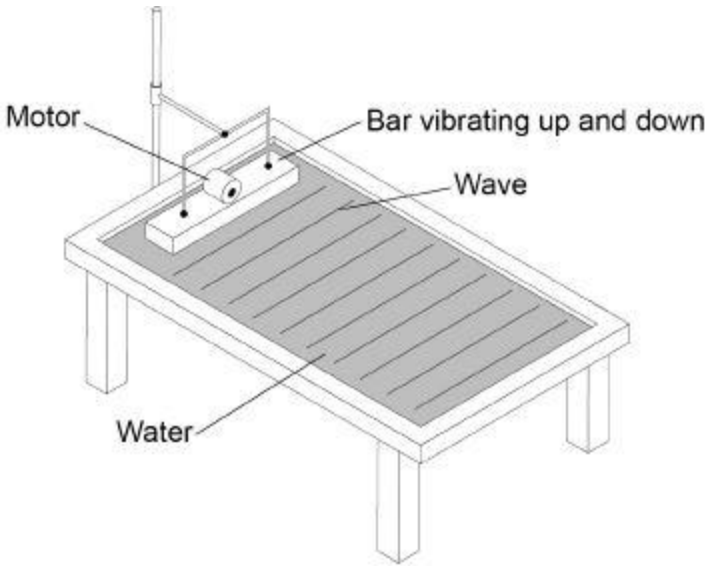
Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

The diagram below shows a ripple tank that a student used to investigate water waves.



(a) The student adjusted the speed of the motor so that the bar hit the water more times each second.

What happened to the frequency of the waves produced?

Tick **one** box.

Decreased ☐

Did not change ☐

Increased ☐

(1)

(b) Describe how the frequency of the water waves in the ripple tank can be measured.

_____

_____

_____

_____

(2)

(c) The student measured the frequency of the water waves as 5 hertz.

Calculate the period of the water waves.

Use the equation:

$$\text{period} = \frac{1}{\text{frequency}}$$

Choose the unit.

metres	**metres / second**	**seconds**

_____

_____

_____

_____

Period = _____ Unit = _____

(3)

(Total 6 marks)

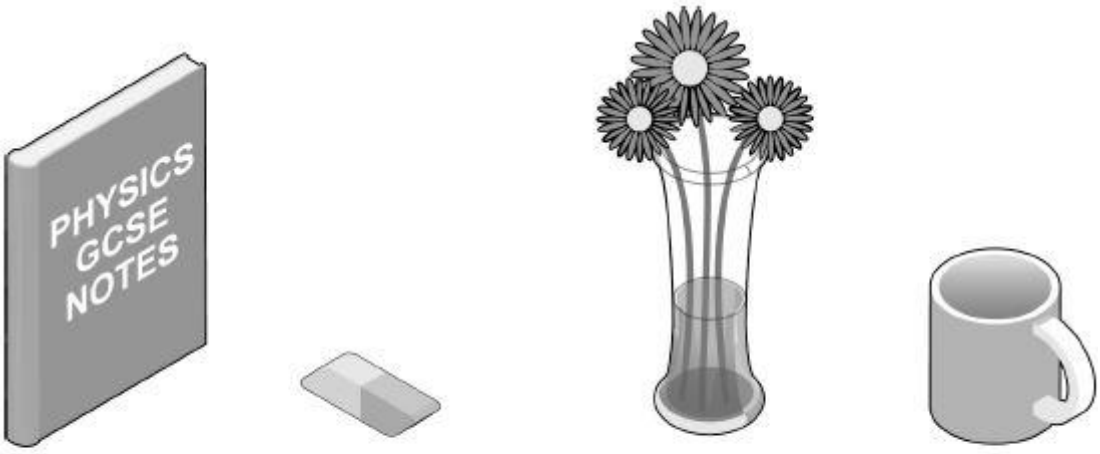
Q2.

Some objects are transparent and some objects are opaque.

(a) Which **one** of the objects in **Figure 1** is transparent?

Tick **one** box.

Figure 1



(1)

(b) Complete the sentence.

Choose an answer from the box.

absorb	reflect	transmit

An opaque object does not _____ light.

(1)

A student wears a white T-shirt and a red baseball cap to a party.

(c) Why does the T-shirt look white in white light?

