

Name of the Student: _____

Max. Marks : 25 Marks

Time : 25 Minutes

Q1.

Sound travels as longitudinal waves.

- (a) Complete the sentences.

Choose the answers from the box.

amplitude	frequency	speed	wavelength
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The distance between the centre of one compression of a sound wave and the centre of the next compression is called the _____.

The number of waves passing a point each second is called the _____.

(2)

- (b) Complete the sentence.

Choose the answer from the box.

opposite	perpendicular	parallel
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In a longitudinal wave, the oscillations are _____
to the direction of energy transfer.

(1)

- (c) A sound wave has a frequency of 8.0 kHz.

Which of the following is the same as 8.0 kHz?

Tick (✓) **one** box.

0.0080 Hz

☐

8.0 Hz

☐

8000 Hz

800 000 Hz

(1)

- (d) Calculate the period of a sound wave with a frequency of 8.0 kHz.

Use the Physics Equations Sheet.

Period = _____ s

(2)

- (e) Calculate the wavelength of a sound wave with a frequency of 6600 Hz.

speed of sound = 330 m/s

Use the equation:

$$\text{wavelength} = \frac{\text{speed}}{\text{frequency}}$$

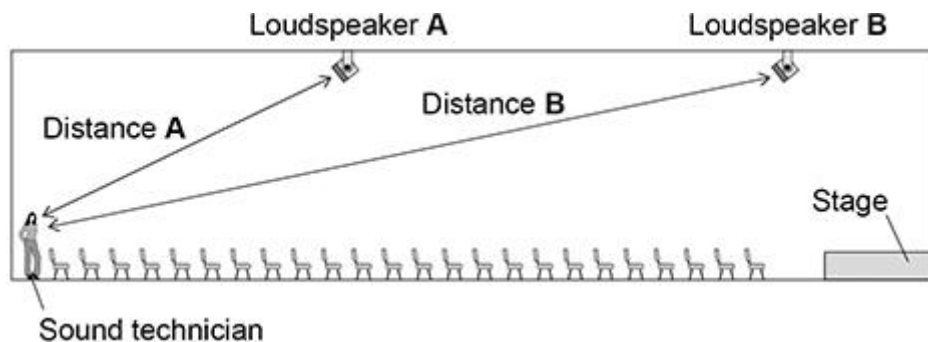
Choose the unit from the box.

kg	m	N
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Wavelength = _____ Unit _____

(3)

The figure below shows the arrangement of two loudspeakers at a concert venue.



The loudspeakers in above diagram are tested by playing the same song through both loudspeakers.

A sound technician listens to the song.

Use the Physics Equations Sheet to answer parts (f) and (g).

(f) Write down the equation which links distance (s), speed (v) and time (t).

(1)

(g) Distance **A** on above diagram is 13.2 m.

speed of sound = 330 m/s

Calculate the time taken for the sound to travel from loudspeaker **A** to the technician.

Time taken = _____ s

(3)

(h) The sound from each loudspeaker travels at the same speed.

For the sound technician to hear the song clearly, the sound from loudspeaker **B** should be emitted slightly before the sound from loudspeaker **A**.

Explain why.

(3)

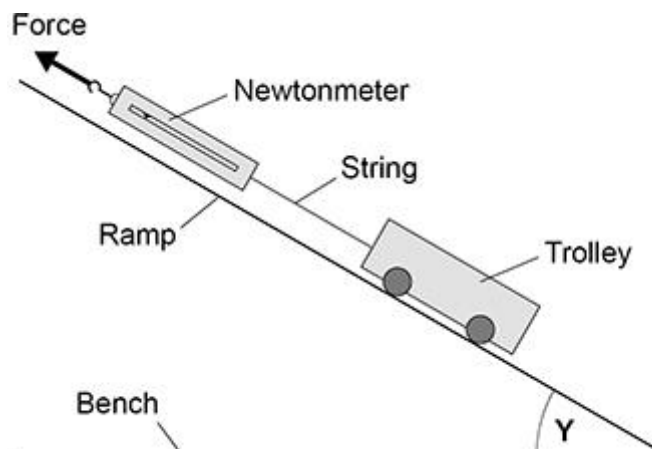
(Total 16 marks)

Q2.

A student investigated how the angle of a ramp affects the force required to hold a trolley stationary on the ramp.

Figure 1 shows the equipment used.

Figure 1



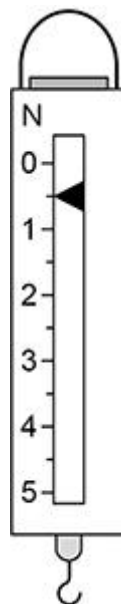
(a) Measure the angle **Y** in **Figure 1**

Angle **Y** = _____ degrees

(1)

Figure 2 shows the newtonmeter before the investigation started.

