OCR
RECOGNISING ACHIEVEMENT

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B622/01

GENERAL CERTIFICATE OF SECONDARY EDUCATION

GATEWAY SCIENCE
SCIENCE B

Unit 2 Modules B2 C2 P2 (Foundation Tier)

FRIDAY 18 JANUARY 2008

Afternoon
Time: 1 hour

Candidates answer on the question paper.
Additional materials (enclosed):
None

Calculators may be used.
Additional materials: Pencil
Ruler (cm/mm)

CUP/T47807

Candidate Forename		Candidate Surname	
Centre Number		Candidate Number	

INSTRUCTIONS TO CANDIDATES

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Do **not** write outside the box bordering each page.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- A list of physics equations is printed on page two.
- The Periodic Table is printed on the back page.

FOR EXAMINER'S USE		
Section	**Max.**	**Mark**
A	**20**	
B	**20**	
C	**20**	
TOTAL	**60**	

This document consists of **23** printed pages and **1** blank page.

EQUATIONS

$$\text{efficiency} = \frac{\text{useful energy output}}{\text{total energy input}}$$

wave speed = frequency × wavelength

power = voltage × current

energy (kilowatt hours) = power (kW) × time (h)

Answer **all** the questions.

Section A – Module B2

1 **(a)** Look at the list of resources that humans use.

Two of these resources are **finite**.

Put (rings) around the **two** finite resources.

fossil fuels

minerals

oxygen

water

wood

[2]

(b) When humans use resources they usually produce pollution.

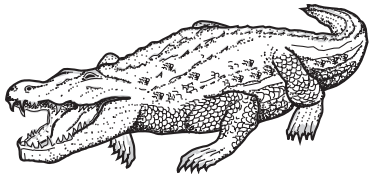
Why is the amount of pollution that humans produce increasing?

.....

.....[1]

[Total: 3]

2 Look at the picture of a crocodile.



(a) Crocodiles are predators.

Describe **one** feature, that you can see in the picture, that shows that crocodiles are predators.

.....[1]

(b) Look at the list of different animal groups.

Crocodiles belong to two of the groups.

Put (rings) around the **two** groups that crocodiles belong to.

amphibians

fish

invertebrates

mammals

reptiles

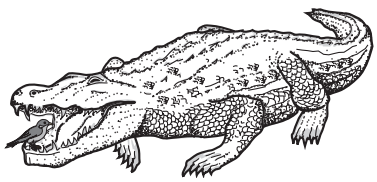
vertebrates

[2]

(c) Crocodiles often rest with their mouths open.

Small birds sometimes go in and out of their mouths.

The birds are not harmed by the crocodiles.



Suggest why crocodiles let these birds go in and out of their mouths.

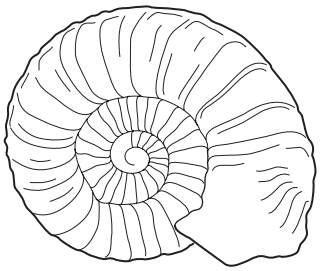
.....

.....[1]

[Total: 4]

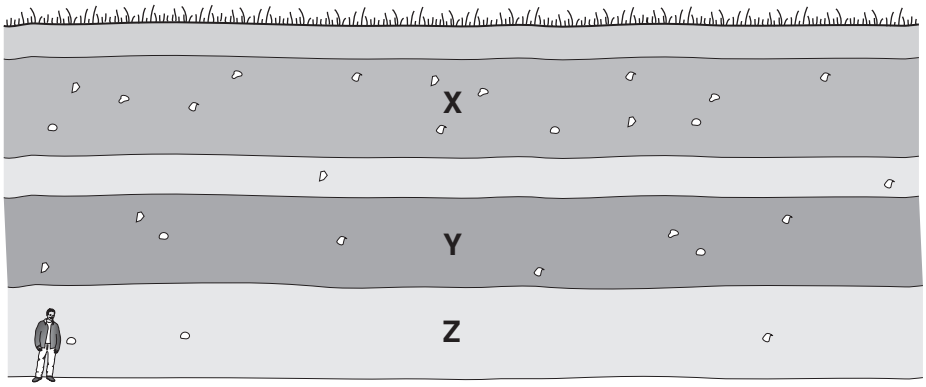
3 Chris is collecting fossils from a cliff.

