

GENERAL CERTIFICATE OF SECONDARY EDUCATION
GATEWAY SCIENCE
SCIENCE B
Unit 1 Modules B1 C1 P1
FOUNDATION TIER
MONDAY 21 MAY 2007

F B621/01

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

Morning
Time: 1 hour



Candidate
Name

Centre
Number

--	--	--	--

Candidate
Number

--	--	--	--

INSTRUCTIONS TO CANDIDATES

- Write your name, Centre Number and Candidate Number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- **WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.**

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [] at the end of each question or part question.
- 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.

2

EQUATIONS

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

$$\text{wave speed} = \text{frequency} \times \text{wavelength}$$

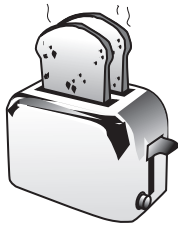
$$\text{power} = \text{voltage} \times \text{current}$$

$$\text{kilowatt hours} = \text{power (kW)} \times \text{time (h)}$$

Answer **all** the questions.

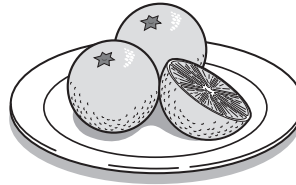
Section A - Module B1

1 Lucy makes a list of some of the foods that she eats in a day.



bread
energy = 100 kJ/g

- high in
- carbohydrate
 - fibre



orange juice
energy = 15 kJ/g

- high in
- water
 - vitamin C



meat
energy = 90 kJ/g

- high in
- protein
 - iron



chips
energy = 80 kJ/g

- high in
- carbohydrate
 - fat

(a) Which food in Lucy's list has the highest amount of energy per gram?

Put a **ring** around the correct answer in the list.

bread

orange juice

meat

chips

[1]

(b) (i) Which food from Lucy's list is best for preventing scurvy?

.....[1]

(ii) Which food from Lucy's list is best for preventing constipation?

.....[1]

(c) Eating food like meat is particularly good for teenagers.

Explain why.

.....

.....[2]

[Total: 5]

2 Jane wears glasses.

This is because she is short-sighted.



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(a) Other people may have other eye problems.

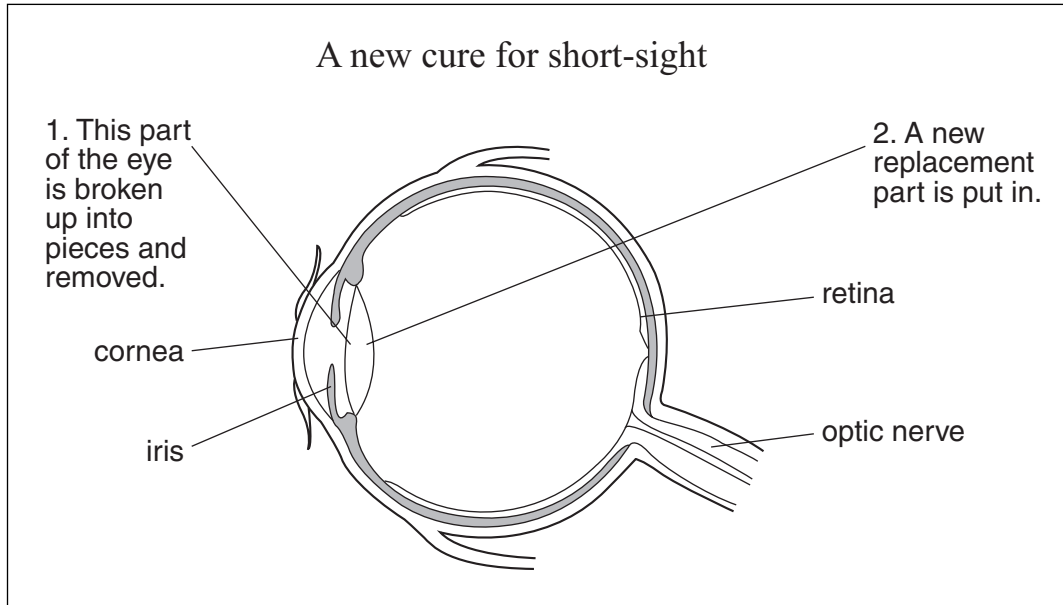
This means that they can see, but not perfectly.

