



GCSE

Science B

General Certificate of Secondary Education

Unit **B622/01**: Unit 2: Modules B2, C2, P2 (Foundation Tier)

Mark Scheme for January 2011

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1 Abbreviations, annotations and conventions used in the detailed Mark Scheme.

| | |
|---------------|---|
| / | = 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 |
| <u> </u> | = 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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| Question | | | Expected answers | Marks | Additional Guidance |
|----------|-----|------|--|----------|--|
| 1 | (a) | | C, D and F (1) | 1 | must have all three correct letters for one mark reject any incorrect letters if answer line blank allow correct letters or pictures circled, underlined or ticked |
| | (b) | | Most animals are more compact than plants so they can move (1) | 1 | more than one tick scores zero |
| | (c) | (i) | glucose (1) | 1 | allow $C_6H_{12}O_6$ |
| | | (ii) | for storage (1) | 1 | allow easier to store (1) ignore store as fats or oils allow higher level answers eg sugar is soluble (1) eg starch is insoluble / stays inside the cell (1) eg so starch does not affect osmosis (1) assume it refers to starch unless otherwise stated |
| | | | Total | 4 | |

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| Question | | | Expected answers | Marks | Additional Guidance |
|----------|-----|------|--|----------|--|
| 2 | (a) | | endangered (1) ecosystem (1) | 2 | |
| | (b) | (i) | predator (1) | 1 | allow secondary consumer / carnivore ignore hunter |
| | | (ii) | any two from: (sharp or large or strong or long) claws or talons (1) eyes at front of head / binocular vision (1) sharp or strong or hooked or pointed beak (1) large or wide or strong or long wings (1) | 2 | allow strong or large or long feet (1) allow idea of being able to judge distance (1) ignore just good / sharp eyesight ignore large or long beak allow camouflage (1) ignore streamlined / aerodynamic |
| | (c) | | they eat the(ir) fish / less fish for the fishermen (1) | 1 | allow reverse argument (1) eg if not protected there will be more fish for the fishermen (1) so the fishermen can catch more fish allow they eat all the fish (1) allow because they want the fish (for themselves) (1) |
| | | | Total | 6 | |

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| Question | | | Expected answers | Marks | Additional Guidance |
|----------|-----|-------|---|----------|---|
| 3 | (a) | | 1967 (1) | 1 | |
| | (b) | | 5500 (1) | 1 | ignore minus sign |
| | (c) | (i) | burning (fossil) fuels / volcanoes (erupting) (1) | 1 | allow any named fossil fuel (1) ignore uses such as from cars / cooking / heating / factories / power stations allow burning sulfur (1) |
| | | (ii) | any one from: idea of more use of fossil fuels (1) increased population (1) | 1 | must have the idea of increase eg allow more cars / more electricity used / more factories / more electricity generated (1) allow burning more sulfur allow more volcanoes erupting (1) allow more people (1) |
| | | (iii) | idea that catches starting to increase (1) | 1 | allow number of salmon increasing (1) allow graph is going up (1) |
| | | | Total | 5 | |

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| Question | | | Expected answers | Marks | Additional Guidance |
|----------|-----|--|---|----------|--|
| 4 | (a) | | <u>binomial</u> (1) | 1 | |
| | (b) | | any two from idea of competing (1) BUT idea of competing for food / space / shelter (2) brown rats better adapted / survival of the fittest (1) | 2 | USE TICKS ON THIS QUESTION allow idea that brown rats are better camouflaged (1) allow brown rats breed faster (1) allow brown rats brought in diseases (1) ignore black rats catch plague ignore brown rats kill / fight black rats |
| | (c) | | poison / kill (1) idea of resistance (1) | 2 | USE TICKS ON THIS QUESTION allow higher level answers e.g. anticoagulant / AW (1) ignore reference to immunity / tolerance allow selection of the best or fittest rat / better adapted (to survive) / survival of the fittest (1) allow idea of variation / mutation (1) allow pass on adaptation to next generation / change in gene frequency / more resistant rats in each new generation (1) |
| | | | Total | 5 | |

