Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION

B622/01

GATEWAY SCIENCE
SCIENCE B

UNIT 2 Modules B2 C2 P2
(Foundation Tier)

FRIDAY 12 JUNE 2009: Morning
DURATION: 1 hour

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

Candidates answer on the question paper
A calculator may be used for this paper

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Pencil
Ruler (cm/mm)

READ INSTRUCTIONS OVERLEAF

DC (CW/SW) OV90664 10004/1

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.
- Use 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.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

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

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 When you look at a group of lions you can see differences between individuals. These differences are known as variation.

(a) Describe TWO ways that lions show variation.

1 _____

2 _____ [2]

(b) Look at the list.

PARASITE

PREDATOR

PREY

Which word best describes a lion?

Choose ONE word from the list.

_____ [1]

(c) Describe and explain ONE way that lions are adapted to survive.

How they are adapted _____

How this helps them to survive

_____

_____ [2]

[Total: 5]

2 Complete the sentences about photosynthesis.

During photosynthesis, plants take in a gas called

_____ from the air.

They also take in a liquid called

_____ from the soil.

The type of food that plants make in photosynthesis

is _____ .

During photosynthesis, plants make a gas called

_____ . [4]

[Total: 4]

3 (a) Look at the list of animals in the table.

Put ticks (✓) in the table to show whether each animal is EXTINCT or ENDANGERED. [2]

ANIMAL	IS IT EXTINCT?	IS IT ENDANGERED?
dodo		
mammoth		
panda		
sabre-toothed tiger		

(b) What do the terms EXTINCT and ENDANGERED mean?

Extinct means _____

_____

Endangered means _____

_____ [2]

(c) The increasing human population has caused some animals to become extinct.

Suggest ONE reason why.

_____

_____ [1]

[Total: 5]

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4 Lynne is investigating some of the animals and plants in a wood.

(a) Lynne notices that small bushes grow in some of the spaces between the trees, but NOT under the trees.

Suggest why small bushes do NOT grow under the trees.

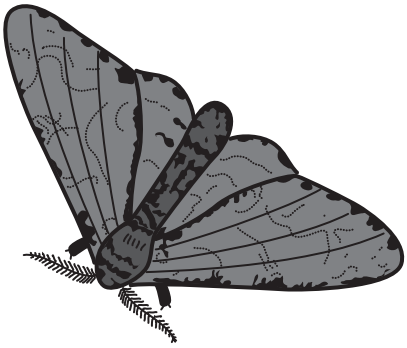
_____

_____ **[1]**

(b) Lynne is investigating peppered moths in the wood.

Some peppered moths are pale. Some are dark.

pale peppered moth



dark peppered moth

Lynne counts the number of both types of peppered moths on ten trees.

The table shows her results.

TREE NUMBER	NUMBER OF PALE PEPPERED MOTHS	NUMBER OF DARK PEPPERED MOTHS
1	1	0
2	0	1
3	1	0
4	3	0
5	0	1
6	1	0
7	0	0
8	0	0
9	2	0
10	0	0

(i) Lynne notices that there are more pale peppered moths than dark peppered moths.

She knows that there are 300 trees in the wood.

Lynne uses this information to estimate that there are 60 dark peppered moths in the whole wood.

Use the information given to estimate the number of pale peppered moths in the whole wood.

You are advised to show your working.

answer _____ [2]

(ii) Suggest ONE reason why there are more pale peppered moths than dark peppered moths in the wood.

_____

_____ [1]

(iii) The two types of peppered moths both belong to the same species.

How could Lynne show this?

_____

_____

_____ [2]

[Total: 6]

SECTION B – MODULE C2

5 Pete and Sally investigate marble and limestone. Limestone and marble both have the formula, $CaCO_3$.

(a) What is the chemical NAME for limestone and marble?

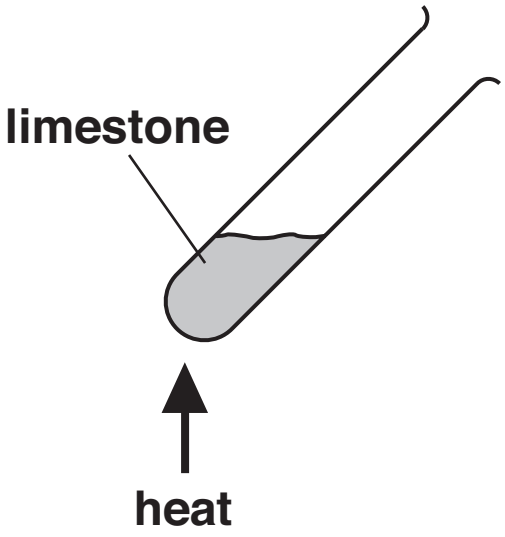
_____ [1]

(b) Limestone and marble are both building materials.