Write down the name of **one** of these other eye problems.

.....[1]

(b) Jane reads an article in a newspaper.

It describes a new operation to cure short-sight.



(i) The diagram names four parts in the eye.

Choose the correct parts to finish the following sentences.

The transparent layer at the front of the eye is called the

The coloured disc of tissue with a hole in the middle is called the [2]

(ii) Write down the name of the part of the eye that is replaced in this operation.

.....[1]

(iii) Why does replacing this part of the eye cure short-sight?

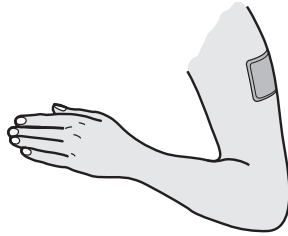
.....

.....[1]

[Total: 5]

3 Read the newspaper article about a new type of drug.

A New Type of Contraceptive



A skin patch has been developed as a contraceptive. It contains a mixture of two female sex hormones. The patch is worn on the arm. It slowly releases the hormones through the skin and into the bloodstream. Each patch lasts for a week. The patch was tested on animals before women were allowed to use it.

- (a) The patch can be used instead of a contraceptive pill.
What do contraceptive pills prevent?
.....[1]
- (b) Suggest an advantage of using the patch rather than taking a pill every day.
.....[1]
- (c) The patch contains oestrogen, a female sex hormone.
 - (i) Write down the name of the organ where oestrogen is usually made.
.....[1]
 - (ii) Oestrogen controls the female secondary sexual characteristics.
Write down **one** of these characteristics.
.....[1]

(d) The patch was used on animals before it was allowed to be used on women.

(i) Why was this?

.....[1]

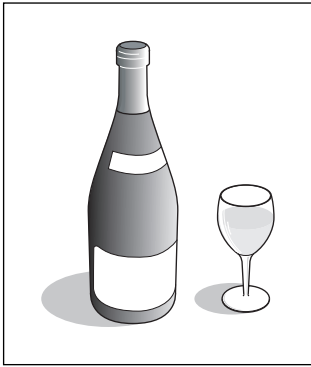
(ii) Suggest why some people may object to using animals in this way.

.....
.....[1]

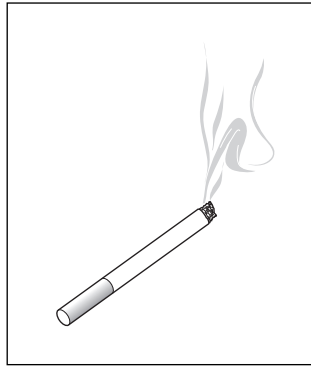
[Total: 6]

4 This question is about drugs.

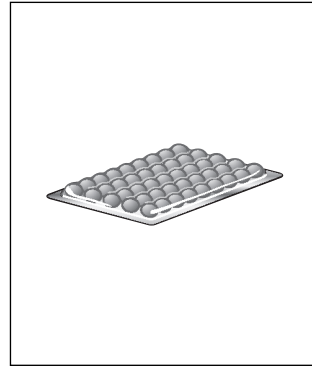
Examples of different drugs are shown below.



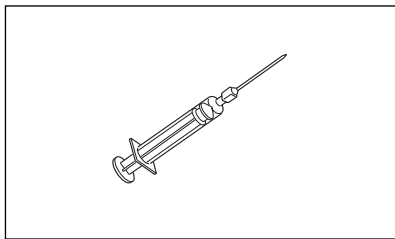
alcohol



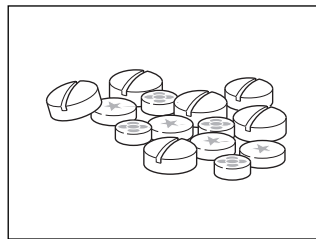
nicotine



LSD



anabolic steroids



ecstasy

(a) LSD is a hallucinogen.

