

**Science B**

General Certificate of Secondary Education **B622/01**

Unit 2: Modules B2, C2, P2

**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)	idea of increased population / idea of more packaging / idea of more (household) waste produced (1)	1	<b>allow</b> reverse argument  <b>allow</b> we have become a throw away society
	(b)	finite (1)	1	more than one answer = 0 <b>allow</b> correct answer ticked, circled or underlined in list if answer line is blank
	(c)	endangered (1)	1	<b>allow</b> phonetic spelling e.g. indangered <b>not</b> in danger
		<b>Total</b>	<b>3</b>	

Question		Expected Answers	Marks	Additional Guidance
2	(a)	net (1)	1	more than one answer = 0
	(b)	leech (1)	1	more than one answer = 0 <b>allow</b> answer indicated on key
	(c) (i)	all 3 bars plotted correctly (1)  i.e. B – 26 C – 3 D – 10  +/- ½ square tolerance	1	<b>ignore</b> width of bars
	(ii)	29 (1)	1	<b>allow</b> answer written in table if answer line is blank
	(iii)	C  <b>AND</b>  idea of the smallest number of (different) species / AW (1)	1	more than one answer = 0  <b>allow</b> 3  <b>must have correct pond and explanation for mark</b> <b>allow</b> least number or less or not many of animals / named organism e.g. fish
	(d)	invertebrates do not have a backbone or spine / vertebrates have a backbone or spine (1)	1	assume answer refers to invertebrates <b>ignore</b> no skeleton / bones <b>allow</b> invertebrates have no spinal cord
<b>Total</b>			<b>6</b>	

Question			Expected Answers	Marks	Additional Guidance
3	(a)	(i)	carbon dioxide (used) (1)	1	<b>allow</b> correct formula / CO <sub>2</sub> <b>allow</b> mark if correct answer next to question
		(ii)	oxygen (made) (1)	1	<b>allow</b> correct formula / O <sub>2</sub> <b>allow</b> mark if correct answer next to question
	(b)		<b>more</b> carbon dioxide or CO <sub>2</sub> / higher temperature (1)	1	<b>allow more</b> water or H <sub>2</sub> O <b>ignore</b> more rain <b>allow</b> more heat or more warmth <b>ignore</b> more temperature or just 'warmth' or more chlorophyll or more surface area
	(c)		starch / oil / fat / lipids (1) for storage (1)  <b>or</b> cellulose (1) make cell walls (1)  <b>or</b> proteins / amino acids (1) growth / repair (1)	2	to gain second mark use must match the substance they name to its use  <b>allow</b> one mark for any use if they do not name a substance  <b>allow</b> other possible products e.g. lignin for support <b>allow</b> sucrose for transport (2) <b>allow</b> wax for waterproofing (2) <b>allow</b> chlorophyll (1) for <b>photosynthesis</b> (1) <b>but</b> chlorophyll for food scores (1)  <b>ignore</b> chloroplasts but chloroplasts for photosynthesis scores (1)
			<b>Total</b>	<b>5</b>	

Question			Expected Answers	Marks	Additional Guidance
4	(a)	(i)	predator(s) (1)	1	<b>allow</b> phonetic spelling e.g. preditor
		(ii)	<p><b>any two from:</b></p> <p>eyes at the side of the head / wide field of view (1)</p> <p>camouflage / difficult to see (1)</p> <p>long / strong legs (1)</p> <p>can run fast or hop fast or move fast (1)</p>	2	<p><b>USE TICKS IN THIS QUESTION</b> answers must be relevant to the kangaroo</p> <p><b>ignore</b> good vision / binocular vision / eyes on front of head</p> <p><b>allow</b> big legs</p> <p><b>ignore</b> feet</p> <p><b>allow</b> good hearing (1), but <b>ignore</b> big ears <b>allow</b> tail for defence / protection / balance (1)</p>
	(b)		<p>more kangaroos more eagles (1) link more <b>food</b> to increase in eagle population (1)</p> <p><b>or</b></p> <p>fewer kangaroos fewer eagles (1) link less <b>food</b> to decrease in eagle population (1)</p>	2	<p><b>USE TICKS IN THIS QUESTION</b> <b>allow</b> higher level answers e.g. eagle numbers can go up because they can raise more young when there are more kangaroos (2)</p> <p>'lack of food' on its own scores 0</p> <p>must show link between food and population for second mark e.g. more kangaroos means more eagles but fewer kangaroos fewer eagles (1)</p> <p><b>but</b> more kangaroos means more eagles because eagles have more food (2) <b>allow</b> the numbers go up because they have more food or prey (1)</p>
	(c)		water / mate / shelter / nesting sites (1)	1	<b>allow</b> habitat / territory / space
			<b>Total</b>	<b>6</b>	