The fossils are of extinct animals called ammonites.



an ammonite fossil

(a) Chris collects fossils from three different places, **X**, **Y** and **Z**, on the cliff.



Where are the oldest fossils found?

Choose from: **X** **Y** **Z**

answer ..... [1]

(b) The fossil only shows the ammonite shell.

Suggest why the rest of the animal did **not** fossilise.

.....[1]

(c) Describe how fossils are formed from shells.

.....

.....[1]

(d) Ammonites are now extinct.

What does the word **extinct** mean?

.....

.....[1]

[Total: 4]

4 **(a)** Plants make food by photosynthesis.

Write about how plants make food by photosynthesis.

In your answer include

- what plants use for photosynthesis
- what plants make in photosynthesis.

.....

.....

.....

.....

.....[3]

(b) Plants also respire.

Explain why they respire.

.....[1]

[Total: 4]

5 Iain and Mary are investigating the animals and plants in the school playing field.

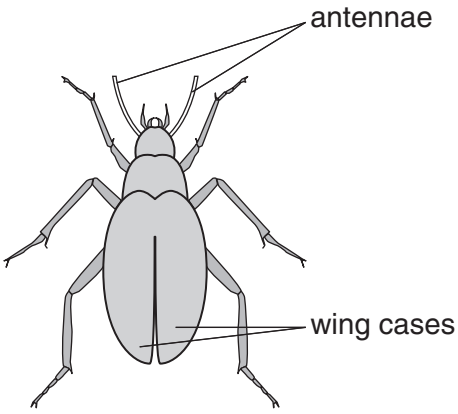
(a) They want to find out if any beetles are moving around the field at night.

Put a (ring) around the best piece of equipment to use to catch beetles at night.

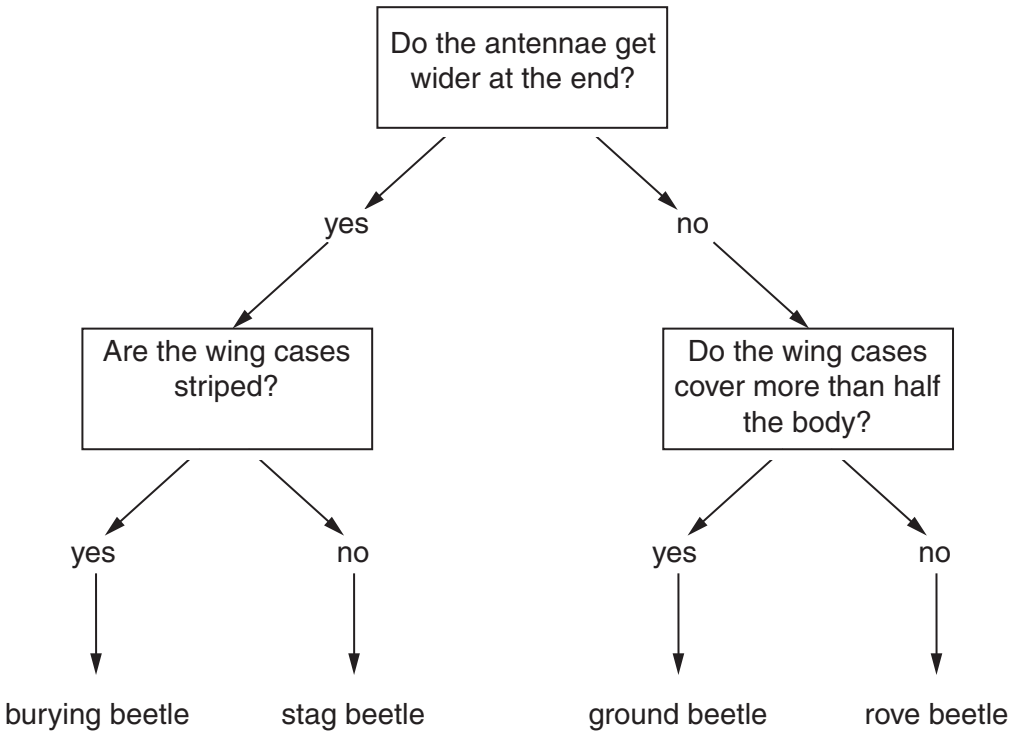
net **pit-fall trap** **pooter**

[1]

(b) Look at one of the beetles Iain and Mary catch.



Use the key to identify the beetle.



