

# **Mark Scheme for June 2012**

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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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## Annotations

| Annotation                                                                        | Meaning                               |
|-----------------------------------------------------------------------------------|---------------------------------------|
|  | Correct Response                      |
|  | Incorrect Response                    |
| <b>BOD</b>                                                                        | Benefit of the doubt                  |
| <b>NBOD</b>                                                                       | benefit of the doubt <b>not</b> given |
| <b>ECF</b>                                                                        | error carried forward                 |
|  | Information omitted                   |
| <b>I</b>                                                                          | Ignore                                |
| <b>R</b>                                                                          | Reject                                |
| <b>CON</b>                                                                        | Contradiction                         |

**Abbreviations, annotations and conventions used in the detailed Mark Scheme**

| <b>Annotation</b> | <b>Meaning</b>                                              |
|-------------------|-------------------------------------------------------------|
| /                 | alternate and acceptable answers for the same marking point |
| (1)               | separates marking points                                    |
| allow             | answers that can be accepted                                |
| not               | answers which are not worthy of credit                      |
| reject            | answers which are not worthy of credit                      |
| ignore            | statements which are irrelevant                             |
| ( )               | words which are not essential to gain credit                |
| —                 | underlined words which are not essential to gain credit     |
| ecf               | error carried forward                                       |
| AW                | alternative wording                                         |
| ora               | or reverse argument                                         |

| Question |     |       | Answer                                                                                                                                                                                                                       | Marks    | Guidance                                                                                                                                                                                                                                      |
|----------|-----|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | (a) | (i)   | a vertebrate and a mammal (1)                                                                                                                                                                                                | 1        | More than 1 tick scores 0                                                                                                                                                                                                                     |
|          |     | (ii)  | helps it judge size / distance / binocular vision (1)                                                                                                                                                                        | 1        | <b>ignore</b> reference to seeing further                                                                                                                                                                                                     |
|          |     | (iii) | sharp teeth / sharp claws / camouflaged / run fast (1)                                                                                                                                                                       | 1        | <b>allow</b> large ears / sensitive ears / better hearing (1)                                                                                                                                                                                 |
|          | (b) |       | in danger of becoming extinct (1)                                                                                                                                                                                            | 1        | <b>allow</b> not many of them left alive (1)                                                                                                                                                                                                  |
|          | (c) | (i)   | Miguel <b>and</b> Rosa (1)                                                                                                                                                                                                   | 1        | <b>allow</b> either order                                                                                                                                                                                                                     |
|          |     | (ii)  | have the smallest population in 2000 / 2006 (1)                                                                                                                                                                              | 1        | Answers must be comparative and be clear that the smallest population refers to later time so:<br><br><b>allow</b> decreased (rapidly) and so have the smallest population (1)<br><b>ignore</b> unqualified they have the smallest population |
|          |     | (iii) | captive breeding of foxes <input checked="" type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br>capturing golden eagles and releasing them a long distance away <input checked="" type="checkbox"/> | 1        |                                                                                                                                                                                                                                               |
|          | (d) |       | fossils (1)                                                                                                                                                                                                                  | 1        | <b>allow</b> casts / mummies / impressions / bodies in tar or amber or ice / bones / check DNA (1)                                                                                                                                            |
|          |     |       | <b>Total</b>                                                                                                                                                                                                                 | <b>8</b> |                                                                                                                                                                                                                                               |

| Question |     | Answer                                                               | Marks    | Guidance                                                                                                                                              |
|----------|-----|----------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2        | (a) | community (1)                                                        | 1        |                                                                                                                                                       |
|          | (b) | carbon dioxide and water on LHS (1)<br>glucose and oxygen on RHS (1) | 2        | <b>ignore</b> references to chlorophyll and energy<br><b>allow</b> sugar (1)<br><b>allow</b> correct chemical symbols e.g. <b>not</b> CO <sup>2</sup> |
|          | (c) | light / sunlight / water / minerals / carbon dioxide (1)             | 1        | <b>allow</b> sugar / glucose / space / nutrients (1)<br><b>ignore</b> Sun<br><b>ignore</b> food                                                       |
|          | (d) | host (1)                                                             | 1        |                                                                                                                                                       |
|          | (e) | growth / respiration / repair / to make starch (1)                   | 1        | <b>allow</b> to make any named organic molecule e.g. glucose / to make leaves fruit etc / energy (1)<br><b>ignore</b> reference to making food        |
|          |     | <b>Total</b>                                                         | <b>6</b> |                                                                                                                                                       |

