FOR OFFICIAL USE			



	KU	PS
Total Mark		

3700/29/01

NATIONAL QUALIFICATIONS 2012

MONDAY, 30 APRIL 10.20 AM - 11.35 AM SCIENCE STANDARD GRADE General Level

Fill in these boxes and read what is printed below.	
Full name of centre	Town
Forename(s)	Surname
Date of birth Day Month Year Scottish candidate number Output Date of birth Day Month Year Scottish candidate number Date of birth	er Number of seat
1 Answer as many questions as you can.	
2 Read the whole of each question carefully before yo	ou answer it.
3 Write your answers in the spaces provided. Showing	ng working may help in some questions.
4 Before leaving the examination room you must giv not, you may lose all the marks for this paper.	ve this book to the Invigilator. If you do





BWR

1

2

Marks KU PS The key below gives information about some nuclear power stations. Nuclear power stations uranium dioxide fuel uranium fuel enriched fuel not carbon heavy dioxide fuel enriched water coolant coolant **PWR** Candu Magnox carbon water dioxide coolant coolant

(a) Give **one** difference between a Candu power station and a Magnox power station.

AGR

(b) List **all** the information that the key gives about a BWR nuclear power station.

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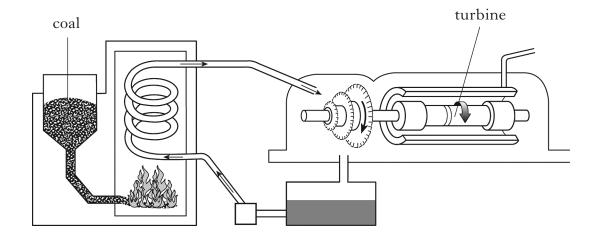
.....

2.	Complete the following sentences by circling the correct word in each box.		KU	PS
	rib cage o o o diaphragm			
	When your rib cage moves down and inwards, you breathe in / out.			
	When your diaphragm moves upwards, you breathe in / out.	2		
3.	Recycling cans made from aluminium saves energy.			
	(a) Give two other advantages of recycling.			
	1			
	2	2		
	(b) To produce one tonne of aluminium from its ore requires 14 000 units of energy. However, producing one tonne of aluminium by recycling cans uses only 5% of this energy.			
	Calculate the energy needed to produce one tonne of aluminium by recycling cans.			
	Space for working			
	Answer units	2		

				Marks	PS
4.	Son	me types of fire extinguisl	ner are shown below.		15
		water	powder		
		foam	fire blanket		
	Wh	ich type of extinguisher			
	(a)	should be used to put or	ut a fire in an electrical applia	ince?	
				1	
	(<i>b</i>)	must not be used to put	out a chip pan fire?		
				1	
5.	(a)	Complete this table by p	providing suitable headings.		
		copper gold tin	stone diamond wood		
		tiii	wood	1	
	(<i>b</i>)		be made from different types	s of material.	
		List two types of mater 1	rials that can be used.		
		2		1	

KU

6. A diagram of a coal-fired power station is shown below.



(a) What **type** of energy is produced by the burning coal?

1

- (b) What turns the turbines?
 - A water
 - B steam
 - C air
 - D electricity

<u>Underline</u> the correct answer.

[Turn over

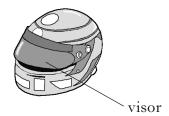
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[3700/29/01]

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7.	Use the	inform	ation in	the	passage	to	answer	the	following	questions.
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The crash helmets used in motor racing provide maximum protection for the driver's head and increase the aerodynamic performance of the car. They must be designed and manufactured to a higher specification than standard helmets. For example, a motor racing helmet is made from seventeen layers of different materials but a standard helmet has only three layers.



Carbon fibre layers are used to make motor racing helmets rigid and light. This minimises stress on the driver's neck. Kevlar layers make the helmet fireproof and polyethylene layers provide protection from impact. Aluminium and titanium layers reinforce the helmet and epoxy resin bonds the layers together.

The helmet has a ventilation system, with a filter which removes oil, carbon and brake dust particles from the air. The visor is 3mm thick and is made from fireproof polycarbonate. It has a chemical tint which automatically adjusts to changing light levels so that the driver is unaffected by the glare of the sun. The helmet also contains a radio which allows the driver to communicate with his team.

(a)	How many layers are there in a motor racing helmet?	
(<i>b</i>)	Why must the helmet be rigid and light?	
	1	
(c)	Which material provides protection from impact?	
(<i>d</i>)	Name all the substances filtered from the air by the ventilation system.	
(e)	Why does the visor have a chemical tint?	

