

**Name of the Student:** \_\_\_\_\_

**Max. Marks : 16 Marks**

**Time : 16 Minutes**

**Q1.**

An athlete runs in a marathon race. As he runs, his body gets hotter.

His body produces sweat to help him cool down.

- (a) Explain in terms of particles, how sweating helps the athlete to cool down.

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**(4)**

- (b) At the end of the race, the athlete is covered with a 'space blanket' made from shiny foil to prevent him from cooling too quickly.



He wraps the space blanket around his body to reduce energy transfer to the surroundings.

How does the space blanket reduce energy transfer to the surroundings?

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(3)

(Total 7 marks)

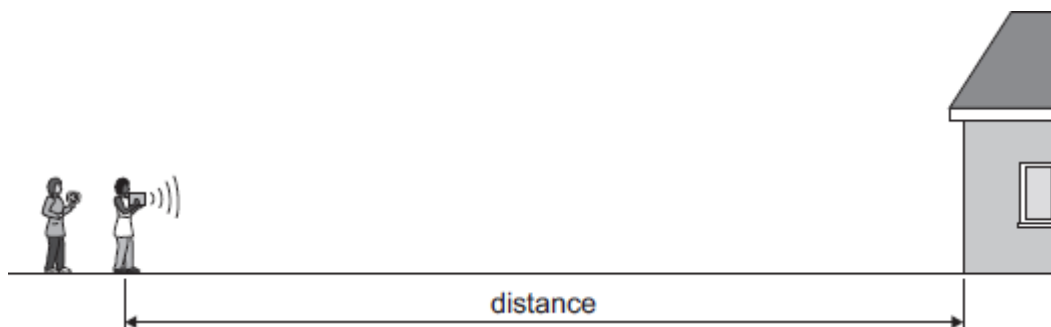
## Q2.

Two students investigated the reflection of sound waves from a building.

One student used a signal generator connected to a loudspeaker to produce a short, high-pitched sound wave.

The second student used a stop clock to measure the time taken for the sound wave to return to the students.

The students repeated the experiment at different distances from the building.



- (a) Sound is a longitudinal wave.

How is a longitudinal wave different from a transverse wave?

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(2)

- (b) The students' results are shown in the table.

|                           | <b>Trial 1</b> | <b>Trial 2</b> | <b>Trial 3</b> |
|---------------------------|----------------|----------------|----------------|
| <b>Time in seconds</b>    | 0.40           | 0.59           | 0.92           |
| <b>Distance in metres</b> | 50.0           | 100.0          | 150.0          |

- (i) What was probably the biggest source of error in the students' investigation?

Give a reason for your answer.

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(2)

- (ii) The signal generator was set at a frequency of 1.2 kHz.

The speed of sound in air, when the students did the investigation, was 340 m/s.

Calculate the wavelength of the sound wave generated by the speaker.

Use the correct equation from the Physics Equations Sheet.

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Wavelength = \_\_\_\_\_ m

(3)

(Total 7 marks)

### Q3.

Electromagnetic waves behave differently in different situations.

Electromagnetic waves travel at a speed of  $3 \times 10^8$  m/s in a vacuum.

Microwave radiation has a wavelength of 2 cm.

Calculate the frequency of microwave radiation.

Use the correct equation from the Physics Equations Sheet.

Show clearly how you work out your answer.

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Frequency = \_\_\_\_\_ hertz  
(Total 2 marks)