Put a tick (✓) in the box next to the effect that it has on the body.

blocks nerve impulses

distorts what is seen or heard

decreases the brain's activity

[1]

(b) Some drugs are only available on prescription.

Write down **one** reason why.

.....
.....[1]

(c) LSD is described as a Class A drug and anabolic steroids as Class C drugs.

Explain why drugs are put in different classes.

.....

.....

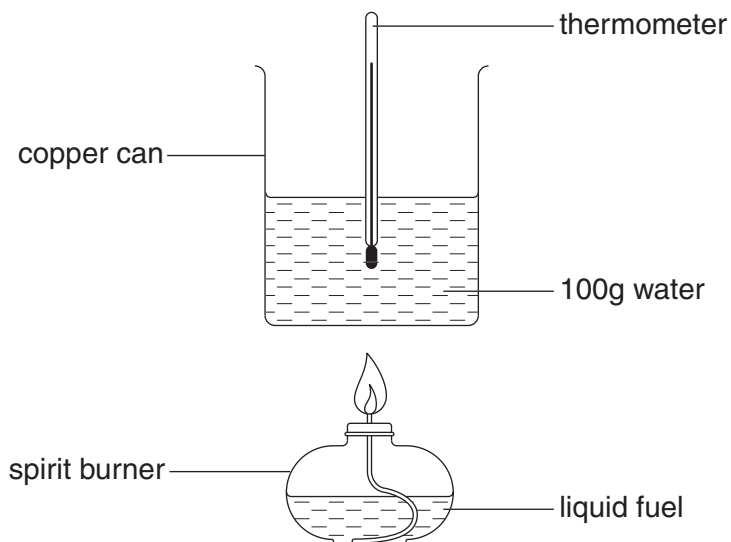
.....[2]

[Total: 4]

Section B - Module C1

5 Rachel and Paul are investigating some fuels.

Look at the diagram. It shows the apparatus they use.



They burn 1.5g of fuel each time.

Look at their table of results.

fuel	starting temperature of water in °C	final temperature of water in °C	temperature change in °C
paraffin	20	45
petrol	20	40	20
ethanol	18	45	27
propanol	15	45	30

(a) Complete the table.

[1]

(b) Which fuel transfers most energy to the water?

answer

Explain your answer.

.....
.....[2]

(c) Burning fuels is an **exothermic** reaction.

What is meant by an exothermic reaction?

.....[1]

[Total: 4]

6 Nick is cooking an egg.



He chooses to **fry** the egg.

(a) Write down **other** ways that Nick could use to cook the egg.

.....
.....[2]

(b) (i) Frying an egg is an example of a chemical change.

Write down one change that you would **see** when an egg is fried.

.....
.....[1]

(ii) Frying an egg is a chemical change.