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							MAR	THIS
8.	Complete the	followi	ng senter	nces b	y circling) the correct answer in each box.	Marks	KU	PS
	Capillaries are	thin	scular -walled k-walled	to le	et oxygen get to the cells of the body.			
	Arteries carry	blood	to around away fr	om	the heart.			
	Veins have v	ells valves olasma	to	keep	blood flowing in one direction.	3		
9.	Complete the their basic nee		to show !	how h	numans change the environment to meet	5		
	Basic need	!		How	humans change the environment			
	Shelter				Build houses			
					Build reservoirs			

3

[Turn over

Warmth

Food

						MAR	GIN
10.	Complet	te the following sentences	s by (circling) the correct answer in each box.	Marks	KU	PS
	Adding	carbon chromium and nickel tungsten	to s	teel increases its hardness.			
	Adding	carbon chromium and nickel tungsten	to st	reel increases its resistance to corrosion.			
	Adding	carbon chromium and nickel tungsten	to s	teel increases its resistance to wear.	3		
11.	The tabl	e shows the generating c	apaci	ty of four power stations.			
		Power station		Generating capacity (MW)			
		Auchben Benglow Cairnallan Dunvetin		660 700 400 240			
		culate the total generating pace for working	g capa	acity of the four power stations.			
				Answer MW	1		
	(b) Wha	at percentage of the total g	genera	nting capacity is provided by Cairnallan?			
	<u>Sp</u>	pace for working					
				Answer%	1		
						I	

Marks KU PS

12. Draw lines to match each word with its correct description.

12.	Draw lines to match each w	ord with its correct description.		\neg
	Word	Description		
	anodising	a chemical reaction at the surface of a metal		
	corrosion	using electricity to thicken the oxide layer on the surface of aluminium		
	galvanising	using electricity to coat one metal onto the surface of another metal		
	electroplating	dipping steel into hot molten zinc	3	
13.	Which aspects of fitness are (a) Being able to bend you without feeling sore			
			1	
	(b) Being able to continue a long time without get			
			1	
		[Turn over		

Marks KU

14.	The	boxes	show	scientific	units.
-----	-----	-------	------	------------	--------

1	kV	2	kWh
3	W	4	A

Which box shows

Box number

(b) the unit for the **power rating** of an electrical appliance?

Box number

1

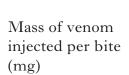
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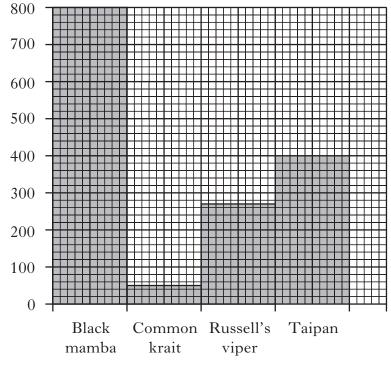
7	1/	~	ar	h	c
/	VI.	а	v	ĸ	ς

. F	our food chains from a woodland area are shown below.	Marks	KU	PS
1	oak leaves ──► earthworm ──► hedgehog ──► fox			
2	oak leaves → snail → hedgehog → fox			
3	oak leaves → vole → stoat → fox			
4	oak leaves ──► vole ──► fox			
(a	Use the food chains to complete the food web.			
(b	oak leaves Name an organism shown above that is both a predator and a prey.	3		
(c	All the hedgehogs were removed from the woodland. How would this affect the size of the earthworm population?	1		
		1		
(d	What happens to the amount of energy that is passed along a food chain	?		
		1		
	[Turn over	r		

16. The graph shows some information about poisonous snakes.







Snake

The table gives some further information about these snakes.

Snake	Where snake is found	Lethal dose of venom (mg)	Death rate of people bitten (%)
Black mamba	Southern Africa	10	95 to 100
Common krait	South East Asia	1	75 to 95
Russell's viper	South East Asia	12	30 to 65
Taipan	Australia	3	25 to 50

DO NOT WRITE IN THIS MARGIN

(co	ntinued)	WIWKS	KU	I
(a)	Which of the snakes found in South East Asia injects more venom per bite?	•		
		. 1		
(b)	What is the death rate of people bitten by the snake which injects 50 mg of venom per bite?	ŗ		
	to %	1		
(c)	Calculate the number of lethal doses of venom that a Black mamba snake injects in a single bite.	,		
	Space for working			
	Number of lethal doses	2		
(a)	What is normal human body temperature?			
	°C	1		
(b)	What name is given to the inability to maintain core body temperature?			
		. 1		
	[Turn over	•		

