



**General Certificate of Secondary Education**

**Applied Science (Double Award)  
4861**

**APSC/2F Science for the Needs of Society**

**Mark Scheme**

2009 examination – June series

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question	answers	extra information	marks
1(a)(i) G	Each component labelled correctly		3
1(a)(ii) G	Nucleus / chromosome / DNA		1
1(a)(iii) E	Any <b>two</b> from: <ul style="list-style-type: none"><li>• Long (and thin)</li><li>• Covered in fat credit</li><li>• Branched</li></ul>	Ignore stem / root / surface area	2
1(b) G	Eye Ear Nose Tongue / mouth / tastebuds		1 1 1 1
<b>Total</b>			<b>10</b>

question	answers	extra information	marks
2(a)(i) G	Steel		1
2(a)(ii) G	Gold		1
2(a)(iii) G	Lead		1
2(b) E	<p>Copper: good conductor (of electricity) / flexible / ductile</p> <p>Gold: shiny / unreactive / malleable / durable</p> <p>Lead: roofing / protection from radioactivity / weights</p> <p>Steel: supporting structures</p>	<p>Ignore irrelevant properties</p> <p>Allow piping</p> <p>Allow any sensible use Ignore buildings unless qualified</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>
2(c)(i) A	Oxygen		1
2(c)(ii) A	Carbon		1
2(c)(iii) A	Reduction		1

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<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>marks</b>
2(d)  E	Any <b>one</b> from: <ul style="list-style-type: none"><li>• Quarry / mine / makes holes</li><li>• Noise / dust</li><li>• Atmospheric pollution / SO<sub>2</sub> / CO<sub>2</sub></li><li>• Disfigure landscape with spoil heaps</li><li>• Pollution of waterways due to run-off</li><li>• Loss of habitat</li></ul>	allow global warming	1
<b>Total</b>			<b>11</b>

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question	answers	extra information	marks
3(a) E	Decreased / gone down		1
3(b)(i) E	Decrease		1
3(b)(ii) E	Longer journey time / traffic jam / cause queues / road rage	allow idea of increased traffic	1
3(b)(iii) E	Any <b>two</b> from: <ul style="list-style-type: none"><li>• Speed bumps</li><li>• Lollypop person</li><li>• Street lights</li><li>• Speed cameras</li><li>• pedestrian crossings</li><li>• Pedestrian barriers</li><li>• signs</li></ul>	ignore traffic lights	2

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<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>marks</b>
<b>3(c)</b> E	Longer / increase	allow higher	1
<b>3(d)(i)</b> E	Any <b>two</b> from: <ul style="list-style-type: none"><li>• Tiredness</li><li>• Alcohol</li><li>• Drugs</li><li>• Concentration</li><li>• Distractions (eg phone, other people)</li><li>• (Old) age</li></ul>		2
<b>3(d)(ii)</b> E	<b>Two</b> from: <ul style="list-style-type: none"><li>• Condition of tyres</li><li>• Condition of brakes</li><li>• Road surface / wet / icy</li><li>• Mass of car</li></ul>		2
<b>Total</b>			<b>10</b>

question	answers	extra information	marks
4(a)(i) G	Herbicides – Kill other plants which compete with crops for resources  Pesticides – Kill insects which may damage crops	1 mark for each correct line.  Any box with more than one line is incorrect	2
4(a)(ii) G	Antibiotics  Restrict movement		2
4(b) A	B  A  C or D		1  1  1
4(c)(i) G	Glucose		1
4(c)(ii) G	Carbon dioxide		1
4(d)(i) E	Bigger body / fatter / bigger breast / chest / weight / heavier		1
4(d)(ii) G	Eggs		1
<b>Total</b>			<b>11</b>



question	answers	extra information	marks
5(a) G	Decreases Liquids Small		3
5(b) E	(2+19+23+30+11=) 85 (100-85=) 15(%)	Correct answer 15 = <b>2</b> marks	1 1
5(c)(i) G	Hydrocarbons		1
5(c)(ii) G	C <sub>7</sub> H <sub>16</sub>	allow H <sub>16</sub> C <sub>7</sub>	1
5(d) E	No mark for name of fraction only diesel – fuel for vehicles Methane / gas – bottled gas for heating / cooking Naphtha – feedstock for chemical industry Kerosene – fuel for aircraft <u>Gas</u> oil – fuel for ships Residue – road making / roofing	<b>Not</b> petrol	1
5(e)(i) G	Water / steam / hydrogen oxide		1