The type of beetle Iain and Mary catch is a ..... .[1]

[Turn over for remainder of question 5

(c) Iain and Mary want to work out the number of dandelion plants in the playing field.

They use a quadrat to count the number of dandelion plants in different parts of the playing field.

The table shows their results.

quadrat	number of dandelions
1st	5
2nd	1
3rd	0
4th	2

Each quadrat has an area of 0.25 m^2.

The total area of the playing field is 20 000 m^2.

Use this information to estimate the total number of dandelion plants in the playing field.

You are advised to show your working.

estimated total number of dandelions = ……. [3]

[Total: 5]

Section B – Module C2

6 Look at the photograph of a car.

(a) Many different materials are used to make a car.

(i) Steel is useful for making car bodies.

Suggest why.

.....[1]

(ii) Write down the name of **another** material that is used when making cars.

.....[1]

(b) Steel is made from iron.

One disadvantage of using iron is that it rusts.

Water is needed for iron to rust.

Write down the name of **one** other substance needed for iron to rust.

Choose from the list.

carbon dioxide **oil** **nitrogen** **oxygen**

answer .....[1]

(c) Old cars are taken to a scrap yard.

The materials in the car are recycled.

One advantage of recycling is to reduce the problems of disposal.

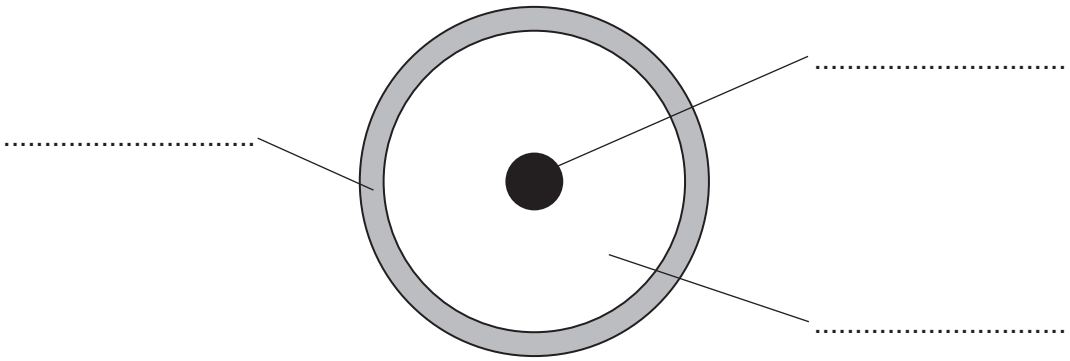
Write down one **other** advantage of recycling.

.....[1]

[Total: 4]

7 This question is about the structure of the Earth.

Look at the diagram.



(a) Complete the labels on the diagram.

Choose from the list.

core

crust

mantle

[2]

(b) The lithosphere is made up of tectonic plates.

Tectonic plates move slowly.

Tectonic plates meet at plate boundaries.

What can happen at a plate boundary when plates meet?

.....

.....[1]

(c) There are two types of tectonic plate.

One type is a continental plate.

Write down the name of the other **type** of plate.

.....[1]

[Total: 4]

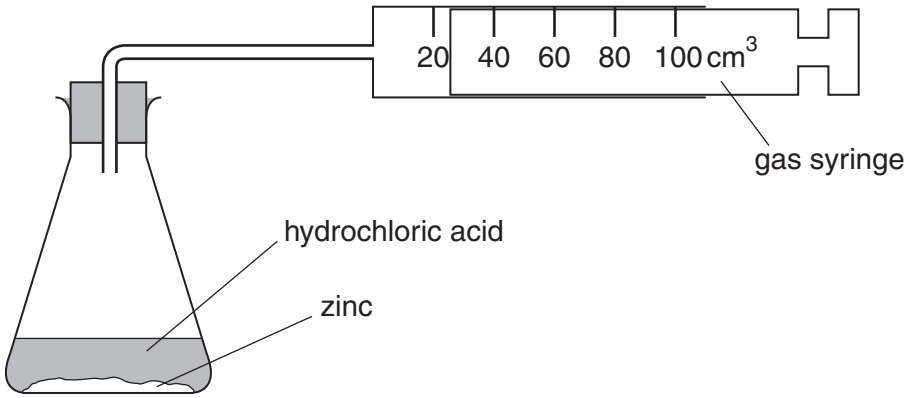
8 Phil and Ann investigate the reaction between zinc and hydrochloric acid.

