



*Rewarding Learning*

**General Certificate of Secondary Education  
2011–2012**

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**Science: Single Award (Modular)**

Materials and their Management

Module 4

Higher Tier

**[GSC42]**

**WEDNESDAY 9 NOVEMBER 2011**

**10.15 am–11.00 am**

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**MARK  
SCHEME**

			AVAILABLE MARKS	
1	(a)	it is lightweight	[1]	6
	(b)	iron is stronger [1] is cheaper [1]	[2]	
	(c)	it is lighter than copper [1] and it is less likely to break [1] it is cheaper [1] not as good conductor but sufficient [1] not as strong but sufficient [1] very good conductor [1] [2] properties + [1] explained	[3]	
2	(a) (i)	fractional [1], distillation [1]	[6]	
	(ii)	bitumen [1]		
	(iii)	roofing/roads/tar [1]		
	(iv)	carbon dioxide [1], water [1]		
(b)	Any <b>two</b> from: <ul style="list-style-type: none"> <li>• extract as much as possible</li> <li>• crude oil running out/make last longer/lower cost</li> <li>• avoid water pollution</li> </ul>	[2]	8	
3	(a)	not broken down [1] by microbes [1]	[1] [1] [1]	5
	(b)	different types of plastic difficult to separate		
	(c)	starch		
4	(a)	Any <b>four</b> from: clean test rod in (conc HCl) acid test rod does not impart colour to flame put test rod in sample note colour of flame when sample is placed in it use a roaring/very hot flame wear safety goggles	[4]	8
	(b)	orange/yellow [1], potassium [1], calcium [1]	[1]	
	(c)	emission		
5	(a) (i)	no other ions present/nothing else in it	[1]	[2] [1] [2]
	(ii)	Any <b>two</b> from: <ul style="list-style-type: none"> <li>• same size of flask</li> <li>• shake for same time</li> <li>• same amount/type of soap</li> </ul>	[2]	
	(iii)	height of lather	[1]	
	(iv)	Mg <sup>2+</sup> and Ca <sup>2+</sup> (names ok)	[2]	

		AVAILABLE MARKS
(b) (i)	Any <b>three</b> from: rainwater/(H <sub>2</sub> O + CO <sub>2</sub> ) runs over limestone and reacts with it calcium hydrogencarbonate solution forms drips from roof of cave to floor stalactites form from roof/stalagmites from floor	[3]
(ii)	add washing soda/ion exchange/distillation	[1]
6 (a)	C <sub>2</sub> H <sub>4</sub> [1]	
	<pre> H   H       C = C       H   H </pre>	[1]
	C <sub>3</sub> H <sub>8</sub> [1]	
	<pre>       H   H   H                 H — C — C — C — H                       H   H   H </pre>	[1]
(b) (i)	polymerisation	[1]
(ii)	solid	[1]
(c)	C <sub>3</sub> H <sub>8</sub> + 5O <sub>2</sub> → 3CO <sub>2</sub> + 4H <sub>2</sub> O LHS [1]                      RHS [1]	8
<b>Total</b>		<b>45</b>