Write down the name of ONE OTHER building material.

_____ [1]

(c) Sally heats some limestone.



(i) A gas is made.

Write down the name of this gas.

_____ [1]

(ii) When limestone is heated, <u>THERMAL DECOMPOSITION</u> happens.

What is thermal decomposition?

_____ [1]

(d) Limestone is used to make cement.
Limestone is mixed with another substance.
Write down the name of this substance.
Choose from the list.

CLAY

GLASS

GRANITE

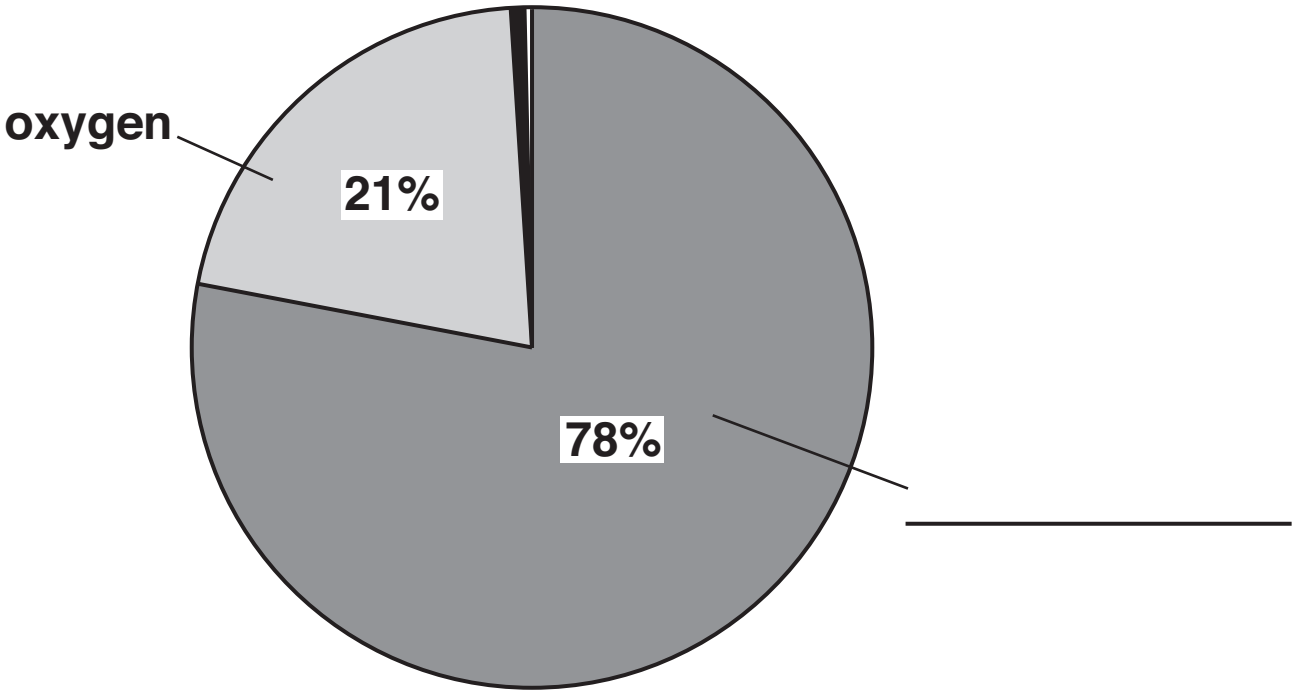
IRON ORE

answer _____ [1]

[Total: 5]

6 This question is about gases in the air.

Look at the pie chart. It shows the composition of the air.



(a) Complete the pie chart to show which gas makes up 78% of the air. [1]

(b) Sulfur dioxide causes air pollution.

Write about sulfur dioxide pollution.

Your answer should include

- what is made during sulfur dioxide pollution
- two effects of sulfur dioxide pollution.

_____

_____

_____

_____ [3]

(c) Carbon monoxide also causes air pollution.

It is made when petrol burns in a car engine.

Carbon monoxide is removed from car exhaust gases.

What is the name of the equipment which removes carbon monoxide?

_____ [1]

[Total: 5]

7 This question is about paints.

(a) Paint is used to paint the front door of John's house.

Write down <u>ONE</u> reason why John paints his front door.

_____ **[1]**

(b) Paints are made up of

<u>BINDING MEDIUM</u>

<u>COLOURING</u>

<u>SOLVENT</u>

Which one thins the paint and makes it easier to use?

