



GCSE

## Science B

General Certificate of Secondary Education **B621/02**

Unit 1 Modules B1, C1, P1

## **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

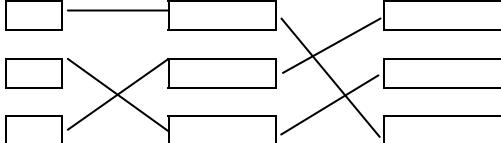
Question		Expected Answers	Marks	Additional Guidance
1	(a)	it is recessive (1)	1	<b>allow</b> only expressed if homozygous <b>allow</b> references to gene rather than allele <b>ignore</b> it is not dominant
	(b) (i)	digests / breaks down fats / converts fats to fatty acids (and glycerol) (1)	1	if products are stated then they must be correct eg <b>not</b> digests fats to amino acids
	(ii)	diabetes (1)	1	<b>allow</b> type 1 or type 2 diabetes
	(c) (i)	emulsifies them / breaks them down (into smaller droplets) (1)	1	<b>not</b> digests / breaks into smaller molecules/breaks fat down <b>allow</b> reduces surface tension / increases surface area
	(ii)	(drinking too much) alcohol (1)	1	<b>not</b> just drinking <b>allow</b> hepatitis / obesity / overweight
	<b>Total</b>		<b>5</b>	

B621/02

## Mark Scheme

June 2010

Question		Expected Answers	Marks	Additional Guidance
2	(a)	sensory neurone (1)	1	more than one tick = zero marks
	(b)	(i) proteins (1)	1	<b>allow</b> enzymes / amino acids / polypeptide <b>ignore</b> named protein
	(ii)	it changes the order of the bases (in DNA) / changes the amino acids in the protein (1)	1	<b>allow</b> changes the base code <b>ignore</b> changes the bases / base structure
	(c)	idea that some people get the drug and some do not / idea of a control group (1)  a person does not know whether or not they are taking the drug or not / use of a placebo or fake pill or sugar pill (1)  the doctors prescribing do not know either (1)	3	the people / trialists don't know whether or not they are taking the drug or not = 2
		<b>Total</b>	<b>6</b>	

Question		Expected Answers	Marks	Additional Guidance
3	(a)	(i) one is systolic and the other diastolic /  one is when the ventricles / heart contract and the other is when they relax (1)	1	
	(ii)	more salt / more fat / more alcohol / more sugar / more cholesterol (1)	1	<b>not</b> fibre / protein <b>ignore</b> named foods <b>allow</b> a lot of salt / fat etc <b>ignore</b> carbohydrate if list all must be correct
	(b)	more energy (is released) / does not produce lactic acid (1)	1	<b>allow</b> no oxygen debt <b>allow</b> less (likely to get) cramp / muscle fatigue <b>ignore</b> can exercise for longer unless qualified  <b>allow</b> ORA if anaerobic specified
	(c)		2	correct links on left hand side: (1)  correct links on right hand side: (1)
		<b>Total</b>	5	

B621/02

## Mark Scheme

June 2010

Question		Expected Answers	Marks	Additional Guidance
4	(a) (i)	by mosquito (1)	1	<b>ignore</b> vector/sex of mosquito <b>not</b> if another organism or named vector is given as well as mosquito eg mosquito and water
	(ii)	<b>any two from:</b> heat stroke (1)  dehydration (1)  reduces enzyme action AW (1)  death of cells / individual (1)	2	<b>not</b> just stroke <b>allow</b> symptoms of heat stroke eg fainting / being sick / dizziness  <b>allow</b> loss of fluids <b>ignore</b> sweating
	(b)	tick in second box (1)	1	more than one tick = no marks
		<b>Total</b>	4	

B621/02

## Mark Scheme

June 2010

Question		Expected Answers	Marks	Additional Guidance
5	(a)	emulsifier / stabiliser (1)	1	
	(b)	(i) hydrophilic end bonds to water molecules (1) hydrophobic end bonds with oil molecules (1)	2	<b>allow</b> marks from a diagram <b>allow</b> surrounded / attracted / bonds to / holds on to / sticks to but <b>ignore</b> loves / hates  If no marks scored from LHS: <b>allow</b> one end/part surrounded by water and the other by oil (1) <b>OR</b> <b>allow</b> idea that the emulsifier molecule has hydrophobic and hydrophilic parts (1)
	(ii)	mayonnaise (1)	1	<b>allow</b> mayo
	(c)	2NaHCO <sub>3</sub> → Na <sub>2</sub> CO <sub>3</sub> + H <sub>2</sub> O + CO <sub>2</sub> (2)  correct formulae (1) balancing (1)	2	<b>allow</b> any correct multiple <b>allow</b> = for →  <b>not</b> 'and' instead of + balancing mark is conditional on correct formulae  <b>allow</b> heat on the arrow but <b>not</b> + heat
	(d)	substance used - limewater / calcium hydroxide (solution) (1) result - turns cloudy / milky / white precipitate (1)	2	<b>allow</b> Ca(OH) <sub>2</sub>  <b>allow</b> both marks on the same line <b>ignore</b> murky / misty  independent marking
		<b>Total</b>	<b>8</b>	

