

P12 Exam Practice 2 Foundation

Q1.

There are different types of electromagnetic waves.

- (a) What do all electromagnetic waves transfer?

Tick (✓) **one** box.

Charge	<input type="checkbox"/>
Energy	<input type="checkbox"/>
Matter	<input type="checkbox"/>
Sound	<input type="checkbox"/>

(1)

- (b) Complete the sentence.

Choose answers from the box.

charge	frequency	speed	wavelength
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Different types of electromagnetic waves have a different _____
and a different _____.

(2)

- (c) The diagram below shows the electromagnetic spectrum.

Radio waves	Microwaves	Infrared	A	Ultraviolet	X-rays	B
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Give the names of parts **A** and **B** of the electromagnetic spectrum.

A _____

B _____

(2)

- (d) Different types of electromagnetic waves have different uses.

Draw **one** line from each type of electromagnetic wave to its use.

Type of

Use

electromagnetic wave

Microwaves

Ultraviolet

X-rays

Electrical heaters

Energy efficient lamps

Imaging bones

Satellite communications

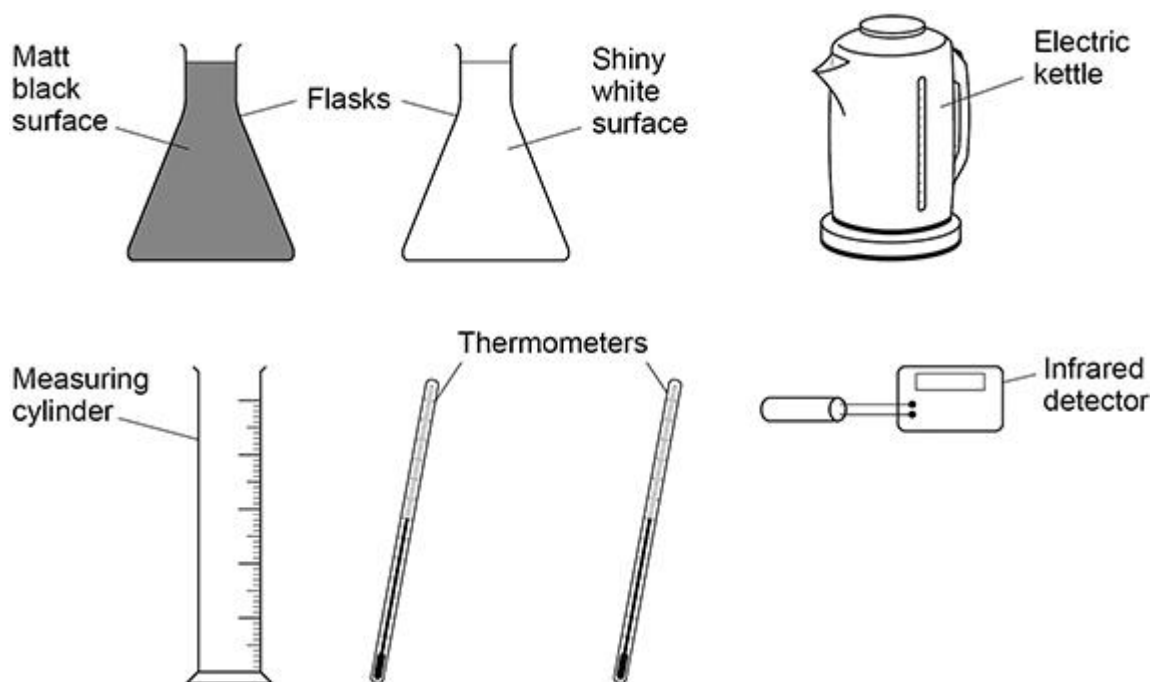
(3)
(Total 8 marks)

Q2.

A student investigated how the colour of a surface affects the power of the infrared radiation emitted by the surface.

Figure 1 shows the equipment used.

Figure 1



The infrared detector measures the power of the infrared radiation emitted by the flasks.

(a) The student poured hot water into each flask.

What should the student do to reduce the risk of burning herself with the hot water?

(b) Describe how the student should use the equipment in **Figure 1** to compare the power of the infrared radiation emitted by each surface.

A student investigated how the power of the infrared radiation emitted from a flask changed with time.

The table below shows the results.

Time in seconds	Power in watts
0	8.0
60	7.2
120	6.5
180	5.9
240	5.4
300	5.0
360	4.7
420	4.5

(c) Describe the pattern shown by the data in the table above.

(2)

- (d) What is the most likely value for the power of the infrared radiation emitted after 480 seconds?

Use the table above.

Tick (✓) **one** box.

4.0 W

4.2 W

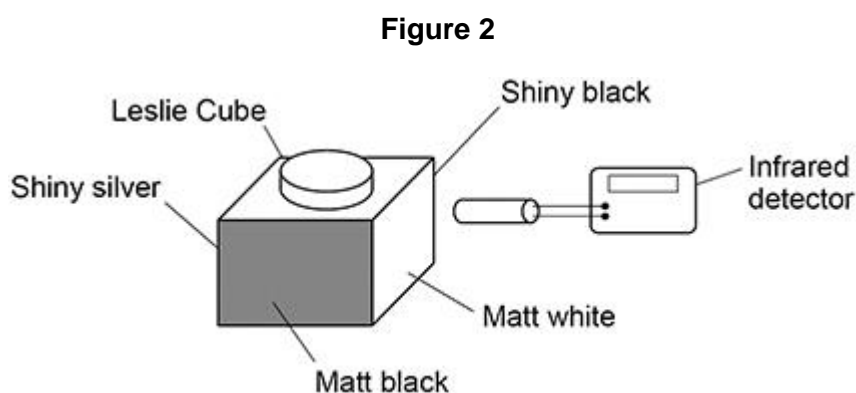
4.4 W

4.6 W

(1)

A Leslie Cube is used to demonstrate that different surfaces emit different amounts of infrared radiation.