Figure 2



(b) What type of error is shown on the newtonmeter in **Figure 2**?

Tick (✓) **one** box.

Human error

☐

Random error

☐

Zero error

☐

(1)

(c) How can this error be corrected after the measurements have been taken?

Tick (✓) **one** box.

Add 0.5 N to each measurement

☐

Multiply each measurement by 0.5 N

☐

Subtract 0.5 N from each measurement

☐

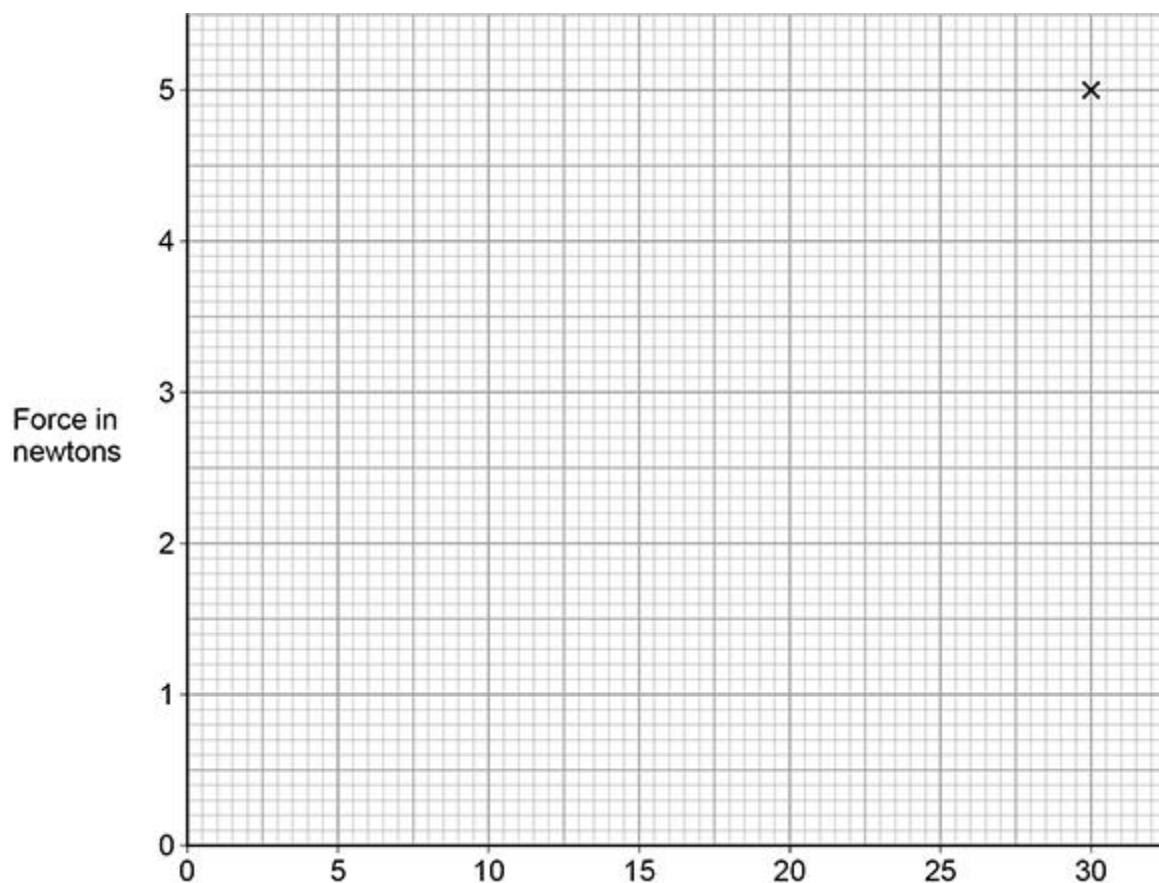
(1)

The table below shows the corrected results.

Angle of ramp in degrees	Force in newtons
5	0.9
10	1.7
15	2.6
20	3.4
25	4.2
30	5.0

Figure 3 is an incomplete graph of the results

Figure 3



(d) Plot the missing results from the table above on **Figure 3**.

(2)

(e) **Figure 4** shows a person in a wheelchair using two different ramps to enter a van.

Figure 4



The ramps are at different angles to the ground.

Explain **one** advantage of using the long ramp compared with using the short ramp.

(2)

(f) A force of 160 N is used to move the wheelchair up the long ramp.

The ramp is 2.5 m long.

Calculate the work done to move the wheelchair up the ramp.

Use the equation:

$$\text{work done} = \text{force} \times \text{distance}$$

Work done = _____ J

(2)

(Total 9 marks)