OCR
RECOGNISING ACHIEVEMENT

GCSE

ADDITIONAL SCIENCE B

F **B624/01**

Additional Science B: Unit 2 Modules B4, C4, P4

Specimen Paper

60 mins

Candidates answer on the question paper:
Additional materials: ruler (cm/mm), calculator

Candidate Name	

Centre Number						Candidate Number				

TIME 60 mins

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers on the dotted lines unless the question says otherwise.
- 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.
- There is a space after most questions. Use it to do your working. In many questions marks will be given for a correct method even if the answer is incorrect.
- Do not write in the bar code. Do not write in the grey area between the pages.
- DO NOT WRITE IN THE AREA OUTSIDE THE BOX BORDERING EACH PAGE. ANY WRITING IN THIS AREA WILL NOT BE MARKED.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **60.**

This specimen paper consists of 23 printed pages.

 Registered Charity Number: 1066969

BLANK PAGE

Answer all questions.

Section 1

1. Mr. Jones has a hedge of conifer trees. The trees grow quickly.

(a) When it rains, puddles of water form on Mr. Jones' garden.

Mr. Jones notices that there are no cracks in the soil near to the trees.

He also notices that the puddles near to the trees are always in shadow.

The puddles near to the trees disappear faster than the other puddles.

Suggest why.

.....

.....

.....[2]

(b) The table shows some information about the trees.

It also shows some information about the conditions in the garden.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average day temperature in °C	-1	3	5	8	11	16	14	15	13	10	7	4
Average hours of daylight per day	6	8	10	12	13	15	14	12	10	9	8	6
Growth rate of trees in cm per month	0	0	0	4	17	32	25	14	5	3	1	0

Look at the table.

(i) During which month did the trees grow fastest?

.....[1]

(ii) Suggest **two reasons** why the trees grow fastest in this month.

Use information from the table to help you to answer.

1. .....

.....

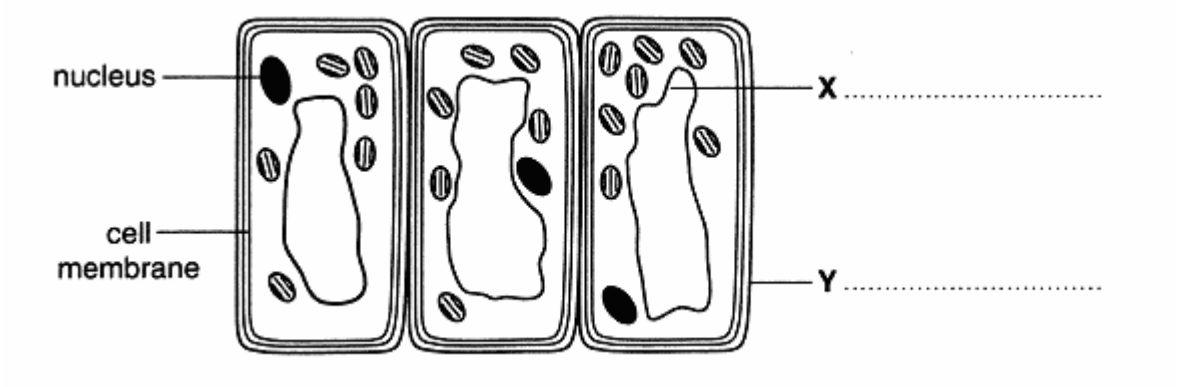
2. .....

.....[2]

[Total: 5]

2. This question is about plant cells.

The diagram shows some cells from inside a green leaf of a tree.



(a) **(i)** Complete the labels **X** and **Y** on the diagram. [2]

(ii) Write down the job of part **Y**

.....[1]

(b) These leaf cells also contain chloroplasts.

What is the job of chloroplasts?

.....[2]

[Total: 5]

3. This question is about decay.

When dead plant material decays it makes gases.

One of the gases is methane.

The methane can be collected using a methane generator

Methane can be used as a fuel.

