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Mark Scheme (Results)
March 2011

GCSE

360Science

GCSE Additional Science
Structured Paper P2 (5020F/1F)

GCSE Physics
Structured Paper P2 (5048F/1F)

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5020F & 5048F Mark Scheme

<table>
<tr><th>Question Number</th><th>Answer</th><th>Acceptable answers</th><th>ignore</th><th>Reject</th><th>Mark</th></tr>
<tr><td>1(a)</td><td>
<table>
<tr><th>safety precaution</th><th>he needs to do this</th><th>he does NOT need to do this</th></tr>
<tr><td>not touch the source with bare hands</td><td>given</td><td></td></tr>
<tr><td>use tongs</td><td>✓</td><td></td></tr>
<tr><td>wear gloves</td><td></td><td>given</td></tr>
<tr><td>not look at the source directly</td><td>given</td><td></td></tr>
<tr><td>wear goggles</td><td></td><td>✓</td></tr>
<tr><td>make his pupils sit at least two metres away</td><td>✓</td><td></td></tr>
<tr><td>wear a lead apron</td><td></td><td>✓</td></tr>
<tr><td>keep the source in a lead box when not in use</td><td>✓</td><td></td></tr>
</table>
any 4 for 2 marks;;
any 2 for 1 mark;
</td><td>adds clear crosses instead of ticks</td><td>any ticks in the rows marked ‘given’</td><td>for 1 mark, two ticks in the same row

for 2 marks two rows with two ticks</td><td>(2)</td></tr>
</table>

Question Number	Answer	Acceptable answers	ignore	Reject	Mark
1(b)	Any **one** idea from • It causes tissue damage • It can damage cells • It can mutate DNA • (It can cause) cancer • It ionises	All alternative wording {destroy / kill} for {damage / mutate}	burns		**(1)**

Question Number	Answer	Acceptable answers	Ignore	Mark
2(a)	12 (m/s);	twelve	units	**(1)**

Question Number	Answer	Acceptable answers	Reject/ Ignore	Mark
2(c)	0.2 (s);	0.20	units	**(1)**

Question Number	Answer	Acceptable answers	Reject/ Ignore	Mark
2(b)	S ;	S unambiguously indicated		**(1)**

Question Number	Answer	Further guidance	Ignore	Mark
2(d)	line on graph starting at (1,12); gradient less steep than original;	tolerance +/- ½ sq • increasing gap if line drawn to R of given line • allow lines drawn without ruler	• curves at 0 m/s • multiple lines unless contradictory	**(2)**

Question Number	Answer	Acceptable answers	ignore	Reject	Mark
3	unstable ; daughter(s); neutron(s) ; kinetic ; fission ;	 radioactive radioactive daughters stable neutrons		any pair of words any other pair of words any other pair of words any pair of words any pair of words	**(5)**

Question Number	Answer	Acceptable answers	Reject/ Ignore	Mark
4(a)(i)	force B ;			**(1)**

Question Number	Answer	Acceptable answers	Reject/ Ignore	Mark
4(a)(ii)	bigger than;			**(1)**

Question Number	Answer	Acceptable answers	Ignore	Mark
4(b)	substitution 0.35 x 4.0; evaluation 1.4 (N);	 correct answer full marks ignore units		**(2)**

Question Number	Answer	Acceptable answers	Reject/ Ignore	Mark
4(c)	substitution 0.23 x 10 x 17 ; evaluation 39 (J);	 39.1 (J) correct answer full marks ignore units		**(2)**

Question Number	Answer	Acceptable answers	Reject/ Ignore	Mark
5(a)(i)	6s;			**(1)**

Question Number	Answer	Acceptable answers	Reject/ Ignore	Mark
5(a)(ii)	Substitution ; $= \frac{0.9}{6}$ Evaluation ; 0.15	correct calc of change of velocity time must be 6 or ecf from ai	no mark for eqn bald incorrect answers	**(2)**

Question Number	Answer	Acceptable answers	Ignore	Mark
5 (b)	56 x 1350; 75 600; J;	• power of 10 error for 1 out of 2 marks • 75.6 kJ for all 3 marks • mark the unit indep • recognisable versions of J e.g. joules, j, Joules, joules, etc • Nm	Ws as ambiguous	**(3)**

Question Number	Answer	Accept	ignore	Reject	Mark
6 (a)	Calculation of number of half-lives = 3 ; (433 X 3 (years) =) 1299 (years) ;	For 1 mark: method of determination of ½ life seen e.g. (16000 →) 8000 →4000→ 2000			**(2)**

Question Number	Answer	Accept	ignore	Reject	Mark
6 (b)(i)	a **reasoned** choice based on Any **one** of 1. Am-232 or Am-241 .....alpha emitter has lower range than beta; 2. Am-241..... has long(est) half life 3. Am-241.....it emits the lower energy of the 2 alpha emitters 4. Am-241.....(as longer half life isotopes have) a reduced activity ; 5. Am-245 .....lowest energy (emitted per particle);	no mark for the choice of isotope the mark is for the reasoning accept combined answers alpha stopped by skin/paper etc Am-241 has less energy than Am-232	Ref to **short /shorter** half-life least radiation		**(1)**

Question Number	Answer	Accept	ignore	Reject	Mark
6 (b)(ii)	Any **one** from: 1. Am-241 has long half life / will not need replacing (as soon) ; 2. Am-241 has high energy /will release n more easily ;		bald emits alpha particle **Note:** repeat of data from table.		**(1)**

Question Number	Answer	Accept	ignore	Reject	Mark
6 (b)(iii)	Any **one** from: • X-rays to detect metal/unusual objects • Neutron-probe to detect explosives • **Both** used to check for harmful objects /contraband • X-rays (safer) for people (and neutrons for luggage) • Neutron-probe is non-proven technology/ eq • perceived danger of radioactive source in airport / near people /liable to terrorist activity	• Neutron-probes can't detect metals • X-rays can't detect explosives			**(1)**

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