

# **Additional Science B**

General Certificate of Secondary Education **B623/01**

Unit 1: Modules B3, C3, P3

## **Mark Scheme for June 2010**

---

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of pupils of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support which keep pace with the changing needs of today's society.

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by Examiners. It does not indicate the details of the discussions which took place at an Examiners' meeting before marking commenced.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

© OCR 2010

Any enquiries about publications should be addressed to:

OCR Publications  
PO Box 5050  
Annesley  
NOTTINGHAM  
NG15 0DL

Telephone: 0870 770 6622  
Facsimile: 01223 552610  
E-mail: [publications@ocr.org.uk](mailto:publications@ocr.org.uk)

Question		Expected Answers	Marks	Additional Guidance
1	(a) (i)	(towards) light (1)	1	<b>allow</b> get light / for photosynthesis / make food / phototropism / towards the sun / towards sunlight / because of the sun / attracted to the light
	(ii)	(towards) gravity (1)	1	<b>allow</b> away from light / where there is no light <b>allow</b> get water / get minerals / geotropism / get nutrients <b>allow</b> anchorage / to keep plant stable <b>ignore</b> support / to hold plants upright <b>not</b> to get food / to get energy
	(b)	remove piece of plant / remove shoot / get a root / get a stem (1)  <b>and any two from:</b> put into suitable medium / soil (1)  (dip into) rooting powder / rooting hormone (1)  warm conditions / leave in light / keep moist / water (1)	3	<b>allow</b> get a leaf <b>ignore</b> take a plant cutting / take a flower bud <b>not</b> take a stem with roots  <b>ignore</b> put into ground / put into fertiliser
	(c)	genetically identical / clone / (produced by) asexual reproduction / has one parent (1)	1	award mark for answers that suggest that the plants all come from the same plant but not from the same type of plant  <b>allow</b> all come from a single plant / all come from the same plant
	(d)	change to gene / change to DNA (1)	1	<b>allow</b> change in chromosomes / change in genetic material / change in base sequence (of DNA) / extra genetic material produced / loss of genetic material <b>not</b> genetic modification
		<b>Total</b>	<b>7</b>	

Question		Expected Answers	Marks	Additional Guidance
2	(a)	fast growth rate (1) resistance to many diseases (1)	2	if more than two answers given mark incorrect ones first – <b>one</b> incorrect award max of 1 mark <b>two</b> incorrect award 0 marks
	(b)	<b>any two from:</b> small(er) (1) streamlined / thin <b>and</b> long / not round (1) tail / can swim (1) pointed head (1)	2	Assume answer refers to sperm unless egg is specified  <b>allow</b> higher level answers such as may contain Y chromosome / contains male genes (1) more mitochondria / lots of mitochondria (1) no food stored / less food stored (1) contains acrosome / contains enzymes to break through egg cell membrane (1)  <b>ignore</b> simply 'move' <b>ignore</b> head can penetrate the egg cell membrane
	(c) (i)	4 (1)	1	
	(ii)	3 (1)	1	
	(iii)	2 (1)	1	
		<b>Total</b>	<b>7</b>	

Question			Expected Answers	Marks	Additional Guidance
3	(a)	(i)	(rate) increases to pH 7 / increases to neutral / increases to optimum / increases to 41 (1)  (rate) decreases above pH7 / decreases from neutral / decreases from optimum / decreases from 41(1)	2	assume description refer to increasing pH unless specified otherwise  <b>allow</b> (rate) increases then decreases / reaction faster and then slower / lower (rate) at high and low pH (2) <b>allow</b> (rate) peaks at pH7 / (rate) is maximum at neutral / (rate) is highest at 41 (1)
		(ii)	7.0 (1)	1	<b>allow</b> any answer in range 6.8 and 7.2 (1)
	(b)	(i)	diffusion (1)  higher concentration in intestine / lower concentration in blood (1)	2	explanation must be <b>linked</b> to correct process  <b>allow</b> diffusion anywhere in answer  this marking point must have a <b>comparison</b> <b>allow</b> high concentration to low concentration <b>allow</b> high concentration in intestine, low concentration in blood <b>but</b> high concentration in intestine on its own should not be awarded a mark  <b>allow</b> higher level answers in terms of active transport / active uptake (1) with <b>correct link</b> to carrier (molecule) / needs energy / needs ATP (1)
		(ii)	plasma (1)	1	
			<b>Total</b>	<b>6</b>	