Methane

Decaying plant material

(a) Look at the list of plant materials.

dry straw
coconut shells
grass cuttings
tree bark
wooden branches

(i) Chris wants to make methane more quickly.

Which material would be best to use in the methane generator?

Choose your answer from the list.

.....[1]

(ii) Explain your answer.

.....

.....[1]

(b) There are living things in the methane generator.

These organisms make the plant material decay.

What kind of living things makes the plant material decay?

.....[1]

(c) The methane generator is not making much methane.

Suggest **two** things Chris could do to the generator to make more methane.

Explain your answers.

1. What Chris could do: .....

Explanation: .....[1]

2. What Chris could do: .....

Explanation: .....[1]

[Total: 5]

4. This question is about Intensive Farming.

(a) **(i)** Look at the list of chemicals.

bactericide
fungicide
herbicide
insecticide
pesticide

What type of chemical would farmers use to kill weeds?

Choose your answer from the list.

.....[1]

(ii) Using chemicals to kill weeds and animal pests can cause harm to other living things.

Explain how.

.....

.....

.....[2]

(b) Some farmers do not use manufactured chemicals to kill weeds.

(i) What is the name of the type of farming that does not use manufactured chemicals?

.....[1]

(ii) Describe one technique this type of farmer could use to stop weeds.

.....[1]

[Total: 5]

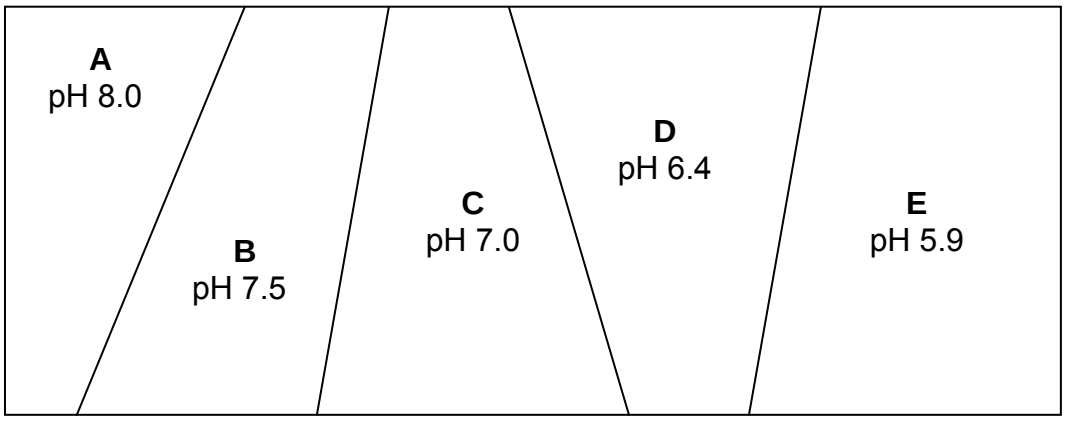
Section 2

5. Sally is testing the pH of soil in her garden.

The garden is divided into five different areas called 'plots'.

She tests the soil on each plot

Look at the diagram. It shows her results.



(a) Which soil is the most alkaline?

Choose from **A, B, C, D** or **E**.

Answer .....[1]

(b) The table shows the names of some plants Sally wants to grow.

It also shows the soil pH the plants need to grow well.

name of plant	best pH of soil
apple	5.0 – 6.5
blackcurrant	6.0 – 8.0
mint	7.0 – 8.0
potato	4.5 – 6.0
strawberry	5.0 – 7.0

Use the information to answer these questions.

(i) Sally wants to grow potatoes.

Which would be the best plot to plant them in?

Choose from **A, B, C, D** or **E**.

Answer. .....[1]

(ii) Sally wants to increase the pH of plot **D**.

Which type of substance should she add to the soil.

Choose from the list

an acid
an alcohol
an alkali
a salt

Answer. .....[1]

(c) Sally puts calcium oxide onto the soil in plot **D**.

Calcium oxide reacts with the nitric acid in the soil.