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| Question | | | Expected answers | Marks | Additional Guidance |
|----------|-----|------|--|----------|---|
| 5 | (a) | | water (1) | 1 | allow correct answer ticked, circled or underlined in list if answer line is blank. |
| | (b) | (i) | calcium carbonate → carbon dioxide + calcium oxide (1) | 1 | allow $\text{CaCO}_3 \rightarrow \text{CO}_2 + \text{CaO}$ (1) allow mix of formulae and names symbols must be correct and numbers as subscript allow = sign for arrow not and for + not + heat in equation but allow heat above arrow |
| | | (ii) | a reaction in which one substance is changed into two or more new substances (by heat) (1) | 1 | allow breaking down / up / split (a substance using heat) (1) allow decomposes (1) allow making two (or more) substances from one (1) not breaks down into two elements ignore disintegrate ignore rot / decay ignore just bonds are broken |
| | (c) | | any two from: landscape destroyed (1) habitats destroyed (1) (increased) noise (1) traffic (1) dust (1) idea of eyesore (1) | 2 | allow a problem (1) and an explanation why it is a problem (1) eg (increased) noise (1) means people not able to relax / sleep (1) allow killing animals living in the area (1) ignore just killing animals or plants allow (increased) air pollution (1) ignore just pollution |
| | | | Total | 5 | |

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| Question | | | Expected answers | Marks | Additional Guidance |
|----------|-----|-------|--|----------|---|
| 6 | (a) | | 1.0 or 1g.(1) | 1 | mark second answer line no mark for 199.00 on first answer line |
| | (b) | (i) | answer in the range 2.8 - 3.0 (1) | 1 | allow answer in the range 2mins 48s and 3mins 0s (1) allow range within range specified (1) |
| | | (ii) | powdered chip curve is steeper / has a larger gradient (1) | 1 | allow same volume of gas produced in a shorter time / reaction finishes in a shorter time (1) allow levels off / becomes straight in shorter time (1) ignore faster time allow reverse argument (1) |
| | | (iii) | larger (surface) area (1) more collisions (1) | 2 | USE TICKS ON THIS QUESTION allow more particles exposed (1) allow more chance of collisions (1) allow higher level answer increases frequency of collisions (1) ignore faster collisions |
| | | | Total | 5 | |

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| Question | | | Expected answers | Marks | Additional Guidance |
|----------|-----|--|--|----------|---|
| 7 | (a) | | <pre> graph LR A[solvent] --- B[helps to stick...] A --- C[thins the paint] D[binding medium] --- B D --- E[colours the paint] F[pigment] --- E </pre> | 2 | all correct (2) one or two correct (1) |
| | (b) | | idea of decoration (1) idea of protection (1) | 1 | allow to look nice / colour the wall (1) |
| | | | Total | 3 | |

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| Question | | | Expected answers | Marks | Additional Guidance |
|----------|-----|------|---|----------|--|
| 8 | (a) | (i) | copper (1) | 1 | allow Cu (1) |
| | | (ii) | idea of more mass change in salt water / ora (1) | 1 | allow mass goes down more in salt water (1) allow more of the iron corroded in salt water than distilled water (1) allow mass of metal decreases faster (1) allow comparison of two final masses (1) but ignore just quoting final mass in salt water e.g. 'because it's gone down to 0.5g' scores 0 |
| | (b) | | any two from (metals) can be used again (1) saves natural resources (1) reduces disposal problems (1) | 2 | allow metals wont be wasted / no shortage of metal / metals wont be in short supply (1) allow less quarrying required (1) e.g. less 'dumps' needed (1) allow idea that if not recycled, scrap cars take up a lot of space (1) ignore vague references to environment or pollution ignore it saves money allow uses less energy (1) |
| | | | Total | 4 | |

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| Question | | | Expected answers | Marks | Additional Guidance |
|----------|-----|--|-----------------------------------|----------|--|
| 9 | (a) | | plates move or plates collide (1) | 1 | allow San Francisco is on a plate boundary / plates grind together / plates rub together / plates meet (1) ignore direction of movement |
| | (b) | | magma (1) lava (1) | 2 | answers must be in correct order |
| | | | Total | 3 | |

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| Question | | | Expected answers | Marks | Additional Guidance |
|----------|-----|------|--|----------|--|
| 10 | (a) | | light (1) direct (1) surface / area / surface area (1) | 3 | allow sunlight but not sun (1) ignore solar allow dc / DC (1) allow exposed surface (1) |
| | (b) | (i) | move magnet / move coil (1) | 1 | allow move magnet and coil (1) allow create (relative) movement or speed between magnet and coil (1) allow put magnet in the coil / put magnet near the ammeter (1) ignore wrap wire around the magnet if answer line is blank allow correct movement eg arrow on diagram |
| | | (ii) | alternating (current) (1) | 1 | allow AC or ac (1) but not just 'A' or 'a' ignore alternate current ignore changing but allow constantly changing direction (1) |
| | | | Total | 5 | |

