

Mark Scheme (Results)

Summer 2010

GCSE

360Science

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

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

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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.

Question Number	Answer	Additional guidance	Mark
1(a)	thinking distance - if the driver has been drinking alcohol ; braking distance - condition of the tyres ;	more than one line from a "distance" box means no mark for that box	(2)

Question Number	Answer	Mark
1(b)	both thinking distance and braking distance ;	(1)

Question Number	Answer	Acceptable Answers		Additional guidance	Mark
1(c)	correct safety feature ; explanation linked to correct safety feature;	<p>FEATURE</p> <p>air bag</p> <p>air bag , crumple zone, roll bars, side impact bars, bumpers, soft padded seats</p> <p>ABS/antilock brakes</p> <p>headrest</p>	<p>EXPLANATION</p> <p>prevent person hitting windscreen / steering wheel /dashboard eq</p> <p>increases time to stop/time of collision/ reduces momentum slowly,</p> <p>reduces force / impact / deceleration,</p> <p>to prevent skidding/wheels locking</p> <p>prevent whiplash</p>	<p>IGNORE</p> <p>"to stop passengers getting hurt" without explanation</p> <p>references to seat belts</p> <p>allow recognisable spellings e.g. crumble breaks</p> <p>allow for 1 mark (rear view/wing) mirror to see behind</p> <p>(seatbelts) prevent person hitting windscreen/steering wheel/dashboard eq</p>	(2)

Question Number	Answer	Acceptable Answers	Additional guidance	Mark
2(a)	image B is clear(er)/bright(er)/shows more detail /eq ;	better quality /shows flesh as well as bones / greater magnification /high(er) resolution / new technology/ more recent / shorter exposure time / less energy used;	IGNORE bigger, smaller, date taken without comparison, unqualified 'see better' 'it' refers to image B	(1)

Question Number	Answer	Acceptable Answers	Mark
2(b)(i)	(X rays...) a treatment for cancer ;	indication of top right hand box (e.g. circle or tick)	(1)

Question Number	Answer	Additional guidance	Ignore	Mark
2(b)(ii)	1. strongly ionising ; 2. damage ; to cells/DNA/genes ;	kills/mutates/denatures/destroys/ (can) cause cancer	references to tissue for 2 nd mark	(1) (2)

Question Number	Answer	Mark
3(a)(i)	has become positively charged ;	(1)

Question Number	Answer	Mark
3(a)(ii)	electrons have moved onto the balloon ;	(1)

Question Number	Answer	Additional guidance	Mark								
3(b)	<table border="1"> <thead> <tr> <th>charge on balloon B</th> <th>what happens to balloon B when it is near the negatively charged balloon</th> </tr> </thead> <tbody> <tr> <td>positive</td> <td>it is attracted and moves to the right</td> </tr> <tr> <td>negative</td> <td>repelled AND moves to left / eq ;</td> </tr> <tr> <td>neutral</td> <td>attracted AND moves to right/eq;</td> </tr> </tbody> </table>	charge on balloon B	what happens to balloon B when it is near the negatively charged balloon	positive	it is attracted and moves to the right	negative	repelled AND moves to left / eq ;	neutral	attracted AND moves to right/eq;	<p>accept pushes for repels away for left “not attracted” is NOT enough for repelled accept pulls for attract towards for right</p> <p>allow for 1 mark BOTH of repelled attracted (no reference to direction) Or BOTH of (moves) left (moves) right (no reference to attract or repel)</p>	(2)
charge on balloon B	what happens to balloon B when it is near the negatively charged balloon										
positive	it is attracted and moves to the right										
negative	repelled AND moves to left / eq ;										
neutral	attracted AND moves to right/eq;										