Question		Expected Answers	Marks	Additional Guidance
4	(a)	lighted splint / burns (1) pops / (small) explosion (1)	2	allow one mark for pop tests / splint gives a squeaky pop
	(b)	cathode (1)	1	
	(c)	oxygen (1)	1	allow any answer indicating candidate knows the gas is oxygen O <sub>2</sub> / O / O <sup>2</sup>
	(d)	H <sup>+</sup> (1)	1	if answer line is blank allow correct answer circled, underlined or ticked
		<b>Total</b>	<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
5	(a)	fluorine / iodine / astatine (1)	1	<b>allow</b> F <sub>2</sub> / I <sub>2</sub> / At <sub>2</sub> / F / I / At
	(b)	sodium bromide (1) potassium chloride (1)	2	<b>allow</b> NaBr <b>not</b> sodium bromine <b>allow</b> KCl <b>not</b> potassium chlorine
	(c)	sodium + chlorine → sodium chloride (1)	1	<b>allow</b> = for → but do <b>not allow</b> and for + <b>allow</b> correct formulae but equation does not need to balance e.g. <ul style="list-style-type: none"> <li>• Na + Cl<sub>2</sub> → NaCl</li> <li>• Na + Cl<sub>2</sub> → 2NaCl</li> </ul> <b>allow</b> mix of correct formulae and words <b>not</b> Na + Cl → NaCl
	(d)	making pesticides (1)	1	if answer line is blank allow correct answer circled, underlined or ticked
		<b>Total</b>	<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
6	(a)	B (1)	1	if answer line is blank allow correct answer circled, underlined or ticked
	(b)		2	<b>all three</b> correct award 2 marks <b>one</b> or <b>two</b> correct award 1 mark
	(c)	<p><b>any two from</b></p> <p>high melting point / solid at room temperature (1)            high boiling point (1)</p> <p>(good) conductor of heat (1)            (good) conductor of electricity (1)            hard (1)            high density (1)            high tensile strength / strong (1)            malleable / flexible / can bend easily (1)            ductile / can be drawn into wires (1)</p> <p>sonorous (1)</p>	2	<p>If <b>one</b> property is contradicted within answer max 1 mark e.g. some conduct electricity and others do not            If <b>two</b> properties are contradicted within answer then award 0 marks</p> <p><b>ignore</b> heat resistance</p> <p><b>allow</b> good conductor (1) if no reference to heat or electricity</p> <p><b>ignore</b> lustrous it is given in the question</p> <p><b>allow</b> strong metallic bond  <b>ignore</b> durable / can make alloys / magnetic</p> <p><b>allow</b> chemical properties:            react with acids (1)            lose electrons (1)            (forms) positive <u>ions</u> (1)            reducing agents (1)            form basic oxides (1)            form ionic compounds with non-metals / form ionic compounds with named non-metal (1)</p>
		<b>Total</b>	<b>5</b>	



Question			Expected Answers	Marks	Additional Guidance
7	(a)	(i)	3 / three (1)	1	<b>allow</b> copper, carbon and oxygen
		(ii)	5 / five (1)	1	
		(iii)	29 (1)	1	<b>allow</b> the proton number / number of protons in atom
	(b)		soluble (in water) (1)  high (melting point) / AW (1)	2	<b>allow</b> dissolves / dissolved / makes a (colourless) solution / good / high <b>not</b> reacts with water  <b>allow</b> large / big / quoted number of at least 600 °C
<b>Total</b>				<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
8	(a)	<p><b>distance</b> measuring tape / trundle wheel (1)</p> <p><b>time</b> stopwatch / stopclock (1)</p>	2	<p><b>allow</b> metre wheel <b>ignore</b> pedometer / metre rule / metre stick</p> <p><b>not</b> merely clock / watch / timer / mobile phone or other device containing a stopwatch <b>but allow</b> use stopwatch function on a mobile phone</p>
	(b)	(i) increases / AW (1)	1	<p><b>allow</b> going up / accelerating <b>ignore</b> changing / more</p>
		(ii) constant / steady / uniform / stays at 9 m/s (1)	1	<b>allow</b> not changing / running at his fastest speed
		(iii) 3 (2) <b>but if answer is incorrect</b> 9 ÷ 3 (1)	2	
		<b>Total</b>	<b>6</b>	