_____

_____

(1)

(d) Explain how the colour of the baseball cap appears to change when the room lights at the party change from white to blue.

_____

_____

_____

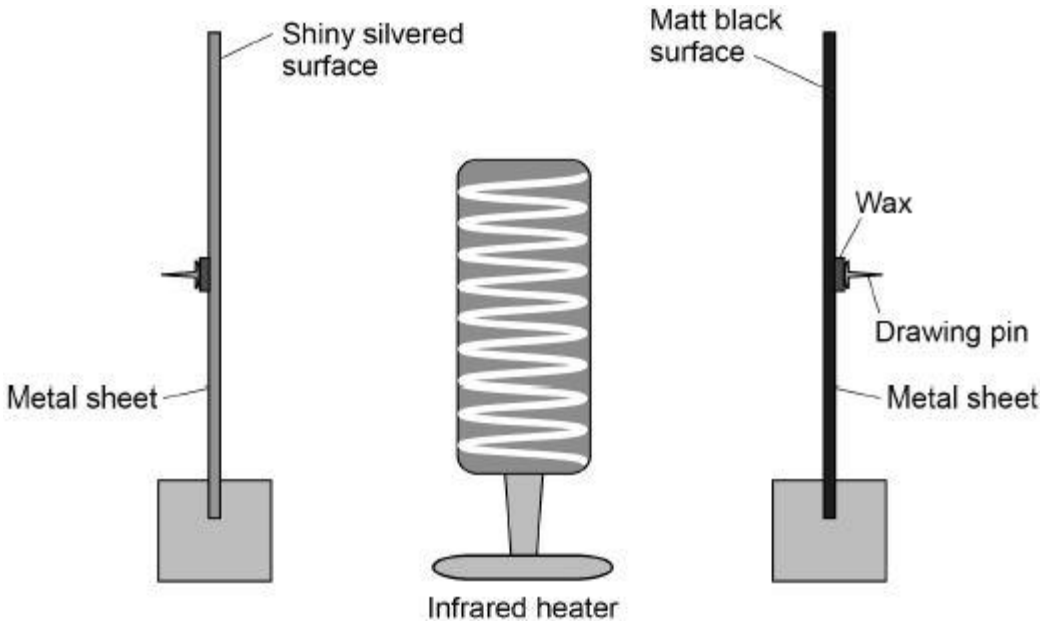
_____

(2)

A student investigated how the type of surface affects the amount of infrared radiation the surface absorbs.

Figure 2 shows the equipment that the student used.

Figure 2



The metal sheets absorb infrared radiation. The wax melts and the drawing pins fall off the surfaces.

(e) In the investigation there are several variables.

Draw **one** line from each variable to the correct description of that variable.

Variable	Description
Control	Distance from the metal sheets to the infrared heater.
Dependent	The surface colour of the metal sheets.
Independent	Time taken for the drawing pins to fall off.

(2)

(f) What is the main hazard in this investigation?

_____

_____

(1)

(g) The drawing pin attached to the matt black metal sheet fell off first.

What can be concluded from this result?

_____

_____

(1)

(Total 9 marks)

Q3.

The diagram below shows the position of three types of wave in the electromagnetic spectrum.

Radio waves	**A**	**B**	**C**	Ultraviolet	X-rays	**D**

(a) Which position shows where visible light is in the spectrum?

Tick **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

(1)

(b) Which **one** of the statements about electromagnetic waves is correct?

Tick **one** box.

Radio waves have a higher frequency than X-rays. ☐

Radio waves have a longer wavelength than ultraviolet. ☐

X-rays have a longer wavelength than radio waves. ☐

X-rays travel faster through the air than ultraviolet. ☐

(1)

(c) Give **one** possible danger of exposing your skin to ultraviolet radiation.

_____

_____

(1)

(d) Having an X-ray taken exposes a person to ionising radiation.

The table below gives the average radiation dose for an X-ray of the chest and an X-ray of the upper digestive system.

Part of the body	**Radiation dose in millisieverts (mSv)**
Upper digestive system	5.0
Chest	0.1

The risk of an X-ray causing cancer is about 1 in 20 000 for each mSv of radiation received.

Compare the risk of developing cancer from having an X-ray of the upper digestive system with the risk from having an X-ray of the chest.

Use the data in the table.

_____

_____

_____

_____

(2)

(Total 5 marks)