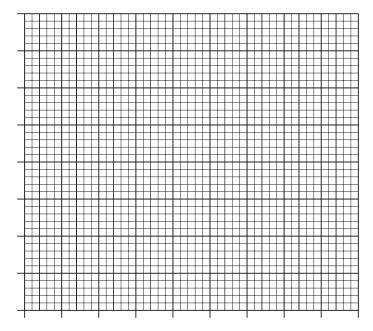
KU PS

18. The table shows information about the average daily use of water by each person in Britain.

Use of water	Volume of water (litres)
toilet	64
bathing	55
laundry	23
cooking	16

Present the information in the table as a bar graph.

(Additional graph paper, if required, can be found on Page twenty-three.)



3

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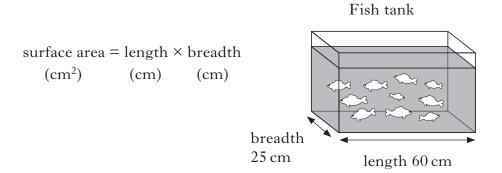
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Fos	sil fu	els, such as crude oi	l, are our main source o	f energy.	Marks	KU	P
(a)			ed for fossil fuels to but				
(4)	(1)				1		
					1		
	(ii)	Name a substance	formed when fossil fuel	s burn.			
					1		
(<i>b</i>)	Cruo	de oil can be found i	n a rock formation calle	ed a fault trap .			
	Nam	ne another rock form	nation in which crude of	l can be found.			
	•••••				1		
(c)	Diffe	erent fractions obtai	ned from crude oil are	shown below.			
				1			
		refinery gas	petrol	naphtha			
		CC	1. 1	1			
		paraffin	diesel	bitumen			
	Which fraction is used for making						
(i) aviation fuel?							
					1		
	(ii)	plastics and other o	hemicals?				
					1		
				[Turn ov	D r		
				[Turn ov	CI		

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			Marks	KU	PS
20.	(a)	There are four countries in the UK. In each country some men have			
		never smoked and some are ex-smokers.			
		In Wales, 45% of men have never smoked and 28% are ex-smokers. 35% of			
		the male population in Northern Ireland have never smoked with another			
		37% being ex-smokers.			
		26% of the male population in Scotland are ex-smokers. In both England			
		and Scotland 41% of men have never smoked. In England 31% of men are			
		ex-smokers.			
		Present this information in a table with three suitable headings.			
		Smaking habits of man in the UV			
		Smoking habits of men in the UK			
			2		
			3		
	(<i>b</i>)	Dangerous substances in cigarette smoke cause damage to body organs			
	(0)	when they are breathed in.			
		How are these substances carried from the lungs to other organs in the			
		body?			
			1		
21.	Ар	erson's alcohol abuse can affect the lives of other people.			
	_	e one example of how a person's alcohol abuse can affect the lives of other			
		ple.			
	-				
			1		

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22. The surface area of water in a fish tank can be found using the formula



(a) Calculate the surface area of the water in the fish tank.

Space for working	

Answer cm²

1

(b) The surface area of water needed for each fish to survive is 50 cm². Calculate the maximum number of fish that can survive in this tank.

Answer.....

1

[Turn over

23. The table below gives information about the value of timber imported into the UK over a five year period.

Marks KU

Year	Value of timber imported (million pounds)
2005	8 750
2006	9 500
2007	10 100
2008	10 125
2009	10 650

Calculate the average value of timber imported.

Space for working	

Answer million pounds

2

24. A group of pupils investigated pollution in a river.

They measured the oxygen levels at different parts of the river.

Their results are shown below.

Part of river	Oxygen level (units per 10 ml)
A	86
В	25
С	52
D	78

(a) Which part of the river had the most polluted water?

