



GCSE

Additional Science B

General Certificate of Secondary Education

Unit **B623/01**: Modules B3, C3, P3

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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- 1 The **Abbreviations, annotations and conventions** used in the detailed Mark Scheme are:

| | |
|---------------|---|
| / | = alternative and acceptable answers for the same marking point |
| (1) | = separates marking points |
| not | = answers which are not worthy of credit |
| reject | = answers which are not worthy of credit |
| ignore | = statements which are irrelevant |
| allow | = answers that can be accepted |
| () | = words which are not essential to gain credit |
| — | = underlined words must be present in answer to score a mark |
| ecf | = error carried forward |
| AW | = alternative wording |
| ora | = or reverse argument |

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Mark Scheme

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| Question | | | Expected Answers | Marks | Additional Guidance |
|----------|---|----|---|----------|--|
| 1 | a | | 3 rd box / fast growth (1) 4 th box / thick wool (1) | 2 | three boxes ticked with two correct for one mark four / five boxes ticked with two correct for zero marks |
| | b | i | no (no mark) have genes from both parents / have two parents / has a mother and a father / are result of sexual reproduction (1) | 1 | yes = 0 marks allow because to be a clone they have the same DNA / genes / genetic code allow they have different DNA / genes / genetic code |
| | | ii | yes (no mark) (could be) identical twins (1) | 1 | no = 0 marks ignore just 'twins' allow higher level answers e.g. monozygotic twins / formed from same egg / description of embryo splitting |
| | c | i | genetic engineering / genetic modification (1) | 1 | allow GM / gene engineering / gene modification ignore gene transformation |
| | | ii | fast(er) (1) | 1 | allow idea that is more precise or accurate / just one characteristic transferred allow more certain of outcome e.g. know what features the sheep will have ignore you get exactly what you want not faster growth rate |
| | | | Total | 6 | |

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| Question | | | Expected Answers | Marks | Additional Guidance |
|----------|---|----|---|----------|--|
| 2 | a | i | 0 (to) 3 (1) | 1 | both answers needed for 1 mark |
| | | ii | 21(to) 24 (1) | 1 | both answers needed for 1 mark |
| | b | | 3 rd box / infancy (1) | 1 | more than one box ticked scores zero |
| | c | | fertilisation / (sexual) reproduction (1) division (1) differentiation / specialisation (1) | 3 | allow fusing ignore 'conceiving' not 'asexual reproduction' allow splitting / multiplication allow higher level answers e.g. mitosis but not meiosis ignore growth |
| | | | Total | 6 | |

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| Question | | | Expected Answers | Marks | Additional Guidance |
|----------|---|-----|---|----------|--|
| 3 | a | | 55 (°C) (1) | 1 | allow answer in range 54-56 |
| | b | i | diffusion (1) | 1 | allow active transport not osmosis allow correct definitions of the processes |
| | | ii | (starch molecules) are big / large / glucose (molecules) are small / starch is insoluble / glucose is soluble (1) | 1 | ignore thick ignore reference to time without mention of size |
| | | iii | (small) intestine (1) | 1 | allow ileum / villi not large intestine |
| | c | i | <u>plasma</u> (1) | 1 | |
| | | ii | pumps (1) <u>right</u> side to lungs (1) <u>left</u> side to (rest of) body (1) | 3 | USE TICKS FOR THIS QUESTION allow contracts / pushes ignore moves / takes / beats allow right atrium / ventricle to lungs allow left atrium / ventricle to body |
| | | | Total | 8 | |

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| Question | | | Expected Answers | Marks | Additional Guidance |
|----------|---|--|--|----------|--|
| 4 | a | | Be (and) F (1) or Sr (and) I (1) | 1 | both answers needed in either order for one mark allow beryllium (and) fluorine ignore BE / be / f allow strontium (and) iodine ignore SR / sr / i |
| | b | | F (1) | 1 | allow fluorine ignore fluoride ignore f |
| | c | | Ar (1) | 1 | allow argon ignore ar / AR |
| | d | | I (1) | 1 | allow iodine ignore iodide ignore i |
| | | | Total | 4 | |

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| Question | | | Expected Answers | Marks | Additional Guidance |
|----------|---|----|--|----------|--|
| 5 | a | i | (iron is) a poor electrical conductor (1) | 1 | allow because of its electrical conductivity not references to high density / high melting point ignore poor conductor unless qualified by electrical ignore poor thermal conductor |
| | | ii | (aluminium has) a low(er) density (than copper) (1) | 1 | ignore references to electrical conductivity not references to melting point / thermal conductivity ignore weighs less / lighter |
| | b | | regular (1) metallic (1) superconductors (1) | 3 | |
| | | | Total | 5 | |