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| Question | | | Expected answers | Marks | Additional Guidance |
|----------|--|--|---|-------|---------------------|
| 11 | | | 18 (watts) (2) but if answer is incorrect 12 x 1.5 (1) | 2 | |
| | | | Total | 2 | |

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| Question | | | Expected answers | Marks | Additional Guidance |
|----------|--|--|---|-------|--|
| 12 | | | any two from: planets collided (1) idea of (iron) cores merge (1) idea that debris ejected from collision OR debris orbits the Earth OR debris forms the Moon (1) | 2 | USE TICKS ON THIS QUESTION allow (large) asteroid collided with the Earth (1) ignore Moon collides with Earth allow the idea of joining to form the Earth's core (1) ignore idea of a single chunk knocked off or out of Earth |
| | | | Total | 2 | |

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| Question | | Expected answers | Marks | Additional Guidance |
|----------|-----|--|----------|--|
| 13 | (a) | <p>any two from: protective or safety clothing (1)</p> <p>remote handling / keep at a distance / use tongs or tweezers (to handle) (1)</p> <p>idea of short exposure time (1)</p> <p>idea of lead shielded storage (1)</p> <p>idea of monitoring badges / photographic film (1)</p> | 2 | <p>allow one example such as goggles or gloves or lead apron or PPE (1) but ignore lab coat</p> <p>allow don't handle the materials with bare hands (1)</p> <p>ignore wear suitable or right equipment or clothing</p> <p>allow stand well back (1)</p> <p>allow keep out of direct line source is facing (1)</p> <p>allow keep (materials or named material) in a lead or lead lined box</p> <p>ignore materials other than lead</p> |
| | (b) | <p>any two from: low level waste put in land fill sites (1)</p> <p>store underground / bury (underground) (1)</p> <p>encase OR seal in glass / vitrify (1)</p> <p>idea of reprocessing (1)</p> <p>need to store for a very long time (1)</p> | 2 | <p>allow in mines (1)</p> <p>ignore bury under the sea (bed)</p> <p>allow seal in concrete / bitumen (1)</p> <p>ignore unqualified put in glass / concrete / steel BUT</p> <p>allow seal in glass / concrete / bitumen then put in steel container (2)</p> <p>allow turn into plutonium / uranium / nuclear fuel (1)</p> <p>allow 100s or 1000s of years but not just long time (1)</p> <p>ignore references to security unless related to / needed for a very long time</p> <p>ignore send into space</p> <p>ignore reference to nuclear bombs / terrorism</p> |
| | | Total | 4 | |

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|----------|-----|--|---|----------|---|--|---|---|--|-----|--|---|--|--|-----|---|--|
| 14 | (a) | | down 1 GALAXY 3 SUN across 3 STAR 4 MOON | 3 | 4 correct = (3) 2 or 3 correct = (2) 1 correct = (1) if boxes are empty allow correct answers written next to clues | | | | | | | | | | | | |
| | (b) | | <table border="1"><tr><td>T</td><td>F</td></tr><tr><td></td><td>✓</td></tr><tr><td>✓</td><td></td></tr><tr><td>(✓)</td><td></td></tr><tr><td>✓</td><td></td></tr><tr><td></td><td>(✓)</td></tr></table> | T | F | | ✓ | ✓ | | (✓) | | ✓ | | | (✓) | 2 | 3 correct = (2) 2 or 1 correct = (1) allow crosses instead of ticks |
| T | F | | | | | | | | | | | | | | | | |
| | ✓ | | | | | | | | | | | | | | | | |
| ✓ | | | | | | | | | | | | | | | | | |
| (✓) | | | | | | | | | | | | | | | | | |
| ✓ | | | | | | | | | | | | | | | | | |
| | (✓) | | | | | | | | | | | | | | | | |
| | (c) | | explosion expanding gas | 2 | 3 correct = (2) 2 or 1 correct = (1) | | | | | | | | | | | | |
| | | | Total | 7 | | | | | | | | | | | | | |

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