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OCR
RECOGNISING ACHIEVEMENT

GCSE

Chemistry A

General Certificate of Secondary Education

Unit **A321/02**: Modules C1, C2, C3 (Higher Tier)

Mark Scheme for June 2011

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OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
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Question			Answer	Mark	Guidance
1	a	i	(451+447+453+449) / 4 (1) = 450 (1)	2	**allow** 1800 / 4 for first mark **give** both marks for answer 450 without working **allow** one mark for answer 430 with or without working
		ii	The mean sulfur dioxide … ☐ ☐ ☐ ✓ ☐ (1)	1	
		iii	The range of measurements taken at **A** ☐ ☐ ✓ ☐ ☐ (1)	1	
	b	i	Amy (1)	1	if two or more names given no mark
		ii	Andrew (1)	1	if two or more names given no mark
		iii	Clarissa (1)	1	if two or more names given no mark

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Question			Answer	Mark	Guidance
1	c		**any two from:** people to use less electricity; remove/reduce sulfur dioxide from the flue/chimney gases; use natural gas/oil/methane/hydrocarbon fuel/low sulfur fuel / remove sulfur from fuel;	2	**allow** switch off appliances when not in use etc **ignore** references to using nuclear power/hydro-electric/wind/solar/renewable **ignore** moving power station to another/less windy place **ignore** produce less electricity from this power station unless related to reduced demand from customers **ignore** burn less fuel **ignore** using another fuel than coal unless fuel is named or described **ignore** use a filter unless qualified eg to remove sulfur dioxide **ignore** catalytic converters/changing sulfur dioxide into a less harmful gas
			Total	**[9]**	

2	a		**any three from:** people will share cars / cars will have more than one person in them; people will use public transport/use cycles/walk; fewer cars (in the town/on the road); less fuel is burned; less exhaust gas/nitrogen dioxide produced;	3	**ignore** use other means of transport unless qualified eg cycles **allow** petrol/diesel/LPG for fuel **ignore** less pollution/emissions/fumes unless qualified **ignore** reference to other pollutants eg carbon dioxide
	b		air/atmosphere nitrogen monoxide / NO (1) oxygen / O_2 nitrogen dioxide / NO_2 (1)	2	one mark for each correct sentence do not allow nitrogen oxide(s) in either sentence **allow** nitrogen(II) oxide for nitrogen monoxide **allow** nitrogen(IV) oxide for nitrogen dioxide
			Total	**[5]**	

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<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>3</td><td>a</td><td></td><td>
<table>
<tr><th rowspan="2">factor</th><th colspan="2">Type of shirt</th></tr>
<tr><th>cotton shirt</th><th>polyester shirt</th></tr>
<tr><td>energy</td><td>✓</td><td></td></tr>
<tr><td>crude oil</td><td>✓</td><td></td></tr>
<tr><td>fertilisers</td><td></td><td>✓</td></tr>
<tr><td>carbon dioxide</td><td></td><td>✓</td></tr>
<tr><td>water</td><td></td><td>✓</td></tr>
</table>
</td><td>2</td><td>all five rows correct = 2 marks
four rows correct = 1 mark
three or fewer rows correct = 0 marks

if there are two ticks in one row, that row does not count</td></tr>
<tr><td></td><td>b</td><td></td><td>any three from:

forces between chains (that are not cross linked) are weak;

cross linking forms bonds between chains;

cross linked bonds/forces between chains are strong(er);

more force/energy needed to separate chains;</td><td>3</td><td>do not credit answers that refer to forces in chains or chains being stronger
ignore idea of chains/molecules being closer together
allow use of polymer molecules instead of chains in all answers
do not accept polymer or fibre in place of molecule or chain
ignore references to sliding or overlapping
ignore harder to break apart</td></tr>
</table>

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Question			Answer	Mark	Guidance
3	c		Making cling film from poly(ethene) … ☐ ✓ (1) ☐ ☐ ☐ ☐ Cling film is used once then thrown … ☐ ✓ (1)	2	
			Total	**[7]**	