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| Question | | | Expected Answers | | | | | | | | | | Marks | Additional Guidance | |
|----------|--|--|------------------|---|---|---|---|---|-----|-----|---|-----|-------|---|--|
| 6 | | | | | | | | | | | | | 4 | answers on crossword take precedence allow answers in clues if answer not in crossword allow incorrect spelling 2 across – nucleus (1) 3 across – proton (1) 5 across – ion (1) 4 down – negative (1) | |
| | | | n | u | c | l | e | u | s | (1) | | | | | |
| | | | | | | | | | | | | | | | |
| | | | p | r | o | t | o | n | (1) | | | | | | |
| | | | | | | | | | e | | | | | | |
| | | | | | | | | | g | | | | | | |
| | | | | | | | | | a | | | | | | |
| | | | | | | | | | t | | | | | | |
| | | | | | | | | | i | o | n | (1) | | | |
| | | | | | | | | | v | | | | | | |
| | | | | | | e | | | | | | | | | |
| | | | | | | | | | | (1) | | | | | |
| Total | | | | | | | | | | | | | 4 | | |

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| Question | | | Expected Answers | Marks | Additional Guidance |
|----------|---|----|--|----------|--|
| 7 | a | | lithium (chloride) (1) (and) potassium (chloride) (1) | 2 | either order |
| | b | i | alkali metals (1) | 1 | ignore just 'alkali' |
| | | ii | any two from very reactive (1) react with air / oxygen (1) react with water (1) | 2 | allow are reactive metals ignore just 'reactive' allow to keep away from air allow to keep away from water ignore react with liquids allow so they will not react with water and air (2) allow idea they react with moist air / need to be kept away from moist air (2) |
| | | | Total | 5 | |

| Question | | | Expected Answers | Marks | Additional Guidance |
|----------|---|--|---------------------|----------|--|
| 8 | a | | CuCO_3 (1) | 1 | not $\text{CuCO}_3 \rightarrow \text{CuO} + \text{CO}_2$ allow copper carbonate |
| | b | | 5 (1) | 1 | |
| | | | Total | 2 | |

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| Question | | | Expected Answers | Marks | Additional Guidance |
|----------|---|----|---|----------|--|
| 9 | a | i | gravity / weight (1) | 1 | allow gravitational (pull) ignore mass |
| | | ii | increases / gets faster / accelerates / AW (1) | 1 | allow speeds up |
| | b | i | drag / air resistance / (air) friction (1) | 1 | allow wind resistance ignore just 'resistance' ignore upthrust / thrust |
| | | ii | distance / length / (idea of) height fallen (1) time (1) | 2 | either order allow correct units of distance e.g. metres ignore instruments e.g. ruler allow how far he has fallen / height of aeroplane allow correct units of time e.g. seconds ignore instruments e.g. stop clock allow how long it takes |
| | | | Total | 5 | |

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| Question | | | Expected Answers | Marks | Additional Guidance |
|----------|---|-----|--|----------|--|
| 10 | a | i | B (1) | 1 | if answer line is blank allow correct answer ticked circled or underlined |
| | | ii | A (1) | 1 | if answer line is blank allow correct answer ticked circled or underlined |
| | b | i | changetime (1) | 1 | both needed allow increase / decrease / AW for change allow any correct unit of time not t^2 ignore t |
| | | ii | 6000 (N) (2) but if answer is incorrect 1200 x 5 (1) | 2 | |
| | | iii | 1600000 (J) (2) but if answer is incorrect 8000 x 200 (1) | 2 | |
| | | | Total | 7 | |

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| Question | | | Expected Answers | Marks | Additional Guidance |
|----------|--|--|---|----------|--|
| 11 | | | <u>hybrid</u> (1) <u>diesel</u> (1) small (engine size) (1) | 3 | USE TICKS FOR THIS QUESTION maximum three marks allow idea of smaller engine size e.g. 'decrease engine size' allow higher level answers e.g. less energy wasted in braking (1) electric motor used at low speeds or when stopped (1) <u>hybrid</u> engine operates closer to maximum efficiency (2) <u>hybrid</u> engines are small because of electric motor assist (3) |
| | | | Total | 3 | |

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| Question | | | Expected Answers | Marks | Additional Guidance |
|----------|---|-----|---|----------|--|
| 12 | a | i | any one from less mass / weight (1) (more) streamlined / reference to absence of roof box (1) | 1 | needs comparison to be made allow lighter / not as heavy ignore smaller allow more aerodynamic / smaller surface area / less air resistance / less drag allow answers about style of driving e.g. (idea of) higher driving force / pressing harder on accelerator |
| | | ii | greater mass (1) | 1 | needs comparison to be made allow greater weight / heavier ignore bigger ignore has more force (pulling it down) |
| | | iii | joule (1) | 1 | if answer line is blank allow correct answer ticked circled or underlined |
| | b | | increases by four / quadruples / x4 (1) | 1 | ignore just 'increases' |
| | c | | C (1) | 1 | if answer line is blank allow correct answer ticked circled or underlined |
| | | | Total | 5 | |

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