Zinc chloride and hydrogen are made.

(a) Write the **word** equation for this reaction.

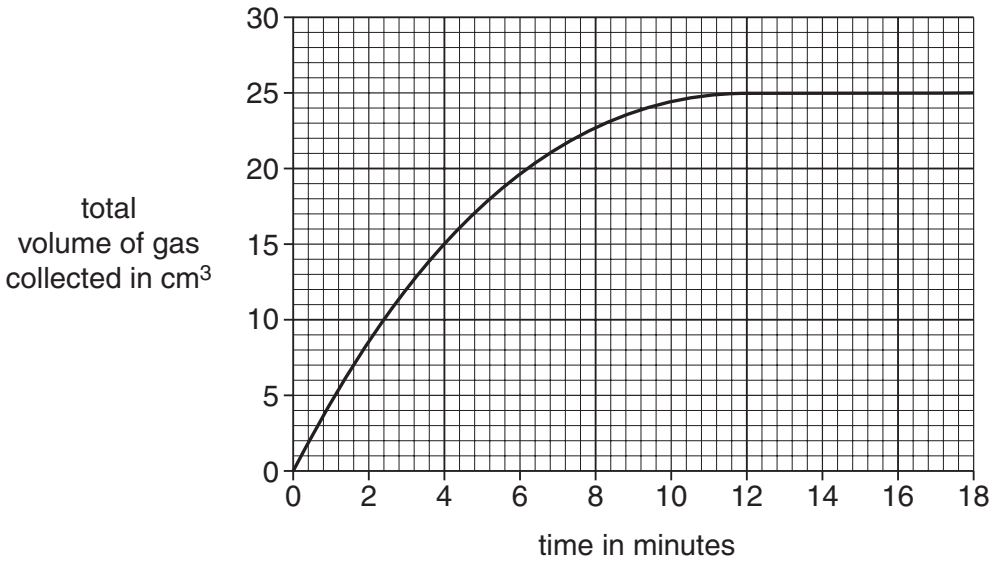
.....[1]

(b) The diagram shows the apparatus they use.



Look at the graph.

It shows their results when 1 g of zinc reacts with 20 cm^3 of dilute hydrochloric acid.



(i) How long does it take to make 15 cm^3 of gas? .....[1]

(ii) Some zinc is left at the end of the reaction.

Why does the reaction stop?

.....[1]

[Turn over for remainder of question 8

(iii) Phil and Ann want the reaction to go faster.

One way is to use a catalyst.

Write about **other** ways they could make the reaction go **faster**.

.....

.....

.....

.....[3]

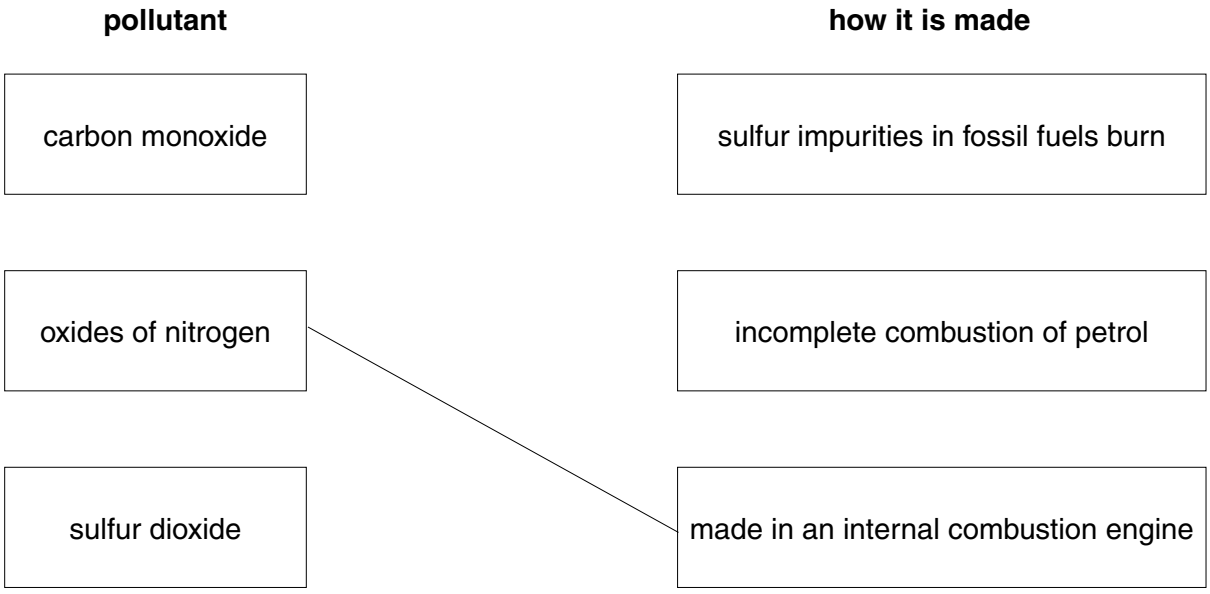
[Total: 6]