Look at the word equation for this reaction.

calcium oxide + nitric acid → calcium nitrate + water

Write down the names of the **products** in this reaction.

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

(d) Sally adds a chemical to plot B.

The pH of plot B changes from 7.5 to 7.0.

What type of reaction has taken place?

Put a tick (✓) in the correct box

electrolysis	☐
neutralisation	☐
oxidation	☐
reduction	☐

[1]

[Total: 5]

6. Asif is adding fertiliser to the soil.

(a) Fertilisers contain the essential elements N, P and K.

N is nitrogen.

Write down the **names** of the other two essential elements in fertiliser.

P is .....

K is .....[2]

(b) Asif uses a fertiliser that contains potassium phosphate, K_3PO_4.

Look at the table.

It shows the number of atoms of each element present in the formula of potassium phosphate, K_3PO_4.

Complete the table.

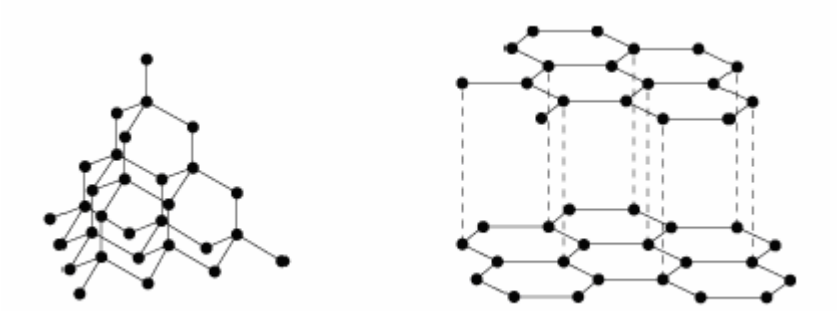
element	number of atoms present in potassium phosphate
potassium	
phosphorus	
oxygen	

[3]

[Total: 5]

7. This question is about diamond and graphite.

Look at the diagrams. They show the structure of diamond and graphite.



diamond graphite

(a) Diamond and graphite are forms of the same element.

Write down the name of this element.

.....[1]

(b) Diamond and graphite have several important uses.

Draw a straight line from each use to the reason why diamond or graphite is suitable for this use.

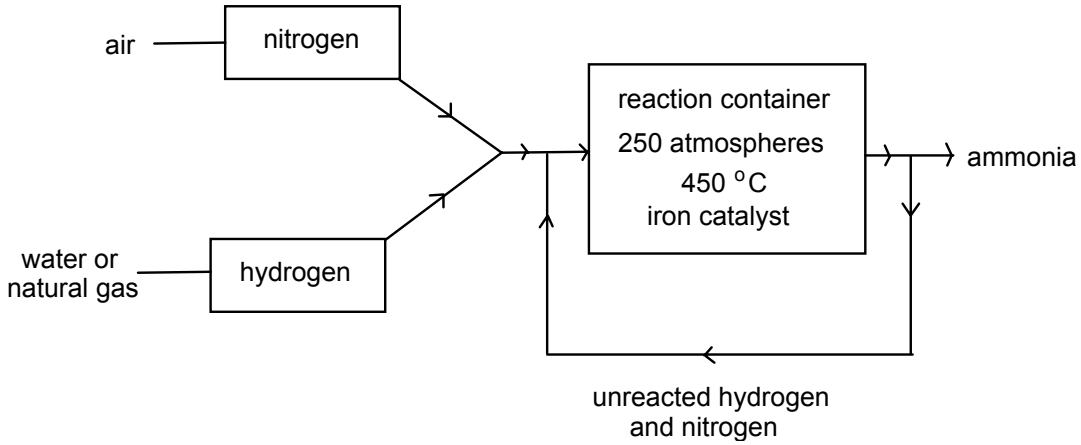
use	reason
Graphite is used in pencil leads	because it conducts electricity
Diamond is used in cutting tools	because it sparkles and is transparent
Graphite is used as an electrode in electrolysis	because it is has a high melting point and is very hard
Diamond is used in jewellery	because it is slippery

[3]

[Total: 4]

8. Ammonia is made from nitrogen and hydrogen.

Look at the flow chart. It shows how ammonia is made using the Haber process.