Question			Expected Answers	Marks	Additional Guidance
9	(a)	(i)	A (1)	1	mark the answer line but if answer line is blank credit the correct answer ticked circled or underlined in the list more than one answer scores zero
		(ii)	B (1)	1	mark the answer line but if answer line is blank credit the correct answer ticked circled or underlined in list more than one answer scores 0
	(b)	(i)	60 000 (2) <b>but if answer is incorrect</b> 4 000 x 15 (1)	2	
		(ii)	watt (1)	1	mark the answer line but if answer line is blank credit the correct answer ticked circled or underlined more than one answer scores zero

Question		Expected Answers	Marks	Additional Guidance
9	(c)	<p><b>braking distance: max one from</b> idea of one specified road condition / weather condition eg wet / loose gravel / ice / leaves / snow / mud (on road) (1)</p> <p><b>or</b></p> <p>idea of one specified car condition eg bald tyres / poor tyres / worn brakes / poor brakes (1)</p> <p><b>or</b></p> <p>greater mass / greater load / more people in car (1)</p> <p><b>thinking distance: max one from</b> driver tired / (under influence of) alcohol / (under influence of) drugs / distractions from inside or outside car (1)</p>	2	<p>read entire answer to ensure there are no contradictions eg. a list of braking distance factors including a thinking distance factor</p> <p>answer must be <b>clearly linked</b> to braking distance</p> <p><b>allow</b> slippery (road surface)</p> <p><b>ignore</b> unqualified references to weather / road conditions eg. bad weather is not sufficient but if its raining or snowing should be awarded a mark</p> <p><b>ignore</b> its foggy / its windy</p> <p><b>ignore</b> unqualified references to tyres / brakes e.g. condition of brakes is not sufficient but tyres have poor grip should be awarded a mark</p> <p>answer must be <b>clearly linked</b> to thinking distance</p> <p><b>allow</b> named distraction eg passengers / phone / radio / kids in back seat / smoking / eating / drinking / pedestrians / signs at roadside</p> <p><b>allow</b> increased age / older age</p>
	(d) (i)	petrol / diesel (1)	1	<p><b>allow</b> LPG / hydrogen</p> <p><b>ignore</b> oil</p>
	(ii)	solar power / idea of battery in the car / battery that gets charged / battery stores energy or charge (1)	1	<p><b>allow</b> charged from mains / from power station / fuel cell</p> <p><b>ignore</b> plugged into mains</p>
		<b>Total</b>	<b>9</b>	

Question		Expected Answers	Marks	Additional Guidance
10		any two from: crumple zones / bumpers (1) seat-belts (1) air bags (1)	2	<b>ignore</b> brakes (pads or shoes) <b>allow</b> side impact bars <b>allow</b> safety cage / roll bars (1) <b>allow</b> reasonable energy absorbing materials in car eg padded fascia <b>allow</b> tyres
		<b>Total</b>	<b>2</b>	

Question		Expected Answers	Marks	Additional Guidance
11	(a) (i)	A (1)	1	mark the answer line but if answer line is blank credit the correct answer ticked circled or underlined more than one answer scores zero
	(ii)	C (1)	1	mark the answer line but if answer line is blank credit the correct answer ticked circled or underlined more than one answer scores zero
	(b)	air resistance / drag (1)	1	<b>allow</b> friction (with the air) <b>ignore</b> upthrust / wind resistance <b>not</b> gravity / (potential) energy
		<b>Total</b>	<b>3</b>	

**OCR (Oxford Cambridge and RSA Examinations)**  
**1 Hills Road**  
**Cambridge**  
**CB1 2EU**

**OCR Customer Contact Centre**

**14 – 19 Qualifications (General)**

Telephone: 01223 553998

Facsimile: 01223 552627

Email: [general.qualifications@ocr.org.uk](mailto:general.qualifications@ocr.org.uk)

**[www.ocr.org.uk](http://www.ocr.org.uk)**

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

**Oxford Cambridge and RSA Examinations**  
**is a Company Limited by Guarantee**  
**Registered in England**  
**Registered Office; 1 Hills Road, Cambridge, CB1 2EU**  
**Registered Company Number: 3484466**  
**OCR is an exempt Charity**



**OCR (Oxford Cambridge and RSA Examinations)**  
**Head office**  
**Telephone: 01223 552552**  
**Facsimile: 01223 552553**

© OCR 2010