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<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>marks</b>
<b>5(e)(ii)</b> E	Produces carbon dioxide / global warming / carbon particles / contains carbon	Ignore acid rain Allow carbon monoxide	1
<b>Total</b>			<b>10</b>

question	answers	extra information	marks
6(a)(i)	Micro(waves)	Answers must be in that order	1
E	X(-rays)		1
6(a)(ii)	Gamma		1
6(a)(iii)	Radio		1
6(a)(iv)	Ultra-violet / uv		1
6(b)	Reflected	Answers must be in that order	2
G	Absorbed	1 or 2 correct = 1 mark	
	Transmitted	All 3 correct = 2 marks	
6(c)(i)	Kills / destroys cells / cancer		1
6(c)(ii)	Time restrictions / stands behind lead / leave the room /wear lead apron		1
6(d)(i)	(They believe) it might kill / harm them / they do not know much about it	allow reference to side effects	1

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>marks</b>
<p><b>6(d)(ii)</b>  E</p>	<p>Introduce them to others who have had the procedure / give them more information / reassurance / accompany them</p>		<p>1</p>
<p><b>Total</b></p>			<p><b>11</b></p>

question	answers	extra information	marks
7(a)(i) E	TB is an infection of the lung		1
7(a)(ii) E	Any <b>two</b> from: <ul style="list-style-type: none"> <li>• Cover mouth eg mask / use a tissue</li> <li>• Isolation</li> <li>• Treatment / use antibiotics / medicine / use drugs</li> <li>• Vaccination / <u>TB</u> injection</li> <li>• Monitor her friends / contacts</li> </ul>		2
7(b)(i) E	Carries / transports / delivers oxygen		1
7(b)(ii) E	Clots blood / prevents microorganisms entering / seals wound / cut / barrier to infection / help to heal / scab / stop bleeding		1
7(c) E	Dead / weak / modified / inactive / not harmful / mild  White / lymphocytes  Antibodies		3
7(d) E	Antibiotics		1
<b>Total</b>			<b>9</b>

question	answers	extra information	marks
8(a)(i) E	<ul style="list-style-type: none"> <li>Increased employment in area / more profit for company</li> <li>Lower cost/economies of scale</li> <li>Less imports needed</li> <li>More product available</li> </ul>	Ignore just increased demand	1
8(a)(ii) E	Promise to restore area after quarrying / plant more trees / restrict blasting to certain times / spray lorries to reduce dust	Not the idea of using the quarry less ignore renewable energy sources	1
8(b) E	Crushing (large stones into small stones)	Ignore method	1
8(c)(i) E	Calcium hydroxide		1
8(c)(ii) G	H <sub>2</sub> O / water	allow OH <sub>2</sub>	1
8(d)(i) E	(heat limestone) add clay		1
8(d)(ii) E	(Mix with) water and sand Small stones	Accept water and gravel for 2 marks	1 1
8(d)(iii) E	Glass making / Blast furnace	Any sensible use Not buildings	1
<b>Total</b>			<b>9</b>

question	answers	extra information	marks
9(a)(i) E	<b>2 bars to show:</b> coal 33, nuclear 19	<b>1</b> mark each  + / $\frac{1}{2}$ a square	2
9(a)(ii) E	Coal / oil / gas / nuclear / uranium / plutonium / peat	allow any named fraction	1
9(a)(iii) E	Any <b>two</b> from: <ul style="list-style-type: none"><li>• Biomass</li><li>• Wind</li><li>• Solar</li><li>• Geothermal</li><li>• Wave</li><li>• Tidal</li><li>• Hydroelectric</li><li>• biogas</li></ul>		2
9(b) G	2173		1
9(c)(i) G	NO <sub>2</sub> / O <sub>2</sub> N		1

question	answers	extra information	marks
<p>9(c)(ii)</p> <p>E</p>	<p>Any <b>two</b> from:</p> <ul style="list-style-type: none"> <li>• Better insulation</li> <li>• Use (more) renewable energy e.g. wind turbines</li> <li>• Remove gases e.g. chemical reaction</li> <li>• Less combustion</li> </ul>	<p>allow idea of using less energy</p>	<p>2</p>
<p><b>Total</b></p>			<p><b>9</b></p>
<p><b>Overall mark = 90</b></p>			