(a) One of the costs of making ammonia is the cost of the catalyst.

Write about the other costs of making ammonia.

.....

.....

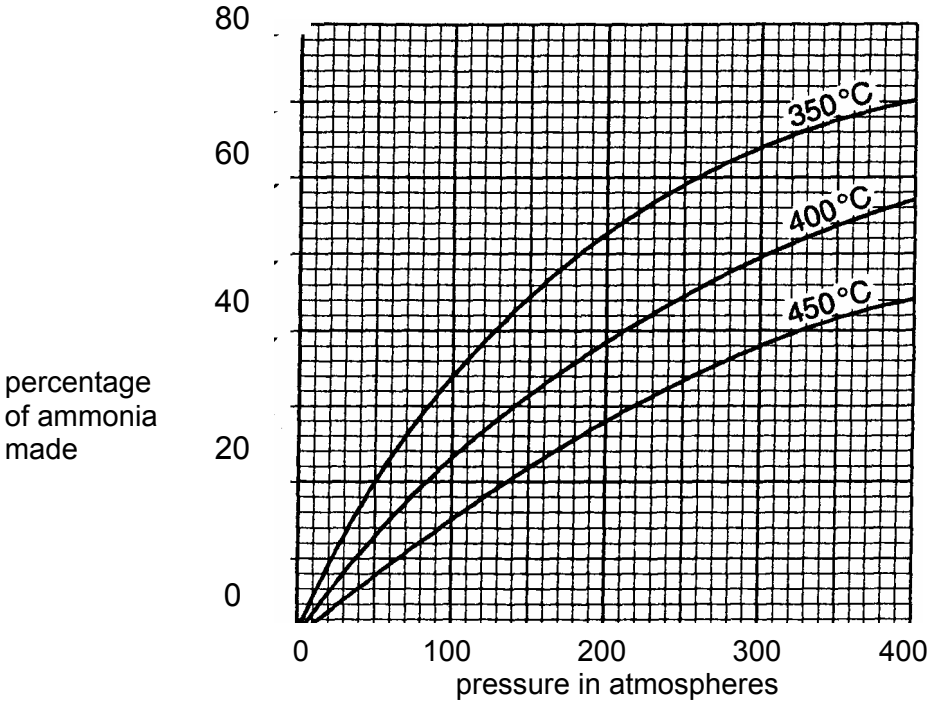
.....

.....

.....[3]

(b) Look at the graphs.

They show the percentage of ammonia made in the converter at different temperatures and pressures.



(i) Look at the graph for 350 °C.

The percentage of ammonia changes as the pressure increases.

Describe how.

.....[1]

(ii) Look at the graphs.

The percentage of ammonia changes as the temperature increases.

Describe how.

.....[1]

(iii) Look at the graphs.

Write down a temperature and a pressure which make 20% of ammonia.

Temperature.....°C

Pressure.....atmospheres

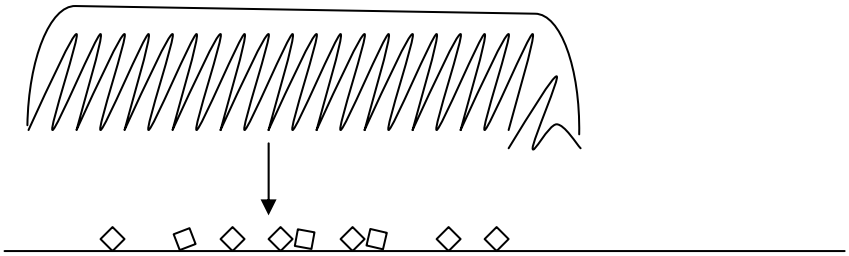
[1]

[Total: 6]

Section 3

9. **(a)** Noelle combs her hair.

Look at the diagram



She holds the comb near to some small pieces of paper.