Question		Expected Answers	Marks	Additional Guidance
5	(a)	<b>any two from:</b> brick (1) cement (1) clay (1) concrete (1) glass (1) MDF (1) metal (1) plastics (1) slate (1) wood (1)	2	<b>allow</b> named metals used in construction e.g. aluminium / iron / steel <b>allow</b> 'metal' and then a named metal for one mark only <b>allow</b> named plastics e.g. poly vinyl chloride <b>allow</b> straw / reeds <b>allow</b> a named wood e.g. oak <b>allow</b> a named stone e.g. limestone / granite <b>allow</b> water / stones / sand / mud
	(b)	decorate / AW (1)  protect (surface) / stops it rusting / corroding (1)	2	<b>allow</b> to colour it / make it look nice
	(c)	can glow in the dark (1)	1	<b>allow</b> so people can see the barrier (at night) / reference to safety <b>ignore</b> to prevent graffiti
		<b>Total</b>	<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
6	(a)	crust core mantle	2	all 3 correct = 2 1 or 2 correct = 1
	(b)	continental (1)	1	
	(c)	less dense (than the mantle) (1)	1	<b>ignore</b> lighter <b>allow</b> lighter weight (than the mantle) / ora
		<b>Total</b>	<b>4</b>	



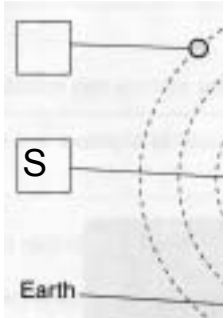
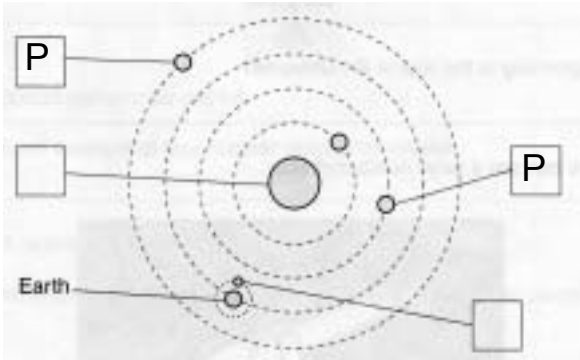
Question		Expected Answers	Marks	Additional Guidance
7	(a)	nitrogen (1)	1	<b>allow</b> N <sub>2</sub> / N <b>allow</b> other ways of indicating answer but answer on answer line takes precedence
	(b)	<b>any two from:</b>  kills plants (1)  kills aquatic life (1)  erodes stonework (1)  corrodes metals (1)	2	<b>allow</b> asthma / respiratory problems, but <b>ignore</b> harms people unless qualified  <b>allow</b> kills trees  <b>allow</b> kills fish  <b>allow</b> erodes limestone / erodes buildings <b>allow</b> damages buildings  <b>allow</b> erodes statues or corrodes statues, as statues may be made from stone or metal  <b>allow</b> idea of having an impact on ecosystems <b>ignore</b> references to fish in the sea <b>ignore</b> kills animals / kills wildlife
	(c)	removes carbon monoxide / AW (1)	1	<b>allow</b> removes nitrogen monoxide / changes carbon monoxide into carbon dioxide / changes nitrogen monoxide into nitrogen  <b>allow</b> produces less polluting gases <b>ignore</b> less pollution <b>allow</b> carbon dioxide is less harmful than carbon monoxide
		<b>Total</b>	<b>4</b>	

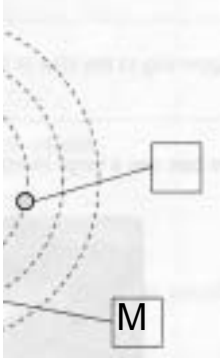
Question		Expected Answers	Marks	Additional Guidance	
8	(a)	magnesium + hydrochloric acid → magnesium chloride + hydrogen (1)	1	<b>allow</b> $\text{Mg} + \text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$ <b>allow</b> mix of correct formulae and names but <b>ignore</b> any balancing <b>allow</b> = or $\rightleftharpoons$ instead of $\rightarrow$ <b>not</b> 'and' or '&' for + <b>allow</b> reactants in either order <b>allow</b> products in either order	
	(b)	(i)	80 (seconds) (1)	1	<b>allow</b> any value in the range 61 - 80
		(ii)	between 0 seconds and 20 seconds (1)	1	<b>allow</b> any time interval between 0 and 20 e.g. 19 - 20
<b>Total</b>			<b>3</b>		

