

Name of the Student: _____

Max. Marks : 17 Marks

Time : 17 Minutes

Q1.

- (a) Which one of the following is not an electromagnetic wave?

Tick **one** box.

Gamma rays

☐

Sound

☐

Ultraviolet

☐

X-rays

☐

(1)

- (b) What type of electromagnetic wave do our eyes detect?

(1)

- (c) What is a practical use for infrared waves?

Tick **one** box.

Cooking food

☐

Energy efficient lamps

☐

Medical imaging

☐

Satellite communications

☐

(1)

Scientists have detected radio waves emitted from a distant galaxy.

Some of the radio waves from the distant galaxy have a frequency of 1 200 000 000 hertz.

- (d) Which is the same as 1 200 000 000 hertz?

Tick **one** box.

1.2 gigahertz

☐

1.2 kilohertz

☐

1.2 megahertz

☐

1.2 millihertz

☐

(1)

- (e) Radio waves travel through space at 300 000 kilometres per second (km/s).

How is 300 000 km/s converted to metres per second (m/s)?

Tick **one** box.

$300\,000 \div 1000 = 300\text{ m/s}$

☐

$300\,000 \times 1000 = 300\,000\,000\text{ m/s}$

☐

$300\,000 + 1000 = 301\,000\text{ m/s}$

☐

$300\,000 - 1000 = 299\,000\text{ m/s}$

☐

(1)

- (f) Write the equation which links frequency, wavelength and wave speed.

(1)

- (g) Calculate the wavelength of the radio waves emitted from the distant galaxy.

Give your answer in metres.

wavelength = _____ m

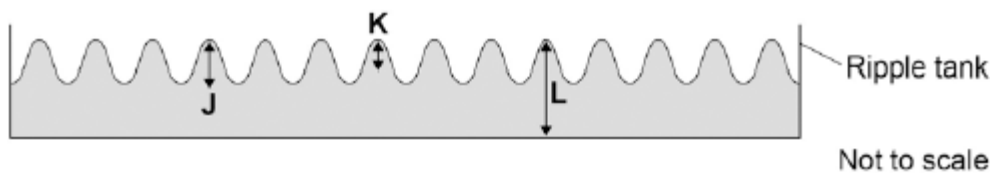
(3)

(Total 9 marks)

Q2.

Small water waves are created in a ripple tank by a wooden bar. The wooden bar vibrates up and down hitting the surface of the water.

The figure below shows a cross-section of the ripple tank and water.



- (a) Which letter shows the amplitude of a water wave?

Tick **one** box.

J

☐

K

☐

L

☐

(1)

- (b) The speed of the wooden bar is changed so that the bar hits the water fewer times each second.

What happens to the frequency of the waves produced?

Tick **one** box.

Increases

☐

Does not change

☐

Decreases

☐

(1)

- (c) Describe how the wavelength of the water waves in a ripple tank can be measured accurately.

(2)

(d) The speed of a wave is calculated using the following equation.

$$\text{wave speed} = \text{frequency} \times \text{wavelength}$$

The water waves in a ripple tank have a wavelength of 1.2 cm and a frequency of 18.5 Hz.

How does the speed of these water waves compare to the typical speed of a person walking?

(4)

(Total 8 marks)