What happens to the paper?

.....

.....[1]

(b) Noelle walks on a nylon carpet.

She touches a radiator.

Write down what might happen.

.....

.....[1]

(c) Static electricity is used by dodoctors to restart a patients heart when it has stopped.

Describe how.

In your answer you should:

- describe what the doctor does
- describe any safety precautions taken

.....

.....

.....

.....

.....

.....[3]

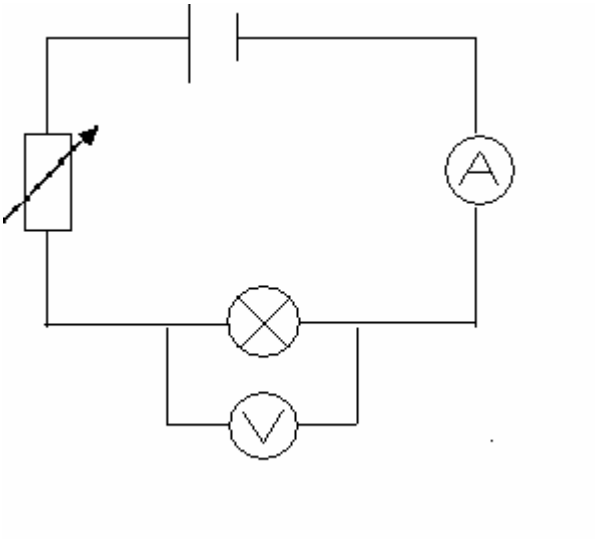
[Total: 5]

10 **(a)** Jamie does an experiment with electricity.

He makes a circuit.

He measures the current and pd (voltage) across the bulb.

Look at the diagram



The pd (voltage) across the bulb is 12V when the current is 2A.

Calculate the resistance of the bulb

.....

.....

.....

Answer .....ohms [3]

(b) Jamie's reading lamp has three wires in the cable.

Complete the table below.

wire	colour
live	brown
neutral	
	green and yellow

[2]

(c) The reading lamp has a fuse and a plug.

Why is the fuse important?

.....[1]

(d) Jamie has a playstation.

It is double insulated.

It has two wires in the plug

What are the **names** of these two wires?

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

[Total: 8]

10. Radioactive atoms give out radiation.

Two types of radiation are alpha radiation and beta radiation.

(a) Which part of the atom gives out these types of radiation?

.....[1]

(b) The radiation from radioactive elements can be useful or harmful.

(i) Write down **one use** of this radiation

.....[1]

(ii) Write down **one harmful effect** of this radiation.

.....[1]

(c) Kelly is measuring the count rate from a radioactive substance.

At the start of the experiment the count rate is 2500 counts per minute (cpm).

At the end of the experiment she measured the count rate again.

Look at the list of counts per minute.

0

2000

2500

3000

5000

What is the most likely count rate at the end of the experiment.

Choose from the list.

.....[1]

(d) Kelly measured the background radiation before she started the experiment.

What is **background radiation**?

.....

.....

.....[2]

(e) Nuclear fuel is used in some power stations.

Write down the name of **one** nuclear fuel.

.....[1]

[Total: 7]

1	2											3	4	5	6	7	8
							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 **Sb** 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							

Key

relative atomic mass
atomic symbol
name
atomic (proton) number

Elements with atomic numbers 112-116 have been reported but not fully authenticated

*The Lanthanides (atomic numbers 58-71) and the Actinides (atomic numbers 90-103) have been omitted
Cu and Cl have not been rounded to the nearest whole number

BLANK PAGE

RECOGNISING ACHIEVEMENT

GCSE

ADDITIONAL SCIENCE B

F **B624/01**

Additional Science B: Unit 2 Modules B4, C4, P4

Specimen Mark Scheme

60 mins

Maximum mark for this paper is 60

This specimen mark scheme consists of 4 printed pages.