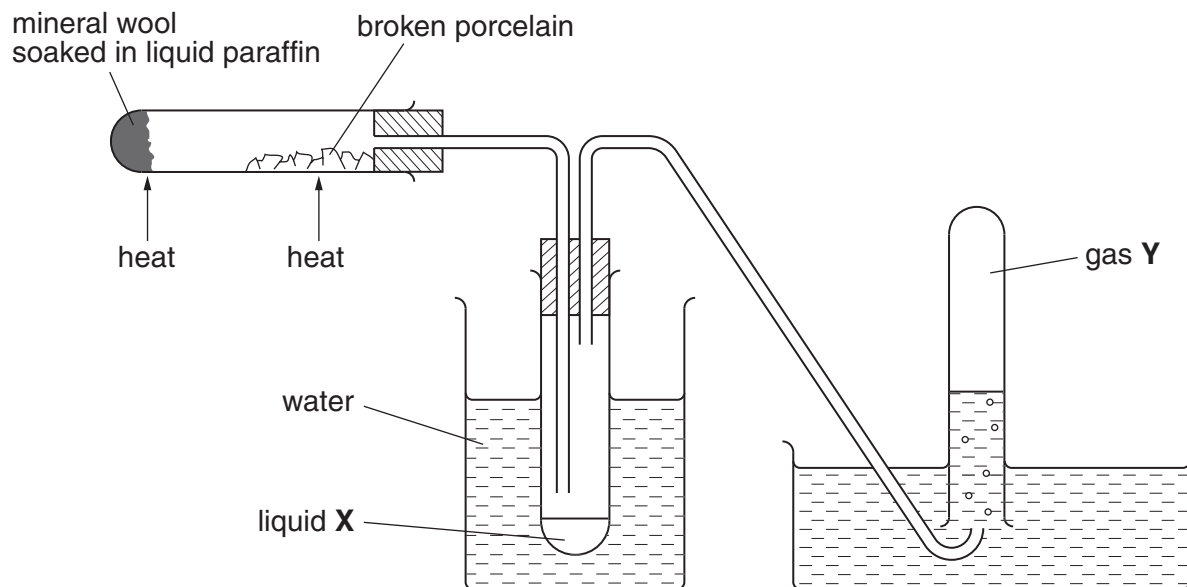
Explain why.

.....[1]

[Total: 4]

7 Lesley and Emily investigate what happens when liquid paraffin is heated.

Look at the diagram. It shows the apparatus they use.



(a) The experiment changes large hydrocarbon molecules into smaller, more useful molecules.
What is the name of this process?

.....[1]

(b) (i) What is the name of liquid X?

Choose from:

- bitumen
- petrol
- water

answer[1]

(ii) What is the name of gas Y?

Choose from:

- carbon dioxide
- ethene
- oxygen

answer[1]

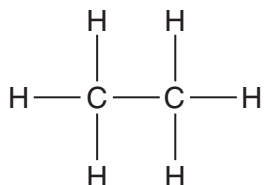
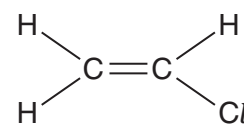
(c) Broken porcelain is used in the reaction tube.

Explain why.

.....[1]

[Total: 4]

8 Look at the five formulae.



Answer the questions.

Choose all your answers from the five formulae above.

Each formula can be used once, more than once, or not at all.

(a) Write down the formula that contains 4 **elements**.

.....[1]

(b) Write down the formula that is made up of 5 **atoms**.

.....[1]

(c) Write down the formula that is a hydrocarbon.

.....[1]

[Total: 3]

9 This question is about polymers.

(a) Draw a straight line to join each polymer to its correct use.

Draw only **three** lines.

polymer	use
polythene	clothing
polystyrene	packaging
nylon	plastic bags

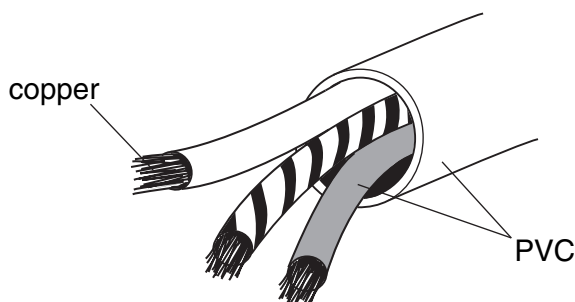
[2]

(b) Polythene is **non-biodegradable**.

What is meant by non-biodegradable?

.....[1]

(c) PVC is a polymer used to cover copper when electrical wires are made.



One property of PVC, which makes it useful for covering electrical wires, is that it lasts a long time.

Write about **other** properties of PVC which make it useful for covering electrical wires.

.....
.....
.....[2]

[Total: 5]

Section C - Module P1

10 This question is about temperature and energy transfer.

(a) Some objects are hot.

Some objects are cold.