9 This question is about pollutants found in the air.

(a) Link each **pollutant** to **how it is made**.

Draw two straight lines.

One has been done for you.



[1]

(b) Acid rain causes environmental problems.

One problem is that it can kill fish.

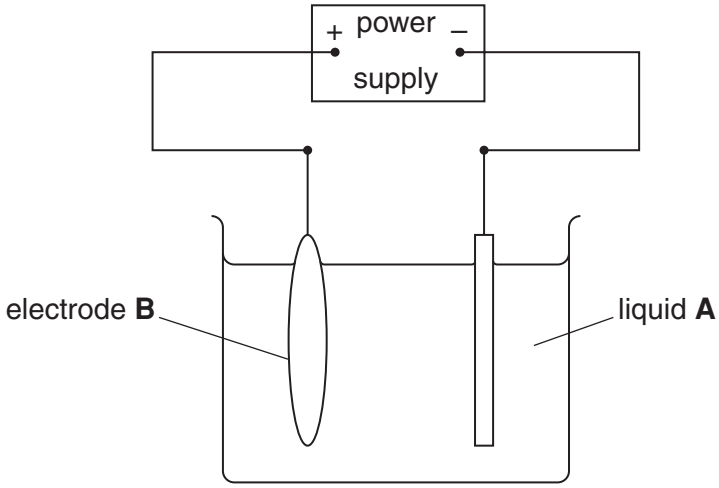
Write down one **other** environmental problem caused by acid rain.

.....[1]

[Total: 2]

10 This question is about copper.

(a) Look at the diagram. It shows the apparatus needed to purify impure copper.



(i) What is the name of the **process** used to purify impure copper?

Use the diagram to help you.

.....[1]

(ii) Write down the name of liquid **A**.

Choose from the list.

copper sulfate solution

paraffin

dilute sulfuric acid

water

answer.....[1]

(iii) Write down the name of electrode **B**.

Choose from the list.

impure copper anode

impure copper cathode

pure copper anode

pure copper cathode

answer.....[1]

(b) Copper can be used to make **alloys**.

Write down the name of one alloy.

Choose from the list.

brass

iron

mercury

zinc

answer .....[1]

[Total: 4]

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Section C – Module P2

11 This question is about nuclear radiation.

Michael is learning about the types of nuclear radiation.

(a) His teacher tells him that there are **three** types of nuclear radiation.

Alpha is one type.

What are the other two types?

1……

2……

[2]

(b) Michael finds out from the internet that nuclear radiation can be harmful.

Describe one way in which nuclear radiation can be harmful.

.....[1]

(c) Michael's teacher, Mr Whitehead, shows his class some properties of alpha radiation.

Mr Whitehead uses the radioactive material **safely**.

Suggest one safety precaution he takes.

.....

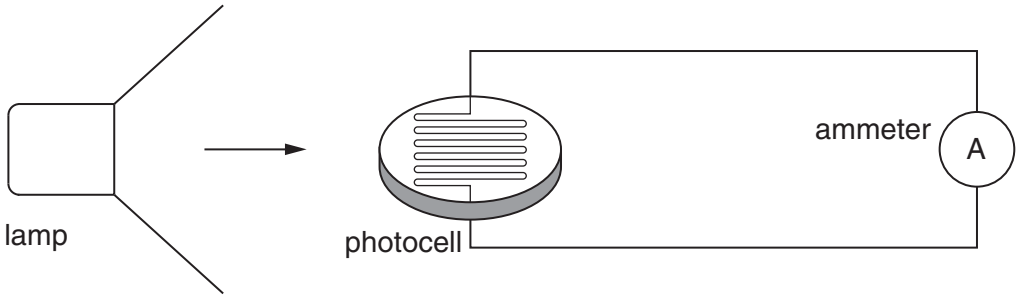
.....[1]

[Total: 4]

12 This question is about photocells.

Olivia investigates photocells.