Registered Charity Number: 1066969

Question Number	Answer	Max Mark
Section 1		
1(a)	Water taken in by tree; Through roots / root hairs / lost by evaporation / transpiration;	**[2]**
1(b)i	June;	**[1]**
1(b)ii	1. warmest month; 2. most light each day;	**[2]**
	Total mark	**[5]**
2(a)i	X – (sap)vacuole; Y – cell wall	**[2]**
2(a)ii	provides support	**[1]**
2(b)	absorb light energy; for photosynthesis **(OWTTE)**	**[2]**
	Total mark	**[5]**
3(a)i	Grass cuttings;	**[1]**
3(a)ii	Contains most water for microbe activity;	**[1]**
3(b)	Micro-organisms / named type;	**[1]**
3(c)	Increase temperature → increase microbe activity/ growth; Add water → needed for microbe activity; Agitate contents → increase contact between microbes + plant material; Allow other valid explained answers, including mixing air to supply oxygen, as specification does not require understanding of anaerobic decay.	**[2]**
	Total mark	**[5]**
4(a)i	Herbicide;	**[1]**
4(a)ii	Herbicides/pesticides/insecticides can enter/accumulate in food chains; Poisoning organisms that are not pests; Damaging food webs / ecological balance;	**[2]**
4(b)i	Organic	**[1]**
4(b)ii	Hand weeding / hoeing / cultivating/mulching;	**[1]**
	Total mark	**[5]**
Section 2		
5(a)	A;	**[1]**
5(b)i	E;	**[1]**
5(b)ii	Alkali;	**[1]**
5(c)	Calcium nitrate and water; **(both required for mark; allow any order)**	**[1]**
5(d)	Neutralisation;	**[1]**
	Total mark	**[5]**

6(a)	P is Phosphorus; K is Potassium;	**[2]**
6(b)	K = 3 P = 1 O = 4	**[3]**
	Total mark	**[5]**
7(a)	Carbon **(allow C);**	**[1]**
7(b)	Graphite is used in pencil leads because it is slippery; Diamond is used in cutting tools because it has a high melting point and is very hard; Graphite is used as an electrode in electrolysis because it conducts electricity; Diamond is used as jewellery because it sparkles and is transparent All 4 correct **(3 marks)** 2 or 3 correct **(2 marks)** 1 correct **(1 mark)**	**[3]**
	Total mark	**[4]**
8(a)	**Any three from** Cost of raw materials / cost of hydrogen / cost of nitrogen, nitrogen is very cheap since it comes from air / aw; Labour cost / aw which will be cheaper if automated / aw; Energy costs / cost of electricity / cost of heating / aw; Plant costs / equipment costs; Catalyst makes reaction quicker so it is cheaper;	**[3]**
8(b)i	Increases / goes up / aw	**[1]**
8(b)ii	Decreases / goes down / aw	**[1]**
8(b)iii	350 and 50 atmospheres / 400 and 80 - 90 atmospheres / 450 and 135 – 145 atmospheres;	**[1]**
	Total mark	**[6]**
Section 3		
9(a)	moves/attracted to comb;	**[1]**
9(b)	get a shock;	**[1]**
9(c)	paddles charged; good electrical contact; with patients chest /aw; charge passed through patient; to make heart contract; care taken not to shock operator **(any three);**	**[3]**
	Total mark	**[5]**

10(a)	R = v ÷ I; = 12 ÷ 2; = 6Ω **(correct answer on own gains 3)**	**[3]**
10(b)	Blue;	
	Earth;	**[2]**
10(c)	Safety/ AW	**[1]**
10(d)	Live;	
	Neutral;**(any order nor colours)**	**[2]**
	Total mark	**[8]**
11(a)	Nucleus;	**[1]**
11(b)i	Smoke detectors/sterilizing/thickness gauges/tracers/ treating cancer;	**[1]**
11(b)ii	Damage cells;	**[1]**
11(c)	2000;	**[1]**
11(d)	radiation that is always present;	
	in the atmosphere/environment;	**[2]**
11(e)	uranium	**[1]**
	Total mark	**[7]**
	Overall Marks	**[60]**