Choose from the list.

answer _____ **[1]**

(c) Some pigments used in paint change colour when they are heated.

They are called <u>THERMOCHROMIC PIGMENTS</u>.

Write down <u>ONE</u> use of thermochromic pigments.

_____ [1]

[Total: 3]

8 Fred and Sue investigate the reaction of pieces of calcium carbonate and hydrochloric acid.

Carbon dioxide is given off during the reaction.

Calcium chloride and water are also made.

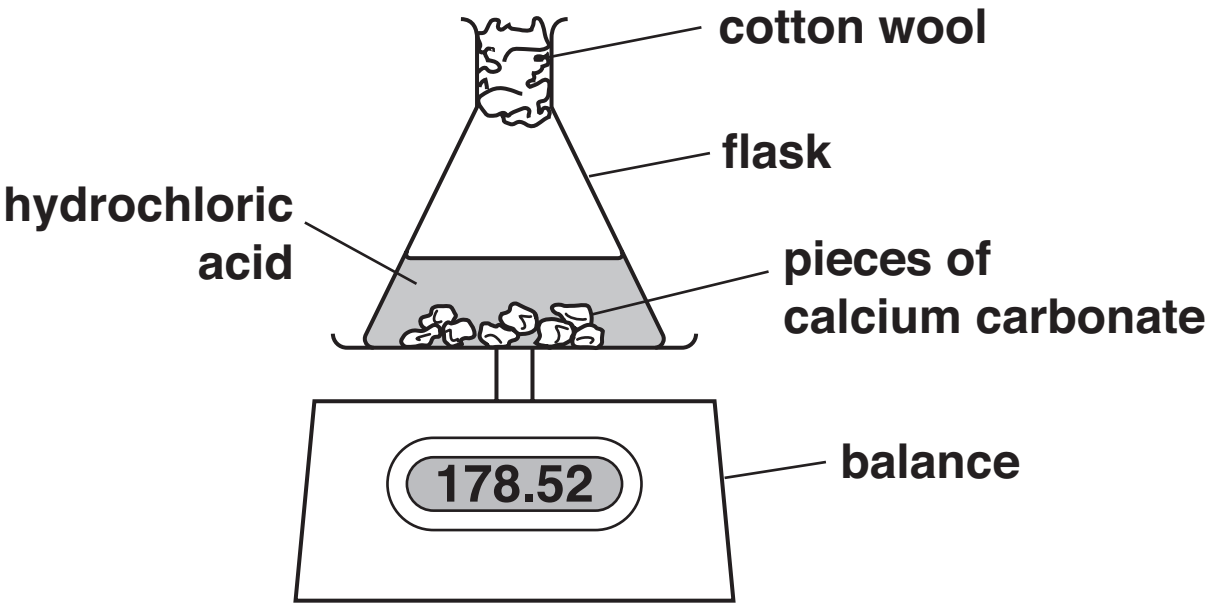
(a) Write a <u>WORD</u> equation for this reaction.

_____ [1]

(b) Fred and Sue measure the mass of the reaction mixture every 30 seconds during the experiment.

Look at the diagram.

It shows the apparatus they use.



After every measurement, Sue works out the total mass of carbon dioxide given off.

They do the experiment again.

They use the same amounts of acid and calcium carbonate.

This time they use <u>SMALLER</u> pieces of calcium carbonate.

Look at the graph opposite. It shows their results.

(i) Look at the curve for the SMALL pieces. What mass of carbon dioxide is given off after 50 seconds?

_____ g [1]

(ii) Look at the curve for the LARGE pieces. How long does it take for this reaction to finish?

_____ seconds [1]

(c) Calcium carbonate is left in the flask at the end of both experiments.

Why do both reactions stop?