Look at the diagram.



(a) Complete the following sentences about the photocell.

Choose from the list.

current **electricity** **light**

The ..... from the lamp falls on the photocell.

This is **transferred** into ..... by the photocell.

The ammeter shows that a ..... flows around the circuit.

[2]

(b) Olivia covers half of the photocell with a piece of paper.

What happens to the reading on the ammeter?

.....[1]

(c) Olivia adds a **voltmeter** to the circuit to measure the voltage across the photocell.

Here are her results.

ammeter reading = 0.1 A

voltmeter reading = 2.5 V

Calculate the power output of the photocell.

The equations on page 2 may help you.

.....

.....

.....

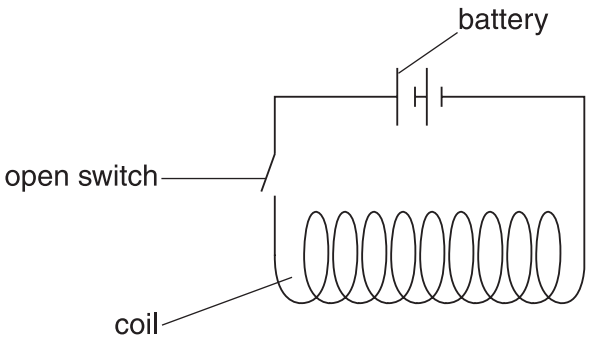
answer ..... units ..... [3]

[Total: 6]

13 This question is about magnetism and generating electric currents.

Sathvir makes a coil of wire and connects it to a battery.

Look at the diagram.



(a) **(i)** Sathvir closes the switch. A current flows through the coil.

He puts iron filings near the coil. They are affected by a force.

What has been created around the coil?

.....[1]

(ii) Sathvir uses a piece of equipment instead of the iron filings.

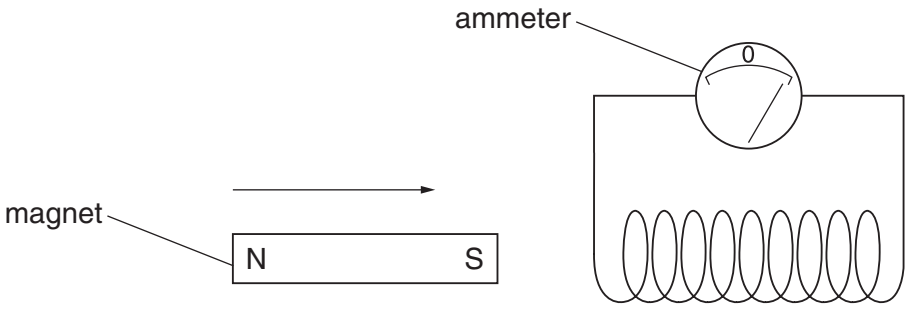
This shows the **direction** of the force.

What is the name of this piece of equipment?

.....[1]

(b) Sathvir replaces the battery with an ammeter.

Look at the diagram.



(i) The North and South ends of the magnet are called the …….... . [1]

(ii) He then moves a magnet towards the coil.

A current flows in the coil. The ammeter shows a reading.

How could Sathvir make a **bigger** current flow in the coil?

Describe **two** things he could change to make a bigger current flow.

.....

.....

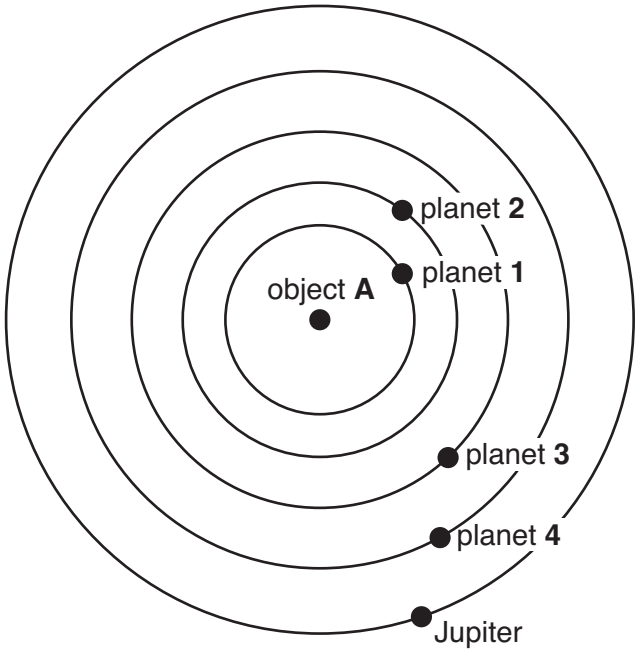
.....[2]