Figure 2 shows an infrared detector and a Leslie Cube filled with hot water.



- (e) Give **one** advantage of using a Leslie Cube rather than the equipment in **Figure 1** above.

(1)

- (f) The teacher improved the demonstration by using four infrared detectors connected to a data logger and computer. Each detector was pointed at a different surface of the Leslie Cube.

The distance between the surface and the detector was the same in each case.

Give **two** reasons why this improved the demonstration.

1

2

Q3.

The different parts of the electromagnetic spectrum are shown below.

Gamma rays	X-rays	Ultraviolet	Visible light	Infrared	Microwaves	Radio waves
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(a) Name a part of the electromagnetic spectrum with:

(i) a longer wavelength than microwaves: _____

(1)

(ii) greater energy than X-rays: _____

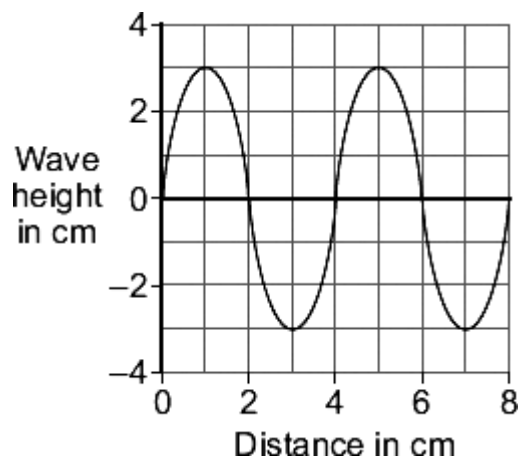
(1)

(iii) a higher frequency than ultraviolet: _____

(1)

(b) The properties of water waves can be measured easily in a school lab.

The diagram shows information about waves.



(i) How many complete waves are shown in the diagram?

(1)

(ii) What is the wavelength of each wave in the diagram?

_____ cm

(1)

(iii) What is the amplitude of the waves?

_____ cm

(1)

(iv) Complete the sentence below.

The oscillations of the waves in the diagram are perpendicular to the direction of energy transfer. They are called _____ waves.

(1)

(Total 7 marks)

Mark schemes

Q1.

(a) energy 1

(b) frequency 1

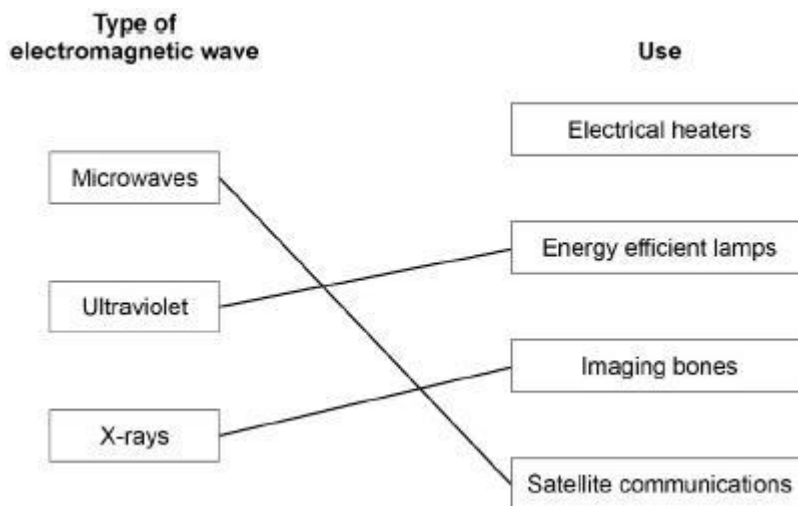
wavelength 1

either order

(c) **A** = visible light 1
allow visible
allow light

B = gamma (rays / waves / radiation) 1

(d)



additional line from a box on the left negates the mark for that box

3

[8]

Q2.

(a) any **one** from: 1

- stand up
- use a funnel
- pour water slowly
- pour at arms-length
- wear heat-proof gloves

gloves on its own is insufficient
allow do not touch hot objects (with bare hands)

- (b) **Level 2:** The method would lead to the production of a valid outcome. All key steps are identified and logically sequenced. 3-4
- Level 1:** The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear. 1-2
- No relevant content 0

Indicative content

- use the kettle to heat the water
 - use measuring cylinder to measure volume of water
 - same volume of water in each flask
 - use the thermometer to measure temperature of the water
 - ensure temperature is the same in each flask
 - infrared detector the same distance from each flask
 - use the infrared detector to measure the power of infrared radiation from each flask and compare results
- (c) as time increases the power decreases 1
- the change (in power) each 60s decreases as the time increases
allow rate of decrease of power decreases 1
- (d) 4.4 W 1
- (e) any **one** from:
- all surfaces will be at the same temperature
 - temperature of the water does not need to be measured
 - more surfaces can be tested
allow different surfaces can be tested at the same time
 - the procedure only needs to be done once
 - volume of water does not need to be measured 1
- (f) measurements can be taken at the same time
allow no need to move the detectors / cube 1
- results will be more accurate 1
- [11]**

Q3.

- (a) (i) radio (waves) 1
- (ii) gamma (rays)
accept γ
*do **not** accept α*

- (iii) X-rays
or
gamma (rays)
accept γ
*do **not** accept α* 1
- (b) (i) 2 1
- (ii) 4(cm) 1
- (iii) 3(cm)
ignore + or – in front of 3(cm) 1
- (iv) transverse 1

[7]