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Question			Answer	Mark	Guidance
4	a		Poly(propene) rope is expensive … ☐ Poly(propene) rope is expensive … ✓ (1) Natural materials are available locally. ☐ Natural materials are available locally. ✓ (1)	2	
	b		LEVEL OF RESPONSE MARK SCHEME Level 1 What affects sustainability (1 Mark) idea of hemp being renewable or poly(propene) not being renewable / idea that poly(propene) will cause more pollution when disposed / idea that poly(propene) will last longer in use Level 2 How does it affect sustainability (2 Marks) plus reasons for hemp being renewable eg more can be grown or poly(ethene) not being renewable eg made from crude oil / reasons for poly(propene) causing more disposal problems – will not rot in landfill/toxic fumes if burned / hemp will last a shorter time because it will rot Level 3 What else affects sustainability (3 Marks) plus one additional piece of information needed eg use of fertilisers/water/pesticides / pollution caused during manufacture / energy input during manufacture / whether material can be recycled Level 4 Additional detail (4 Marks) plus two additional pieces of information given or one additional piece of information explained	4	**apply** level of response marking – judge the worth of the whole answer based on the Levels. You need to mark holistically using the Levels as a guide. apply reverse arguments throughout if Level 1 and/or Level 2 ideas are not given, max 2 marks can be given for additional pieces of information needed as described in Level 3 and Level 4 the answer must relate to **sustainability** of the material used for the rope **there are no marks if the answer simply compares the properties of the two rope materials from the table** **ignore** references to cost

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Question			Answer	Mark	Guidance
4	c		☐ ☐ ☐ add plasticizer to the polymer ☑ (1)	1	
			Total	**[7]**	

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Question			Answer	Mark	Guidance
5	a		nitrogen and oxygen react to form … ☐ ☐ ✓ ☐ ☐ (1) nitrogen dioxide dissolves in rainwater ✓ (1)	2	
	b		phosphorus (1) potassium (1)	2	if three circled, max 1 if more than three circled, no marks
	c		☐ ☐ ☐ They spread animal manure on the soil. ✓ (1) They use annual crop rotation. ✓ (1) ☐	2	
			Total	[6]	

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<tr><td>6</td><td>a</td><td></td><td>
<table>
<tr><th></th><th colspan="4">element present</th></tr>
<tr><th></th><th>carbon</th><th>hydrogen</th><th>nitrogen</th><th>oxygen</th></tr>
<tr><td>hydrocbn</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>sugar</td><td>✓</td><td>✓</td><td></td><td>✓</td></tr>
<tr><td>protein</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
</table>
</td><td>3</td><td>one mark for each correct row</td></tr>
<tr><td></td><td>b</td><td>i</td><td>liver (1)</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>ii</td><td>urea (1)</td><td>1</td><td>not urine</td></tr>
<tr><td></td><td></td><td>iii</td><td>kidney (1)</td><td>1</td><td>allow kidneys
do not allow bladder</td></tr>
<tr><td></td><td>c</td><td></td><td>any two from:

gives information about sugar content so consumer can avoid getting obese/diabetes;

gives information about fat content so consumer can avoid getting obese/heart disease;

gives information about salt content so consumer can avoid getting high blood pressure/strokes;

gives information about additives/e-numbers/ preservatives/colouring etc so consumer can avoid specific harmful effect eg hyperactivity/allergy;

gives information about nuts/soya/dairy products/gluten etc so consumer can avoid foods that they are allergic to;</td><td>2</td><td>allow other relevant ideas, eg looking for omega-3 fatty acids/vitamins because these promote good health
allow named chemical in place of type of chemical eg glucose for sugar
do not give two marks for two chemicals from the same marking point
allow chemicals put into food = additives
allow sugar because diabetics need to control sugar input for first marking point
do not give marks for chemicals that would not normally be listed on food labels
there are no marks for naming chemicals without effects or with incorrect effects
effects on health must be specific, so no mark if eg could damage us / could cause harm unless qualified</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>[8]</td><td></td></tr>
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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

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