[Total: 5]

14 This question is about our Solar System.

Look at the diagram.

It shows **some** of the planets in our Solar System.



(a) The planets orbit around object **A**.

What is the name of object **A**?

.....[1]

(b) **(i)** The **asteroid belt** is between Jupiter and planet **4.**

What is the name of planet **4**?

.....[1]

(ii) What are asteroids mainly made of?

.....[1]

(c) **(i)** An asteroid is an example of a **Near-Earth Object** (NEO).

Name another example of a NEO.

.....[1]

(ii) What do scientists use to observe NEOs?

.....[1]

[Total: 5]

END OF QUESTION PAPER

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The Periodic Table of the Elements

1	2											3	4	5	6	7	0
							1 **H** hydrogen 1										4 **He** helium 2
7 **Li** lithium 3	9 **Be** beryllium 4											11 **B** boron 5	12 **C** carbon 6	14 **N** nitrogen 7	16 **O** oxygen 8	19 **F** fluorine 9	20 **Ne** neon 10
23 **Na** sodium 11	24 **Mg** magnesium 12											27 **Al** aluminium 13	28 **Si** silicon 14	31 **P** phosphorus 15	32 **S** sulfur 16	35.5 **Cl** chlorine 17	40 **Ar** argon 18
39 **K** potassium 19	40 **Ca** calcium 20	45 **Sc** scandium 21	48 **Ti** titanium 22	51 **V** vanadium 23	52 **Cr** chromium 24	55 **Mn** manganese 25	56 **Fe** iron 26	59 **Co** cobalt 27	59 **Ni** nickel 28	63.5 **Cu** copper 29	65 **Zn** zinc 30	70 **Ga** gallium 31	73 **Ge** germanium 32	75 **As** arsenic 33	79 **Se** selenium 34	80 **Br** bromine 35	84 **Kr** krypton 36
85 **Rb** rubidium 37	88 **Sr** strontium 38	89 **Y** yttrium 39	91 **Zr** zirconium 40	93 **Nb** niobium 41	96 **Mo** molybdenum 42	[98] **Tc** technetium 43	101 **Ru** ruthenium 44	103 **Rh** rhodium 45	106 **Pd** palladium 46	108 **Ag** silver 47	112 **Cd** cadmium 48	115 **In** indium 49	119 **Sn** tin 50	122 **Sb** antimony 51	128 **Te** tellurium 52	127 **I** iodine 53	131 **Xe** xenon 54
133 **Cs** caesium 55	137 **Ba** barium 56	139 **La*** lanthanum 57	178 **Hf** hafnium 72	181 **Ta** tantalum 73	184 **W** tungsten 74	186 **Re** rhenium 75	190 **Os** osmium 76	192 **Ir** iridium 77	195 **Pt** platinum 78	197 **Au** gold 79	201 **Hg** mercury 80	204 **Tl** thallium 81	207 **Pb** lead 82	209 **Bi** bismuth 83	[209] **Po** polonium 84	[210] **At** astatine 85	[222] **Rn** radon 86
[223] **Fr** francium 87	[226] **Ra** radium 88	[227] **Ac*** actinium 89	[261] **Rf** rutherfordium 104	[262] **Db** dubnium 105	[266] **Sg** seaborgium 106	[264] **Bh** bohrium 107	[277] **Hs** hassium 108	[268] **Mt** meitnerium 109	[271] **Ds** darmstadtium 110	[272] **Rg** roentgenium 111	Elements with atomic numbers 112-116 have been reported but not fully authenticated						

Key

relative atomic mass
atomic symbol
name
atomic (proton) number

**** The lanthanoids (atomic numbers 58-71) and the actinoids (atomic numbers 90-103) have been omitted.***

The relative atomic masses of copper and chlorine have not been rounded to the nearest whole number