Part of river	• • • • • • • • • • • • • • • • • • • •	
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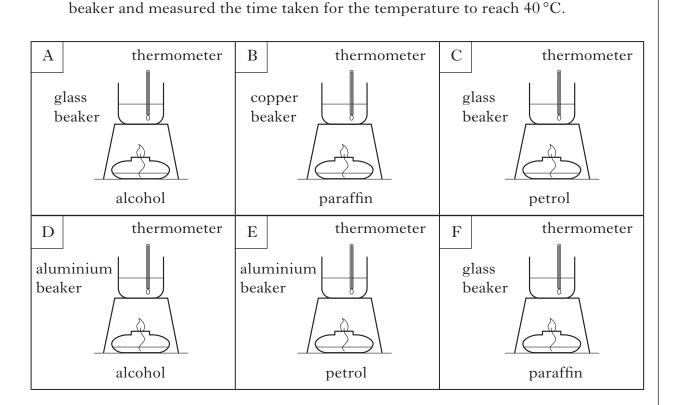
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1

(b)	The pupils also surveyed the number and types of invertebrates in the
	river. How could they use these results to find out which part of the river
	was least polluted?

Marks	ſ
IVIUIIVS	

KU PS Francine set up six experiments. She put 50 ml of water at 20 °C in each



(a) Which two experiments should Francine compare to find out if paraffin or alcohol heats water more quickly?

Letters	and	1

(b) Francine compared the results of experiments C and E.

What was she trying to find out?

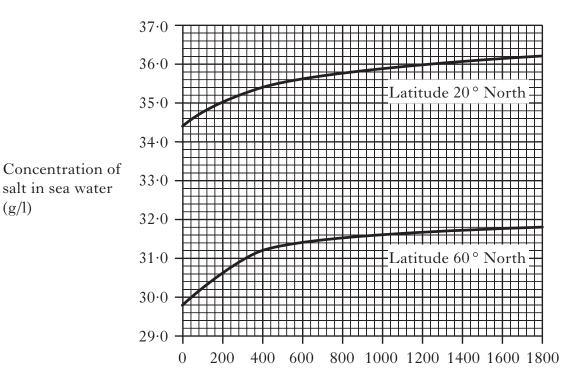
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1

2

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ks	KU	PS	

The graph shows the concentration of salt in sea water at two different latitudes.



Depth of water (m)

(a) What concentration of salt is found in sea water at a depth of 200 metres and a latitude of 20° North?

(b) Draw **two** conclusions from the information in the graph.

1	l	

 •••••

(g/l)

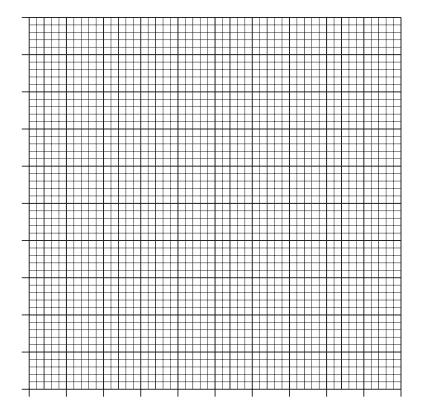
KU PS

27. An engineer measured the strength of concrete while it was setting. Her results are shown below.

Time (days)	0	5	10	15	20	25
Strength (MPa)	0	10	16	20	22	22

(a) Draw a **line** graph to show these results.

(Additional graph paper, if required, can be found on Page twenty-three.)



3

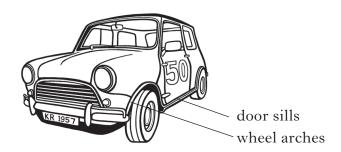
(b) The engineer found that a sample of concrete had a strength of 15MPa. Predict how long the sample of concrete had been setting.

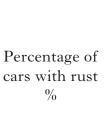
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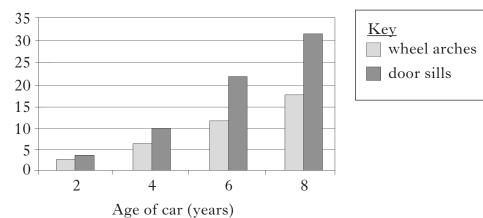
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KU	PS

28. The graph below shows the percentage of cars with rust affecting their wheel arches and door sills.







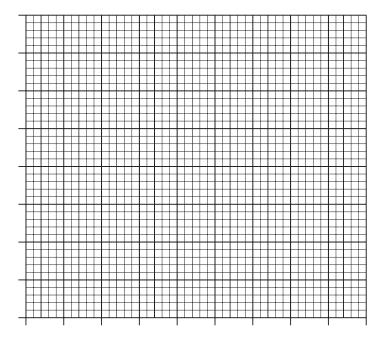
Draw **two** conclusions from the information shown in the graph.

1	
2	

2

[END OF QUESTION PAPER]

ADDITIONAL GRAPH PAPER FOR USE IN QUESTION 18



ADDITIONAL GRAPH PAPER FOR USE IN QUESTION 27(a)

