Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 Minutes**

Q1.

Ultraviolet is a type of electromagnetic wave.

(a) Give **one** use of ultraviolet.

_____

(1)

(b) An ultraviolet wave has a wavelength of 300 nanometres.

Which of the following is equal to 300 nanometres?

Tick (✓) **one** box.

3×10^{7} m ☐

3×10^{-7} m ☐

3×10^{9} m ☐

3×10^{-9} m ☐

(1)

(c) The speed of ultraviolet waves is 3×10^{8} m/s.

Calculate the frequency of the ultraviolet wave.

Use your answer to part (b)

_____

_____

_____

_____

_____

Frequency = _____ Hz

(3)

(d) The table below gives the wavelength of an ultraviolet wave and three other electromagnetic waves.

	Ultraviolet	**Wave E**	**Wave F**	**Wave G**
Wavelength in nanometres	300	0.1	600	100 000

Draw **one** line from each wave to the name of the wave.

Wave	**Name**
Wave E	Infrared
Wave F	Visible light
Wave G	X-rays

(1)

(e) Electromagnetic waves are transverse.

Some other types of wave are longitudinal.

Describe the difference between transverse and longitudinal waves.

_____

_____

_____

_____

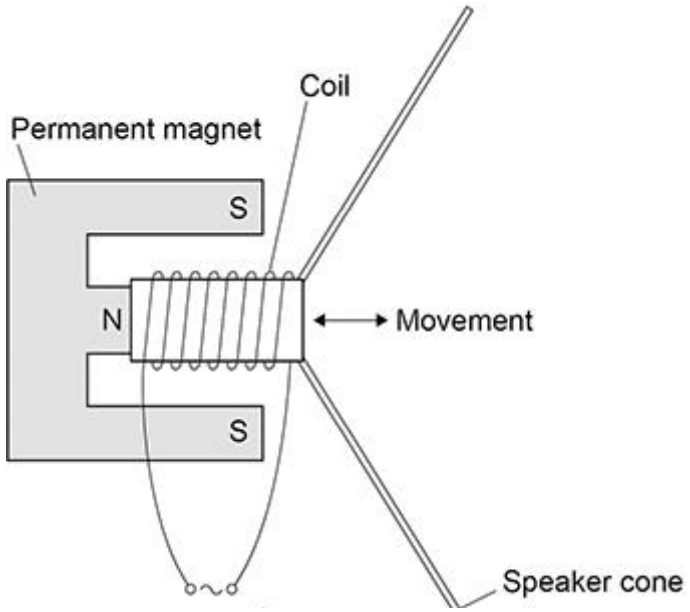
(2)

(Total 8 marks)

Q2.

A student made a moving-coil loudspeaker.

The figure below shows a diagram of the loudspeaker.



(a) What is the name of the effect used by the moving-coil loudspeaker to produce sound waves?

_____

(1)

(b) Explain how a moving-coil loudspeaker produces a sound wave.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(4)

(c) A student investigated how the loudness of sound from the loudspeaker depends on:

- the number of turns on the coil
- the frequency of the supply.

The table below shows the results.

Number of turns	Frequency of supply in Hz	Loudness of sound in arbitrary units
100	200	32

200	400	47
300	600	63

Explain why the results **cannot** be used to make a valid conclusion.

_____

_____

_____

_____

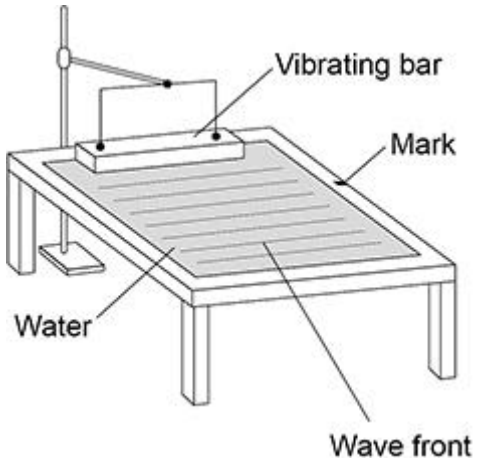
(2)

(Total 7 marks)

Q3.

A teacher demonstrated some features of waves using a ripple tank.

The figure below shows the ripple tank.



(a) The teacher measured the time taken for 10 wave fronts to pass the mark.

The teacher repeated this measurement three times and calculated the mean.

What is the advantage of repeating measurements and calculating a mean?

_____

_____

(1)

(b) The teacher's measurements for the time taken for 10 wave fronts to pass the mark were:

8.4 s 7.8 s 8.1 s

Calculate the mean frequency of the wave.

Give your answer to 2 significant figures.

_____

_____

Mean frequency (2 significant figures) = _____ Hz

(5)

(c) In a different investigation, the teacher wanted to determine the speed of water waves in the ripple tank.

The teacher did **not** measure the wavelength of the wave.

Explain how the teacher could determine the speed of the wave.

(3)

(Total 9 marks)