

**Physics A**

General Certificate of Secondary Education

Unit **A331/01**: Modules P1, P2, P3 (Foundation Tier)

**Mark Scheme for June 2011**

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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.

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Question		Answer	Mark	Guidance
1	a	neutron (1) proton (1)	2	
	b	<p>an element that emits ionising radiation</p> <p><input type="checkbox"/></p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	1	more than one tick = 0 marks
<b>Total</b>			<b>[3]</b>	

Question			Answer	Mark	Guidance
2	a	i	<p>by changes in the nucleus</p> <p><input type="checkbox"/></p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	1	more than one tick = 0 marks
		ii	<pre> graph TD     A[ ] --&gt; B[reactor (1)]     B --&gt; C[turbine (1)]     C --&gt; D[generator (1)]     D --&gt; E[ ]                     </pre>	3	<p>one mark per correct answer in correct place</p> <p><b>if no mark awarded</b> then allow 1 mark if all words correct but all in the wrong places</p>
	b		carbon dioxide (1)	1	<b>accept</b> steam/water/correct formulae if given in place of word do not accept CO <sup>2</sup> or CO2
<b>Total</b>				<b>[5]</b>	

Question	Answer	Mark	Guidance
3	<p><b>any four from (max three from each group):</b></p> <p><b>effects:</b> damages/kills living cells; can lead to cancer; produces ions/causes ionisation / causes unwanted chemical reactions in cells / removes electrons from atoms; mutations / DNA/genes altered;</p> <p><b>factors:</b> type of radiation (alpha / beta / gamma); idea of irradiation / contamination; intensity/activity/level/strength of radiation/dose; half-life; time of exposure; distance from source; amount of radioactive material;</p>	4	<p>at least one from each group of ideas is required for 4 marks</p> <p><b>ignore</b> changes living cells / kills you / damages eyes / any heating effect eg burns or blisters / cells ionised <b>ignore</b> radiation poisoning/sickness <b>ignore</b> damage to foetus</p> <p>eg breathe in and become contaminated</p> <p><b>accept</b> how much radiation you get</p>
<b>Total</b>		<b>[4]</b>	

Question		Answer	Mark	Guidance
4	a	<div style="text-align: center;"> <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  X-rays <input checked="" type="checkbox"/> (1)  gamma <input checked="" type="checkbox"/> (1) </div>	2	more than two ticks deduct one mark for each extra tick
	b	photons with enough energy can ... <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ultraviolet has high energy photons <input checked="" type="checkbox"/> (1)	2	more than two ticks deduct one mark for each extra tick
	c	i	intensity (1)	1

Question			Answer	Mark	Guidance
4	c	ii	<p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: right;">the number of photons arriving <input checked="" type="checkbox"/> (1)</p> <p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: right;">the distance from the source <input checked="" type="checkbox"/> (1)</p> <p style="text-align: right;"><input type="checkbox"/></p>	2	more than two ticks deduct one mark for each extra tick
	d		ozone (layer) (1)	1	
	e		<p><b>any three from (max two from each group):</b></p> <p><b>method:</b> example of methods to reduce exposure to sunlight; any two from: e.g. stay indoors/in shade; limit amount of time in the sun; any form of covering up; don't sunbathe; use sun screen/cream/lotion;</p> <p><b>explanation:</b> any two from: e.g. block out the Sun/sunlight; reduce exposure time; (sun cream) absorbs UV; so sunlight will not damage cells;</p>	3	<p>maximum 2 marks for methods</p> <p>maximum 2 marks for explanations</p> <p><b>explanation must be linked to method given</b></p>

Question		Answer	Mark	Guidance
4	f	<p><b>any two from:</b>            sitting in the sunlight makes people relaxed/ happy / people enjoy sitting in the sun / enjoy heat on body;            getting suntanned/to look good;            idea of production of vitamin <b>D</b>;            they don't think they will get cancer;            they don't agree with/believe official advice;            they think sun screen offers protection;</p>	2	<p><b>ignore</b> any reference to not knowing about the risks  <b>ignore</b> 'benefits outweigh the risk' BUT mark any benefits</p>
<b>Total</b>			<b>[13]</b>	
5	a	<p>idea of a <b>correlation</b> between CO<sub>2</sub> and human activity / CO<sub>2</sub> and global warming / human activity and global warming (1)</p> <p>idea of disagreement about the <b>cause</b> of global warming / a correlation does not mean a <b>cause</b> (1)</p>	2	<p><b>accept</b> there is more than one cause of global warming, or examples</p>
	b	<p>expansion of water in the oceans <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p> <p>some places getting colder winters <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p> <p>melting of icecaps <input checked="" type="checkbox"/></p>	2	<p>3 correct answers = 2 marks            2 correct answers = 1 mark            0 or 1 correct answers = 0 marks            more than three ticks then minus 1 mark for each extra tick</p>
			<b>[4]</b>	

Question		Answer	Mark	Guidance
6	a	<p>the shapes of the continents fit together <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>the same animals and plants are found <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p>	2	more than two ticks deduct one mark for each extra tick
	b	<p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>nobody could detect the movement <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p>	1	more than one tick = 0 marks
	c	<b>C and X</b>	1	both needed for one mark <b>accept</b> any clear indication on diagram
<b>Total</b>			<b>[4]</b>	

Question		Answer	Mark	Guidance
7	a	<p><b>B and E</b> (1)</p> <p><b>D or C</b> (1)</p> <p><b>A and C</b> (1)</p>	3	both needed, either order
	b	<p><input type="checkbox"/></p> <p>where two tectonic plates meet <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p>where sea floor spreading is ... <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p>	2	both needed, either order more than two ticks deduct one mark for each extra tick
<b>Total</b>			<b>[5]</b>	

Question	Answer	Mark	Guidance
8	<p><b>object in the solar system</b></p> <p><b>description</b></p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>asteroids</p> <p>comets</p> <p>moons</p> <p>planets</p> </div> <div style="width: 45%;"> <p>can be large or small, but always orbit planets (1)</p> <p>are usually made of rocks and ice, ... (1)</p> <p>are large and orbit the Sun (1)</p> <p>are very large and produce their own light</p> <p>are usually made of rock, ... (1)</p> </div> </div>	4	<p>one mark for each correct line drawn from a left hand box</p> <p>if two lines start from the same left hand side box then no mark awarded for that box</p>
<b>Total</b>		<b>[4]</b>	

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