The table shows the temperatures of different objects.

object	temperature in °C	hot	cold
ice	0		
boiling water	100		
boiling oil	280		
liquid air	-190		
burning match	600	✓	

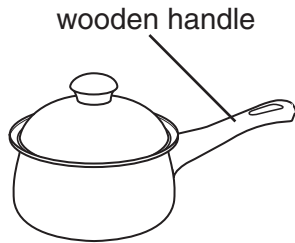
Put ticks (✓) in the table to show which objects are hot and which objects are cold.

One has been done for you.

[2]

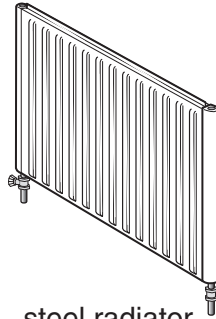
(b) Look at the diagrams.

They show objects in the home.

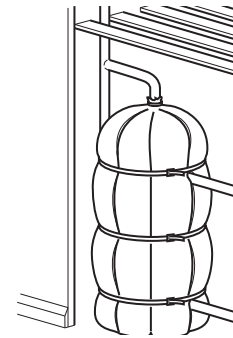


wooden handle

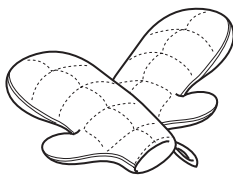
metal pan



steel radiator



jacket on hot water tank



oven gloves

(i) Insulators are poor conductors of heat.

Write down the name of **one** insulator.

Choose from:

- jacket on hot water tank**
- oven gloves**
- steel radiator**
- metal pan**

answer[1]

(ii) Write down the name of **one good conductor** of heat.

Choose from:

- jacket on hot water tank**
- oven gloves**
- steel radiator**
- wooden handle**

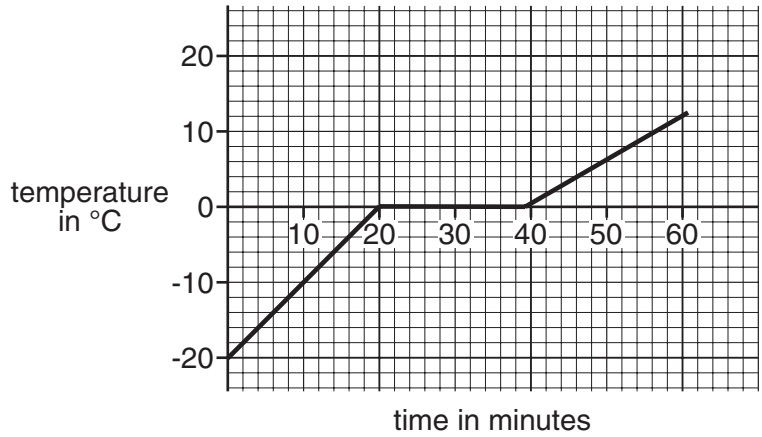
answer[1]

(c) John takes a packet of frozen peas out of his freezer.

The peas are covered in ice.

He measures the temperature of the peas every few minutes for an hour.

Look at the graph of his results.



The temperature does not change between 20 minutes and 40 minutes.

What is happening to the bag of peas between 20 minutes and 40 minutes?

.....
.....[1]

(d) After 40 minutes, the temperature of the bag of peas goes up slowly.

This is because water has a high specific heat capacity.

Complete the sentence below:

The specific heat capacity is the amount of energy needed to

.....

.....