Question		Expected Answers	Marks	Additional Guidance
9	(a)	copper (1)	1	
	(b)	<p>any two from:</p> <p>iron is more dense (1)</p> <p>iron is stronger (1)</p> <p>iron does not conduct electricity as well (1)</p>	2	<p><b>answer must clearly refer to iron or aluminium</b></p> <p><b>ignore</b> aluminium is lighter but <b>allow</b> aluminium is lighter weight</p> <p><b>not</b> just iron is strong / dense / conducts electricity – answer must be comparative</p> <p><b>allow</b> reverse arguments</p> <p><b>allow</b> iron is magnetic (1)</p> <p><b>allow</b> iron rusts / iron corrodes more easily (1)</p> <p><b>allow</b> aluminium is more expensive (1)</p> <p><b>ignore</b> values simply quoted from table unless qualified</p>
	(c)	ornaments / door handles / (decorative) light switches / (musical) instruments / trophies / keys / AW (1)	1	<p><b>allow</b> any suitable use</p> <p><b>ignore</b> pipes / monuments / statues / jewellery</p> <p><b>ignore</b> properties of brass</p>
		<b>Total</b>	<b>4</b>	

Question			Expected Answers	Marks	Additional Guidance
10	(a)	(i)	convection (1)	1	<b>allow</b> correct answer ticked, circled or underlined in list if answer line is blank
		(ii)	kinetic (1)  electrical (1)	2	<b>allow</b> KE or ke <b>ignore</b> movement  <b>allow</b> electricity
	(b)	(i)	biomass (1)	1	<b>allow</b> named examples e.g. wood, straw, manure, household waste, biogas <b>ignore</b> wind / waves / gas
		(ii)	coal / (crude) oil / (natural) gas (1)	1	<b>allow</b> peat / coke / petrol / diesel / paraffin / any named fuel from crude oil
			<b>Total</b>	<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
11	(a)	<p>any three from:</p> <p>fuel burned (1)</p> <p>water heated / steam produced (1)</p> <p>steam drives turbine (1)</p> <p>turbine turns generator (1)</p> <p>generator produces electricity (1)</p>	3	<p><b>USE TICKS IN THIS QUESTION</b></p> <p><b>allow</b> nuclear fuel producing energy</p> <p><b>ignore</b> 'burning nuclear fuel' or 'fuel heated up'</p> <p><b>ignore</b> references to water condenses</p> <p><b>ignore</b> water vapour produced</p> <p><b>ignore</b> steam turns generator</p> <p><b>allow</b> steam turns propeller or fan or blades</p> <p><b>allow</b> turbine powers or spins generator</p> <p><b>allow</b> higher level answers e.g. coil moves (1) in magnetic field (1) voltage <b>induced</b> (1) or e.g. magnet moves (1) in a coil (1) voltage <b>induced</b> (1)</p>
	(b)	<p>reduce energy waste or power loss or reduce heat waste or reduce cost (1)</p>	1	<p><b>allow</b> cheaper</p> <p><b>allow</b> higher level answers e.g. less or low(er) current in the cables or thinner cables can be used</p> <p><b>ignore</b> electricity or current or voltage lost or wasted</p> <p><b>ignore</b> references to efficiency</p> <p><b>not</b> stops energy loss</p>
		<b>Total</b>	<b>4</b>	

Question		Expected Answers	Marks	Additional Guidance
12	(a)	<p>S / Sun in middle box left hand side (1)</p> 	1	any letter in incorrect box loses mark for that letter
	(b)	<p>P / planet in <b>either or both</b> top box on left or top box on right (1)</p> 	1	any letter in incorrect box loses mark for that letter

Question		Expected Answers	Marks	Additional Guidance
	(c)	<p>M / moon in bottom box on right (1)</p> 	1	any letter in incorrect box loses mark for that letter
	(d)	<p><b>any two from:</b></p> <p>oxygen (1)</p> <p>food (1)</p> <p>water (1)</p>	2	<p><b>allow</b> air / suitable atmosphere  <b>ignore</b> reference to just space suits</p> <p><b>allow</b> named type of food</p> <p><b>allow</b> liquid / drink</p> <p><b>allow</b> method of communication but <b>ignore</b> mobile phone  <b>allow</b> fuel (to get home)  <b>allow</b> higher level answers e.g. warmth (suitable temperature) or shielding from radiation</p>
		<b>Total</b>	<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
13	(a)	Big Bang (1)	1	
	(b)	increasing / getting bigger / expanding / AW (1)	1	
	(c)	(i)	1	if more than one box ticked scores 0
		Stars are closer to us than the Sun <input type="checkbox"/>		
		Stars give off their own light <input checked="" type="checkbox"/>		
		Stars reflect light from the Moon <input type="checkbox"/>		
		Stars reflect light from the Sun <input type="checkbox"/>		
		(ii)	1	<b>allow</b> as dust clouds <b>allow</b> dust <b>allow</b> nebular <b>ignore</b> references to explosion <b>ignore</b> rock
		<b>Total</b>	<b>4</b>	



Question		Expected Answers	Marks	Additional Guidance
14	(a)	tracer / thickness gauge / sterilising equipment / treating cancer / smoke alarms / pacemaker battery / non-destructive testing (1)	1	<b>ignore</b> as energy <b>ignore</b> nuclear power <b>not</b> bombs  <b>ignore</b> prevent cancer
	(b)	87 (1)	1	<b>allow</b> 50+14+13+10
		<b>Total</b>	<b>2</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