

Leave blank

Answer ALL the questions. Write your answers in the spaces provided.

1. Draw a line from each type of wave to a main use.
One has been done for you.

type of wave	use
gamma	sterilising food, such as strawberries
ultrasound	making images of bones
ultra-violet	checking for fake £10 notes
X-ray	scanning an unborn baby

(Total 3 marks)

Q1

2. Mains electricity can be dangerous.
Mains plugs are designed to give some protection from the dangers.

- (a) Give one example of a danger of mains electricity.

.....
.....
(1)

- (b) Give one safety feature of a mains plug and explain how this reduces danger.

safety feature

.....
(1)

this reduces the danger by

.....
(1)

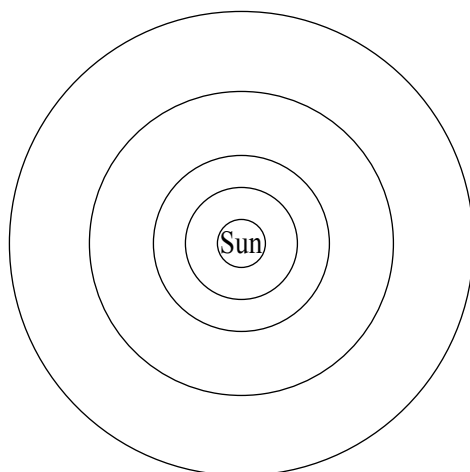
(Total 3 marks)

Q2



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3. The diagram shows the orbits of some planets around the Sun.



not to scale

(a) Draw the orbit of a comet on the diagram.

(1)

(b) Put an X on the diagram to show where the comet is travelling fastest.

(1)

(Total 2 marks)

Q3



4. Freya wants to make her house more energy efficient.

(a) She decides to improve the insulation.

(i) Name a part of the house where she can make the insulation better and state what the type of insulation should be.

part of the house

type of insulation

.....
(1)

(ii) Mark a cross (☒) next to the correct words to complete this sentence.

produces more energy ☒

The insulation will help her save energy because insulation **stops cold entering** ☒

reduces heat loss ☒

(1)

(b) Freya wants to buy a new lamp for her room.

She compares two lamps. Each lamp gives out the same amount of light. One has a compact fluorescent bulb and the other has a halogen bulb.

The table shows what she found out.

	compact fluorescent bulb	halogen bulb
power used (W)	11	50
lifetime (hours)	12 000	1 500
notes	takes 1 minute to be fully bright	fully bright almost immediately

Freya chooses the lamp with the compact fluorescent bulb.

Suggest one advantage and one disadvantage of this bulb.

advantage

.....
(1)

disadvantage.

.....
(1)



Leave blank

(c) Freya has an electric storage heater which heats up overnight when the electricity costs are low.

Calculate the cost of electricity for the heater for one night when

- the heater's power is 3 kW
- it uses electricity for 7 hours each night
- electricity costs 4p for each kW h

Use the equation below.

$$\text{cost of electricity} = \text{power (kW)} \times \text{time (hours)} \times \text{cost of 1 kW h}$$

.....

.....

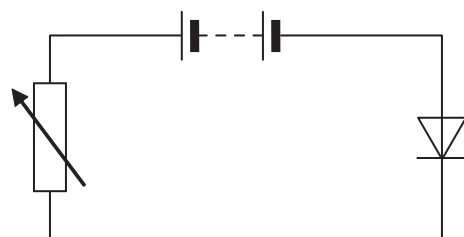
.....

p
(2)

Q4

(Total 6 marks)

5. William investigates how the current varies with voltage in a diode. Complete the diagram to show how he should connect an ammeter and a voltmeter in the circuit.



Q5

(Total 2 marks)



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6. Radioactive sources are used in hospitals to treat some patients. Radioactive sources can emit alpha, beta and gamma radiation.

(a) Complete the table to show the properties of the three types of radiation.

type of radiation	relative mass	charge	amount of ionisation produced
alpha particle	4		very high
beta particle	almost 0	-1	
gamma ray		0	low

(3)

(b) Radioactive sources often remain dangerous after they have been used. Describe one way in which technicians in a hospital could deal with radioactive waste safely.

.....
.....

(1)

(Total 4 marks)

Q6



7. (a) NASA plans to send a robot lander called 'Phoenix' to Mars.



Source: www.nssdc.gsfc.nasa.gov

Phoenix is designed to search for water or ice.

(i) Suggest a reason why NASA scientists want to find out if there is any water or ice on Mars.

.....
.....

(1)

(ii) NASA scientists do not plan to send people to Mars in the near future. One reason that they prefer to send robot landers rather than astronauts, is that people would need to exercise. Suggest two other reasons.



.....
.....
.....
.....

(3)

(b) Other scientists work for SETI (the Search for Extra-Terrestrial Intelligent life). State how these scientists search for extra-terrestrial life.

.....
.....

(1)

QUESTION 7 CONTINUES OVERLEAF



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(c) In 1781, an astronomer named William Herschel discovered the planet Uranus.
In 2005, Mike Brown discovered a tenth planet, code-named 2003UB313.
Suggest how Herschel and Brown communicated their discoveries to other scientists
throughout the world.

William Herschel

.....

Mike Brown

.....

(2)

Q7

(Total 7 marks)

8. A kettle for use in a caravan has this label.

- 5 A
- 60 W
- 2.4 Ω

Calculate the correct supply voltage for this kettle. Show your working.

.....

.....

.....

.....

..... V

Q8

(Total 3 marks)

TOTAL FOR PAPER: 30 MARKS

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