_____ [1]

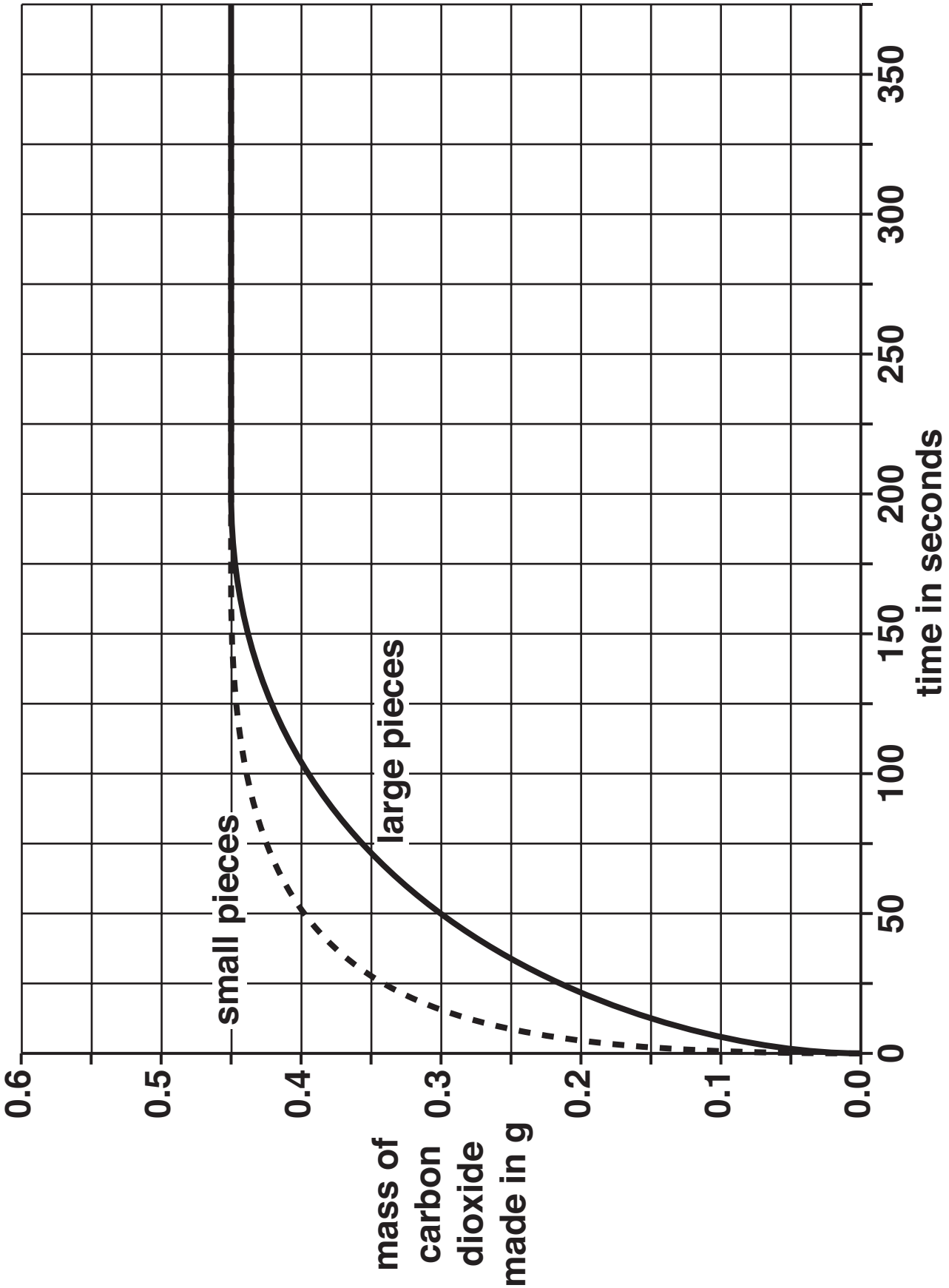
(d) The reaction using small pieces is faster than the reaction using large pieces.

Explain why. Use ideas about particles.

_____

_____ [1]

[Total: 5]



9 Look at the formulas.

$CaCO_3$	H_2O	CO_2
HCl	$MgCl_2$	$ZnSO_4$

(a) Which one of the formulas contains three oxygen atoms only?

_____ [1]

(b) Which one of the formulas contains a TOTAL of six atoms?