Question Number	Answer	Additional guidance	Mark																		
3(c)	<p>any 2 correct for 1 mark ; any 4 correct for 2 marks ;</p> <table border="1" data-bbox="398 288 1099 842"> <thead> <tr> <th data-bbox="398 288 687 392">situation</th> <th data-bbox="687 288 898 392">static electricity is a problem</th> <th data-bbox="898 288 1099 392">static electricity is a help</th> </tr> </thead> <tbody> <tr> <td data-bbox="398 392 687 496">lifting fingerprints from a surface</td> <td data-bbox="687 392 898 496"></td> <td data-bbox="898 392 1099 496">✓</td> </tr> <tr> <td data-bbox="398 496 687 564">T.V. screens</td> <td data-bbox="687 496 898 564">✓</td> <td data-bbox="898 496 1099 564"></td> </tr> <tr> <td data-bbox="398 564 687 633">photocopying</td> <td data-bbox="687 564 898 633"></td> <td data-bbox="898 564 1099 633">✓</td> </tr> <tr> <td data-bbox="398 633 687 737">removing dust from waste gases</td> <td data-bbox="687 633 898 737"></td> <td data-bbox="898 633 1099 737">✓</td> </tr> <tr> <td data-bbox="398 737 687 842">taking dry clothes out of a tumble drier</td> <td data-bbox="687 737 898 842">✓</td> <td data-bbox="898 737 1099 842"></td> </tr> </tbody> </table>	situation	static electricity is a problem	static electricity is a help	lifting fingerprints from a surface		✓	T.V. screens	✓		photocopying		✓	removing dust from waste gases		✓	taking dry clothes out of a tumble drier	✓		two ticks on the same row - no marks for that row	(2)
situation	static electricity is a problem	static electricity is a help																			
lifting fingerprints from a surface		✓																			
T.V. screens	✓																				
photocopying		✓																			
removing dust from waste gases		✓																			
taking dry clothes out of a tumble drier	✓																				

Question Number	Answer	Additional guidance	Mark
4(a)	it swings higher/moves faster/gains (G)PE / kinetic (energy)/KE;	<i>change</i> in speed/height is not enough	(1)

Question Number	Answer	Acceptable Answers	Additional guidance	Mark
4(b)	gravitational potential (energy) / potential (energy);	GPE / PE /gravitational (energy)	Ignore gravity Reject KE	(1)

Question Number	Answer	Additional guidance	Mark
4(c)(i)	4 (m/s);	accept answers in the range 3.9 to 4.0 ignore all units	(1)

Question Number	Answer	Additional guidance	Mark
4(c)(ii)	bottom of swing / 3(s) / 9(s) ;	accept 3 and /or 9 ignore 4 m/s ignore 3 m/s	(1)

Question Number	Answer	Additional guidance	Mark
5(a)	substitution $F = 620 \times 8.4$; evaluation = 5208 ; unit N ;	accept 5200 accept recognisable alternatives	(3)

Question Number	Answer	Additional guidance	Mark
5(b)	any one from <ul style="list-style-type: none"> • air resistance • drag • friction in the engine; 	ACCEPT wind resistance	IGNORE friction between the tyres and road references to energy such as heat in motor/wires etc (1)

Question Number	Answer	Acceptable Answers	Ignore	Mark
6(a)	any sensible answer	allows student to do experiment that he could not otherwise do, faster to do, safer to do, work at individual rate, can be repeated if you don't understand it, can save it/re-do it, can work from home ;	more accurate more valid more exact more detailed clearer	(1)

Question Number	Answer	Acceptable Answers	reject	Mark
6(b)(i)	<ul style="list-style-type: none"> time for half of the atoms to decay OR <ul style="list-style-type: none"> time for the activity/count rate to drop to half (of original value); 	allow for atoms: isotope / element / nuclei / (radioactive) substance / particles/(radioactive) material ignore "mass" accept "radiation" MUST have the time idea MUST be clear & correct as to what is halving "time for ½ of it to decay" is not enough	atom die be lost molecules	(1)

Question Number	Answer	Acceptable Answers	Mark
6(b)(ii)	40 to 47 s		(1)

Question Number	Answer			Additional guidance	Mark
7	alpha charge + 2	beta ionisation = medium or medium/high or high range= accept a number which is more than 10 cm but less than 3m accept a few m	gamma charge none/0/zero / neutral range = more than answer given for beta range but not less than 3m accept ∞	accept moderate for medium	
	any two correct for 1 mark any four correct for 2 marks any six or seven for 3 marks				(3)

TOTAL MARKS 30

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