..... [2]

[Total: 7]

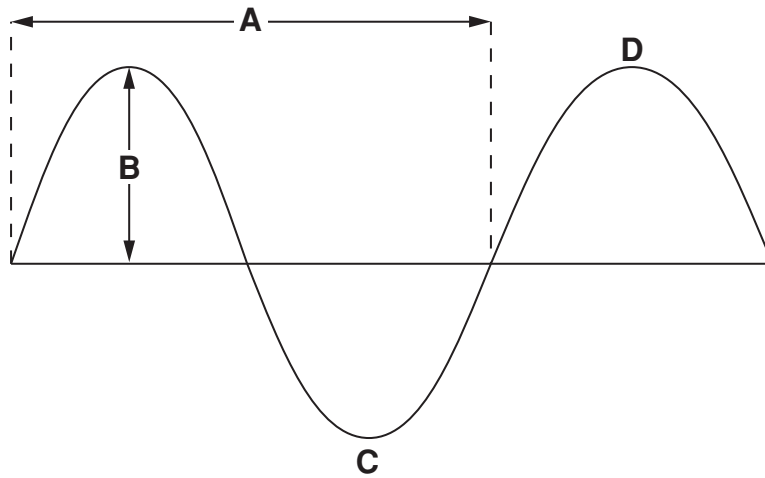
19
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Question 11 begins on page 20.

PLEASE DO NOT WRITE ON THIS PAGE

11 This is a question about waves.

(a) Look at the diagram of a wave.



(i) Which letter shows a crest?

Choose from: **A B C D**

.....

[1]

(ii) Which letter shows the amplitude?

Choose from: **A B C D**

.....

[1]

(b) (i) In the past, people carried messages on foot or on horseback.

It took a long time for the message to get to where it was going.

It is better to use light for sending messages.

Give **two** reasons why.

reason 1

.....

reason 2

.....[2]

(ii) We cannot hear messages sent using light.

When light is used to send a message, a code is needed.

Write down the name of the code that uses flashes of light.

.....[1]

(c) Many people use mobile phones to communicate.

Look at the list of waves from the electromagnetic spectrum.

- gamma ray
- microwave
- radio wave
- visible light
- X-ray

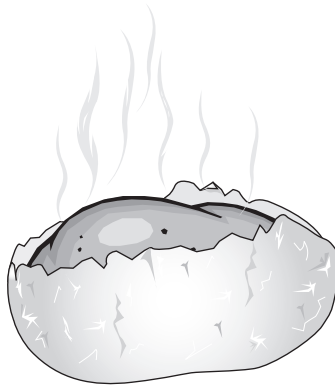
Which sort of wave is used by mobile phones?

Choose from the list.

answer[1]

(d) Mira cooks a potato in her microwave oven.

She takes the potato out of the oven and wraps it up in aluminium foil.



Suggest reasons why she does this.

.....
.....
.....[2]

[Total: 8]

12 (a) Earthquakes produce shock waves in the Earth's crust.

(i) Write down **one** effect of shock waves on the Earth.

.....[1]

(ii) Write down the name of the instrument used to detect shock waves.

Choose from:

- ammeter**
- anemometer**
- barometer**
- thermometer**
- seismometer**

.....[1]

(b) The waves produced by earthquakes can travel inside the Earth.

They are called seismic waves.

There are two sorts of seismic waves: p-waves and s-waves.

Look at the table.

It compares p-waves and s-waves.

Complete the table.

feature of wave	p-waves	s-waves
speed	faster	slower
travel through	solids and liquids	
type		

[3]

[Total: 5]

END OF QUESTION PAPER

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The Periodic Table of the Elements

	1	2	3	4	5	6	7	0	
	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		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		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		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		201 Hg mercury 80	201 Au gold 79	197 Pt platinum 78	197 Au gold 79	[272] Rg roentgenium 111	
				56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	63.5 Cu copper 29		
				55 Mn manganese 25	59 Co cobalt 27	59 Ni nickel 28	63.5 Cu copper 29		
				45 Sc scandium 21	51 V vanadium 23	52 Cr chromium 24	59 Co cobalt 27		
				48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	59 Co cobalt 27		
				91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	103 Rh rhodium 45		
				91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	103 Rh rhodium 45		
				178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	192 Ir iridium 77		
				178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	192 Ir iridium 77		
				[261] Rf rutherfordium 104	[262] Db dubnium 105	[266] Sg seaborgium 106	[268] Mt meitnerium 109		
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