

Mark Scheme (Results)

June 2008

GCSE

360Science

GCSE Additional Science P2 (5020H/1H)
GCSE Physics P2 (5048H/1H)

USING THE MARK SCHEME

1. This mark scheme gives you;
 - * an idea of the type of response expected
 - * how individual marks are to be awarded
 - * the total mark for each question
 - * examples of responses that should not receive credit.
2. ; separates points for the award of each mark.
3. / means that the responses are alternatives and either answer should receive full credit.
4. () means that a phrase/word is not essential for the award of the mark but helps the examiner to get the sense of the expected answer.
5. Phrases/words in bold indicate that the meaning of the phrase/word is essential to the answer.
6. OWTTE (or words to that effect) and eq (equivalent) indicate that valid alternative answers (which have not been specified) are acceptable.
7. 'Ignore' means that this answer is not worth a mark but does not negate an additional correct response.
8. 'Reject' means that the answer is wrong and negates any additional correct response for that specific mark.
9. ORA (or reverse argument) indicates that the complete reverse is also valid for the award of marks.
10. ecf (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

MARKING

1. Suggestion/explanation questions should be marked correct even when the suggestion is contained within the explanation.
2. Do not award marks for repetition of the stem of the question.
3. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct scientific context.

AMPLIFICATION

1. In calculations, full credit must be given for a bold, correct answer. If a numerical answer is incorrect, look at the working and award marks according to the mark scheme.
2. Consequential marking should be used in calculations. This is where a candidate's working is correct but is based upon a previous error. When consequential marks have been awarded write "ecf" next to the ticks.
3. If candidates use the mole in calculations they must be awarded full marks for a correct answer even though the term may not be on the syllabus at their level.
4. If candidates use chemical formulae instead of chemical names, credit can only be given if the formulae are correct.

Unit 5020H / 5048H / 1H (P2) Mark Scheme

Question Number	Answer	allow/ <i>comments</i>	ignore	reject	Mark
1 (a)	<p>(work done = force X distance...no mark - given)</p> <ul style="list-style-type: none"> • (work =) 500 x 6; • 3000; • J; 	<ul style="list-style-type: none"> • for 1 mark, 500 X 10 or 5000 • independent unit mark • Nm or in words • j • multiples, kJ,etc <p><i>check for correct physics—do not allow confusion between force and mass</i></p>		500kg (instead of 500N)	<p>1 1 1 (3)</p>
1 (b)	<p>(E=l.t.V.....no mark--- given)</p> <ul style="list-style-type: none"> • (Energy=)220 x 4.5 x 5; • 4950 (J); 	<p>IF equation is seen allow ecf from incorrect substitution</p> <p><i>units if seen must be correct</i></p>			<p>1 1 (2)</p>
1 (c)	<ul style="list-style-type: none"> • any sensible/relevant reason; • second named reason and place; <p><i>allow for 2 marks 'heat lost in suitable named place due to friction'</i></p>	<p>allow</p> <ul style="list-style-type: none"> • correct efficiency statement • friction • named energy • energy needed to move the conveyor belt. • <p>examples are</p> <ul style="list-style-type: none"> • heat in wires • friction at bearings • heat in motor <p><i>if the same energy is named twice, two places must be seen in order to award 2 marks</i></p>			<p>1 1 (2)</p>

2 (a)	<ul style="list-style-type: none"> time for half of the atoms to decay <p>OR</p> <ul style="list-style-type: none"> time for the activity to drop to half (of original value); <ul style="list-style-type: none"> same element AND different no of neutrons 	<p>allow for atoms: isotope / element / nuclei / radioactive substance</p> <p><i>MUST have the time idea</i> <i>MUST be clear & correct as to what is halving</i></p> <p>allow for element: nuclei/ atom / atoms / particles / ions</p> <p>allow for neutron : different mass number</p> <p><i>BOTH ideas needed</i></p>		<p>ion(s)/atom/reactivity decompose/die/lose for decay halve in size</p> <p>different proton no molecules</p>	<p>(1)</p> <p>(1)</p>
2 (b) (i)	<p>labels and scales;</p> <p>points;; tolerance= ½ sq on activity axis, zero for time axis</p> <p>best fit line;</p>	<ul style="list-style-type: none"> graph should fill over 1/4 of the area min of 3 labels/units linear scales <p><i>(-1 for each mistake to max -2)</i></p> <p>ecf -plotting onto non linear scale</p> <p>ecf- plotting onto transposed axes</p> <p>line should be smooth</p> <p><i>ignore attempts to extrapolate beyond plotted points</i></p> <p><i>look for good line</i></p>	<p>1 missing unit or label</p>	<ul style="list-style-type: none"> non-linear scale transposed axes <p>‘tram’ lines/multi lines/series of st lines</p>	<p>1</p> <p>2</p> <p>1</p> <p>(4)</p>
2 (b) (ii)	range 87-93 (years)	<p>ecf from graph</p> <p><i>check graph for 980/2</i></p>		<p>answers based on 1000/2</p>	(1)

2 (c) (i)	(heat energy =) 0.56×2.7 ; <i>OR</i> 1.5;	1.512 1.51	any units		(1)
2 (c) (ii)	idea of <ul style="list-style-type: none"> • small α range <i>OR</i> • lower penetration; idea of <ul style="list-style-type: none"> • low power <i>OR</i> • energy output; 	α absorbed by ceramic <i>ORA</i> will be warm but not hot	<ul style="list-style-type: none"> • ionisation idea • α will not penetrate skin 		1 1 (2)
2 (d) (i)	any one sensible reason;	long life don't need replacing low mass greater energy density greater energy density per vol smaller reliable battery would freeze	efficiency stronger		(1)
2 (d) (ii)	any one sensible reason that is <i>always</i> true;	<ul style="list-style-type: none"> • (O/P) not dependent on light (level) • smaller than solar cells 	<ul style="list-style-type: none"> • efficiency • would need to replace the isotope 	no light in space	(1)
2 (d) (iii)	shorter life; higher electrical (power) output;		<ul style="list-style-type: none"> • less/more energy or heat • danger when replacing unit • more isotope needed 		(2)

3 (a) (i)	(momentum= mass X velocity.....no mark--given) 0.15 x 3; 0.45; kg.m/s;	0.75 for 1 mark (large puck) 150g X 3 m/s for 1 mark independent unit mark Ns <i>units if seen must be correct</i>			1 1 1 (3)
3 (a) (ii)	(KE = $\frac{1}{2} X m X v^2$...no mark---given) 0.5 x 0.15 x 3 ² ; 0.675 (J)	allow 0.68 allow for 1 mark 1.125 (large puck) $\frac{1}{2} X 150g X 3^2$ for 1 mark <i>units if seen must be correct</i>		bald 0.7	1 1 (2)
3 (b)	to reduce <u>friction</u>	<i>read the entire ans</i>	idea of floating make puck move further idea of moving easily	idea of increasing KE/ momentum/speed	(1)
3 (c) (i)	20N in opposite direction;	equal force backwards NW towards smaller puck away from larger puck <i>BOTH needed</i>	arrows		(1)
3 (c) (ii)	(F=m.a.....no mark---given) 20 = 0.25 x a; a = 80 (m/s ²);	seen in original form or as a=20/0.25 allow 1 for 133 <i>units if seen must be correct</i>		mass of 0.4--sticky pucks	1 1 (2)

TOTAL MARK 30