B621/02

## Mark Scheme

June 2010

Question		Expected Answers	Marks	Additional Guidance
6	(a)	top label - petrol (1) bottom label - bitumen (1)	2	
	(b)	(i) they are broken / they are overcome (1)	1	<b>ignore</b> weakens <b>allow</b> bonds
		(ii) interMFs (between large molecules) are stronger (than those between smaller molecules) / more energy needed to break interMF's (1)	1	must state that forces / bonds / attractions are between molecules <b>allow</b> more interMFs to break <b>not</b> intraMF
	(c)	(i) (making) polymers or plastics or poly(ethene) / making ethanol / alcohol (1)	1	<b>ignore</b> making bags <b>allow</b> making polythene bags / makes polythene bags / making plastic bags
		(ii) it has a (carbon to carbon) double bond (1)	1	<b>not</b> has an equals sign
		(iii) $C_2H_4$ (1)	1	<b>allow</b> $H_4C_2$
		<b>Total</b>	7	

Question		Expected Answers	Marks	Additional Guidance
7	(a)	<p><b>any two from</b></p> <p>idea of energy content (1)</p> <p>idea of availability / how long fuel will last (1)</p> <p>storage (1)</p> <p>idea of toxicity (1)</p> <p>idea of pollution / emissions (1)</p> <p>easy to use / ignite / burn (1)</p> <p>how easy / expensive is it to transport (1)</p>	2	<p>eg gives off lots of energy / heat (1)</p> <p>eg easy to get hold of / how fast will it run out / is it renewable (1)</p> <p><b>allow</b> is the fuel harmful <b>ignore</b> dangerous</p> <p>eg does it cause acid rain or greenhouse effect or global warming / damage to the environment (1) <b>not</b> ozone layer</p> <p><b>ignore</b> efficiency of fuel</p>
	(b)	<p>11760 (J) scores (2)</p> <p>BUT if answer incorrect  <math display="block">\frac{17640}{1.5}</math> or <math>\frac{\text{energy released}}{\text{mass}}</math> scores (1)</p>	2	<p><b>allow</b> <math>\frac{2}{3} \times 17640</math> (1)</p>
	(c)	energy or heat given out / energy released into surroundings (1)	1	<b>allow</b> temperature rise
		<b>Total</b>	5	

B621/02

## Mark Scheme

June 2010

Question		Expected Answers	Marks	Additional Guidance
8	(a)	✓ ✓ (X) ✓ ✓ ✓	2	all correct (2) any 3 correct /2 incorrect (1)
	(b) (i)	C (1)	1	
	(ii)	A (1)	1	
Total			4	

Question		Expected Answers	Marks	Additional Guidance
9	(a)	(minimum) angle at which TIR occurs / above this angle TIR occurs / above this angle there is no refraction / at this angle the ray travels along the boundary between the glass and air (1)	1	<b>not</b> total internal refraction
	(b) (i)	rays transmitted and angle of refraction greater than $30^\circ$ by inspection (1)	1	<b>ignore</b> any reflections
	(ii)	ray comes out along the boundary to the right (1)	1	<b>not</b> if shows any refraction <b>allow</b> a reflection at $42^\circ$ on its own or in addition to line along boundary <b>not</b> if a reflection is shown clearly at a different angle to $42^\circ$
	(iii)	ray is reflected at same angle as incident angle by inspection or labelled as $60^\circ$ (1)	1	<b>not</b> if it shows any refraction
	(c)	interleaving (of several signals) / AW more than one signal (down a line) at the same time / together (1)	1	<b>not</b> several signals in the same wave
		<b>Total</b>	<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
10	(a)	<p><b>1 mark for each type of energy transfer</b></p> <p>(air in) foam is a poor conductor/reduces conduction or (air in) foam is an insulator (1)</p> <p>stopper reduces convection or (air in) foam / trapped air reduces convection (1)</p> <p>shiny metal case reflects radiation / heat / energy or shiny metal stops radiation /IR (1)</p>	3	<p><b>There must be a link between the heat transfer process and the feature</b></p> <p><b>not</b> shiny metal stops conduction <b>ignore</b> stopper prevents conduction</p> <p><b>not</b> shiny metal stops convection</p> <p><b>not</b> foam stops radiation <b>not</b> stopper prevents radiation <b>not</b> away from the mug</p>
	(b)	<p>82.5 (3)</p> <p><b>but if answer incorrect</b> 62.5 (2)</p> <p><b>or</b> <math>9000 = 800 \times 0.18 \times \text{temp rise}</math> (1) <b>or</b> clearly states adding 20 to incorrect calculation figure (1)</p>	3	<p><b>allow</b> 83 (3)</p> <p><b>allow</b> 63 (2)</p> <p><b>allow</b> <math>\frac{9000}{0.18 \times 800}</math> (= temp rise) (1)</p>
		<b>Total</b>	<b>6</b>	

Question		Expected Answers	Marks	Additional Guidance
11	(a)	idea that it pays back in only six months / payback is short / starts saving money quickly (1)	1	allow less than a year
	(b)	1000 (KWh) (1)	1	
		<b>Total</b>	<b>2</b>	

Question		Expected Answers	Marks	Additional Guidance
12	(a)	dust prevents (Sun's) radiation from reaching Earth (1)	1	<b>allow</b> dust reflects radiation / blocks out heat from the sun / absorbs suns heat / IR / suns rays <b>ignore</b> just there is dust in the atmosphere / blocks the sun <b>ignore</b> UV / sunlight
	(b)	use of CFCs (1) destroys (AW) ozone layer (1)	2	greenhouse effect or any incorrect gases loses the CFC mark
<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**

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