_____ [1]

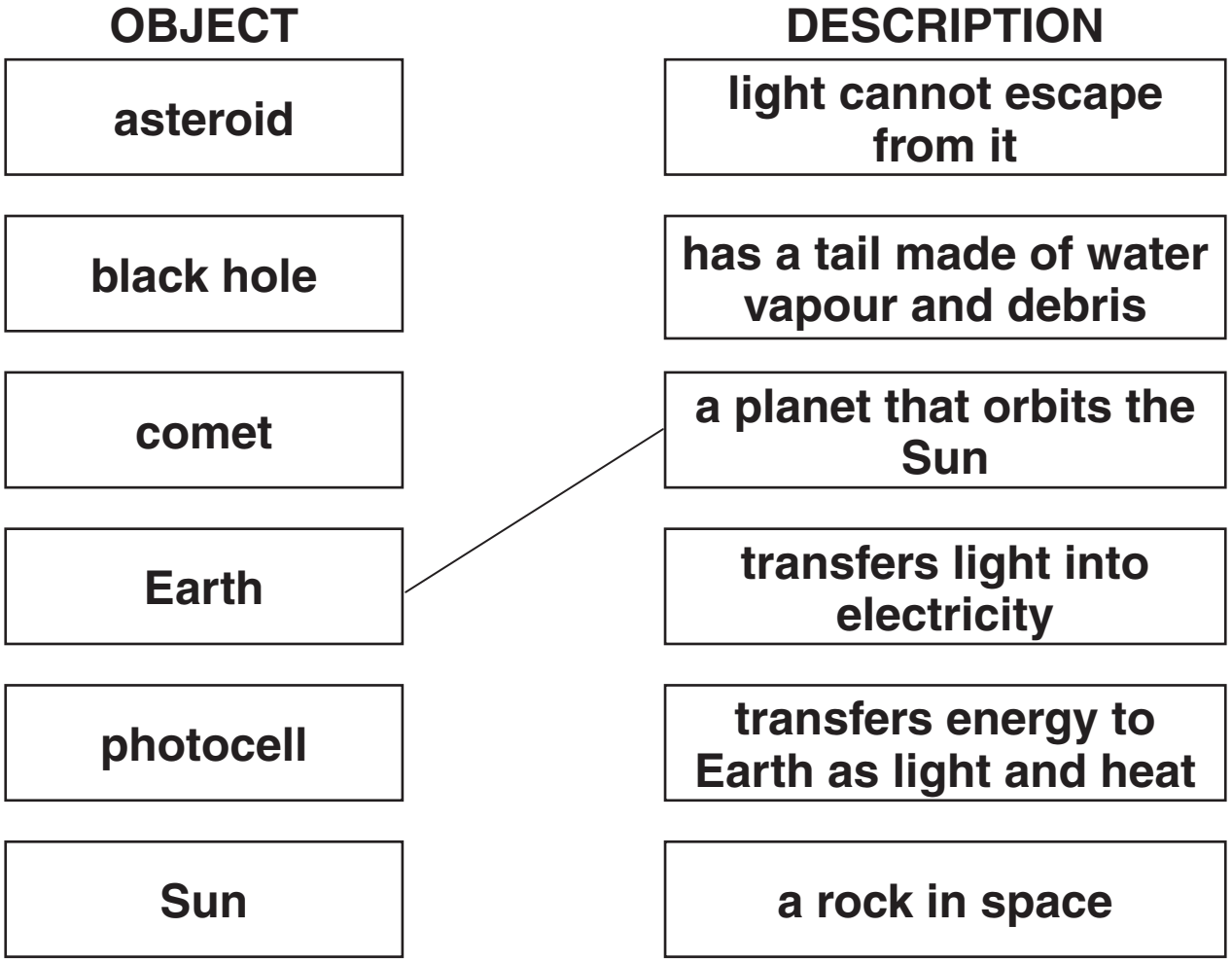
[Total: 2]

SECTION C – MODULE P2

10 Look at the list of objects.

Draw a line between each OBJECT and its correct DESCRIPTION.

One has been done for you.



[4]

[Total: 4]

11 Electricity is produced by power stations.

(a) Many power stations burn fuels to get electricity.

(i) Name one <u>FOSSIL</u> fuel burnt in power stations.

_____ [1]

(ii) Name one <u>RENEWABLE</u> fuel burnt in power stations.

_____ [1]

(b) Electricity leaves a power station through a transformer.

(i) What does a transformer do?

_____ [1]

(ii) The electricity is sent to consumers.

Write down <u>ONE</u> example of a consumer of electricity.

_____ [1]

(iii) How does the electricity get to the consumers?

_____ [1]

[Total: 5]

12 Space rockets can carry people (astronauts) into space.

(a) Some rockets carry satellites into space.

The SATELLITE is released and it orbits the Earth.

Write down two USES of satellites.

1 _____

2 _____ [2]

(b) Astronauts use space rockets to visit the Moon.

After this journey they return to Earth.

This takes several days.

The astronauts need things to keep them alive.

Write about what they need to keep them alive.

_____

_____

_____

_____ [3]

[Total: 5]

13 This question is about nuclear radiation.

(a) The three types of nuclear radiation are alpha, beta and gamma.

They can all be used in cancer treatment.

(i) Write down one other use of <u>ALPHA</u> radiation.

_____ [1]

(ii) Write down one other use of <u>BETA</u> radiation.

_____ [1]

(iii) Write down one other use of <u>GAMMA</u> radiation.

_____ [1]

(b) Background radiation is around us all the time.

Write down one source of this background radiation.

_____ [1]

(c) A nuclear power station uses uranium as a fuel.

(i) Why do we get PLUTONIUM in this nuclear power station?

_____ [1]

(ii) What is PLUTONIUM used for?

_____ [1]

[Total: 6]

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.