency. (4)

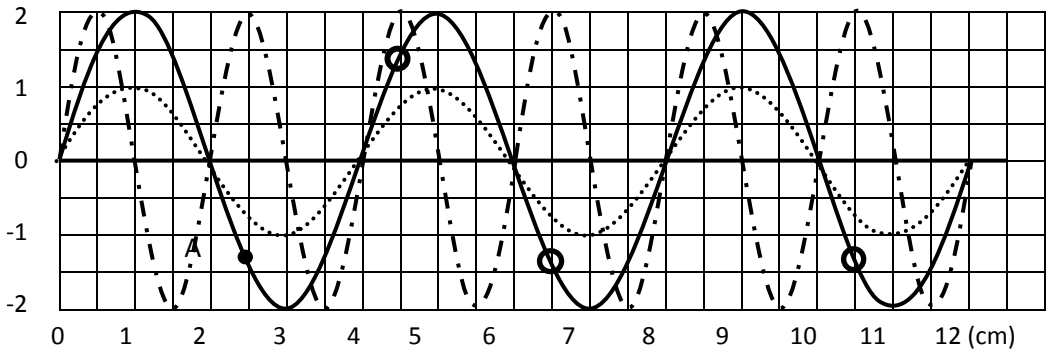
6.5 Sound travels at 1500 $m.s^{-1}$ in the sea. A ship sends out an echo location signal that it receives back in 1,8 seconds. How deep is the ocean floor below the ship? (3)

6.6 The note middle C has a frequency of 256 Hz. If the speed of sound in air is 340 $m.s^{-1}$, calculate the wavelength of the note. (3)

[40]

Answers:
1.1 C 1.2 B 1.3 A 1.4 D

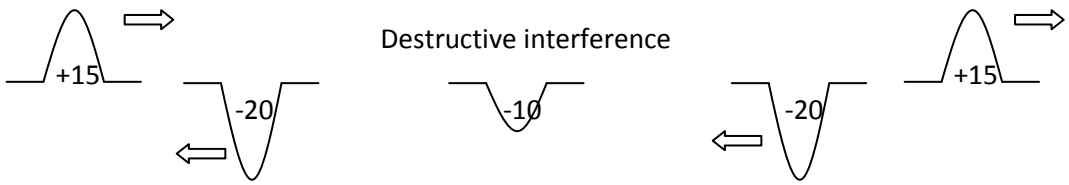
2



3. vel=dist/time therefore: dist = vel x time = 6 x 5 = 30 m

4.1 $f=v/\lambda = 12/3 = 4$ Hz 4.2 $T = 1/f = ¼ = 0.25$ s

5 Approaching Crossing Gone passed each other

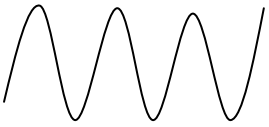


5.4 Principle of superposition of waves

6.1 Space silent because there is no medium to vibrate.
6.2 Faster in water the more elastic medium.
6.3 Sound is a compression / longitudinal wave.
6.4 High pitch equals high frequency and short wavelength

Low pitch equals low frequency and long wavelengths

Loud equals big amplitude



soft equals small amplitude

6.5 Dist sound travels = vel x time = 1500 x 1,8 = 2700 m in total
i.e. to the bottom of the ocean and back.
So the depth is half that distance = 1350 m = 1,35 km
6.6 $\lambda = v/f = 340/256 = 1{,}33$ m.s^{-1}