| Question |     | Answer                                                                                                                                  | Marks    | Guidance                                                                                                                                                                                     |
|----------|-----|-----------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3        | (a) | use of a <b>quadrat</b> (1)<br>count plants (growing inside) (1)                                                                        | 2        | <b>allow</b> approximate phonetic spelling e.g. quadrant<br>must refer to counting and imply within quadrat                                                                                  |
|          | (b) | 5.0                                                                                                                                     | 1        | <b>allow</b> 5 (1)<br><b>allow</b> answer written on line or in the table (1)<br>answer line may contain working and answer shown in table<br>if answer on answer line is incorrect, score 0 |
|          | (c) | more daisies grow further from the road (1)                                                                                             | 1        | <b>allow</b> increases / goes up (1)<br><b>ignore</b> reference to size of plants                                                                                                            |
|          | (d) | sulfur dioxide given off from burning of fossil fuels /<br>burning petrol / from cars (1)<br>more sulfur dioxide closer to the road (1) | 2        | <b>allow</b> implied link between sulfur dioxide and cars (1)<br><br><b>ignore</b> reference to acid rain                                                                                    |
|          |     | <b>Total</b>                                                                                                                            | <b>6</b> |                                                                                                                                                                                              |

| Question |     |      | Answer                                                                                                                                        | Marks    | Guidance                                                                                                       |
|----------|-----|------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------------------------------------------------------------------------------|
| 4        | (a) | (i)  | <b>B</b> (1)                                                                                                                                  | 1        | <b>allow</b> correct answer underlined, ringed or ticked if answer line is blank (1)                           |
|          |     | (ii) | <b>C</b> (1)                                                                                                                                  | 1        | <b>allow</b> correct answer underlined, ringed or ticked if answer line is blank (1)                           |
|          | (b) |      | binding medium (1)<br>sticks the pigment / paint to the surface (1)<br><br>solvent (1)<br>thins the paint / allows the paint to be spread (1) | 4        | job must be correctly linked to correctly named ingredient<br><b>allow</b> binder / binding substance / AW (1) |
|          |     |      | <b>Total</b>                                                                                                                                  | <b>6</b> |                                                                                                                |

| Question |     |     | Answer                                     | Marks    | Guidance                                                                       |
|----------|-----|-----|--------------------------------------------|----------|--------------------------------------------------------------------------------|
| 5        | (a) |     | volcanoes (1)<br>earthquakes / tsunami (1) | 2        | <b>allow</b> mountains form (1)<br><b>ignore</b> landslide / cracks in surface |
|          |     | (b) | iron (1)                                   | 1        | <b>allow</b> Fe / nickel / Ni / alloy of iron and nickel (1)                   |
|          |     | (c) | lithosphere (1)                            | 1        |                                                                                |
|          |     |     | <b>Total</b>                               | <b>4</b> |                                                                                |



| Question |     |       | Answer                                 | Marks    | Guidance                                                                                      |
|----------|-----|-------|----------------------------------------|----------|-----------------------------------------------------------------------------------------------|
| 6        | (a) | (i)   | 17.75 (minutes) (1)                    | 1        | <b>allow</b> 17.5 to 18.0 (1)<br><b>allow</b> use of : to indicate minutes:seconds e.g. 17:45 |
|          |     | (ii)  | 13.75 (°C) (1)                         | 1        | <b>allow</b> answer in range 13.5 – 14.0                                                      |
|          |     | (iii) | increases / AW (1)                     | 1        | <b>allow</b> curing / hardening / reaction time decreases / AW (1)<br><b>ignore</b> drying    |
|          | (b) |       | any time less than 17.75 (minutes) (1) | 1        | <b>allow</b> a range of times if range lies below 17.75 minutes (1)                           |
|          | (c) |       | H – 18<br>N – 4 (1)                    | 1        | both required                                                                                 |
|          |     |       | <b>Total</b>                           | <b>5</b> |                                                                                               |

| Question     |     | Answer                                                                                                                                                                                                                                                                                                    | Marks    | Guidance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7            | (a) | iron (1)                                                                                                                                                                                                                                                                                                  | 1        | <b>allow</b> Fe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|              | (b) | brass (1)                                                                                                                                                                                                                                                                                                 | 1        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|              | (c) | <p><b>Either:</b></p> <p>copper (1)<br/> <b>any two from:</b><br/> tarnishes very slowly (1)<br/> shiny (1)<br/> strong (1)<br/> good thermal conductivity (1)<br/> high melting point (1)</p> <p><b>or</b></p> <p>aluminium (1)</p> <p>protective oxide layer (1)<br/> good thermal conductivity (1)</p> | 3        | <p>copper / aluminium must be stated to score marks for properties.</p> <p><b>ignore</b> does not tarnish / it tarnishes<br/> <b>allow</b> second strongest <b>ignore</b> relative strength of 4.8<br/> <b>allow</b> third highest conductivity <b>ignore</b> conductivity of 5.7<br/> <b>allow</b> second highest MP <b>ignore</b> MP = 1083</p> <p>stand alone mark</p> <p>each of the following references to an incorrect property negates a correct property if three or more properties are given:<br/> <b>not</b> reference to melting point<br/> <b>not</b> reference to dull light grey<br/> <b>not</b> references to strength<br/> i.e. one correct and one incorrect scores 1<br/> two correct and one incorrect scores 1<br/> two correct and two or more incorrect scores 0</p> |
| <b>Total</b> |     |                                                                                                                                                                                                                                                                                                           | <b>5</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| Question |     |  | Answer                                         | Marks    | Guidance       |
|----------|-----|--|------------------------------------------------|----------|----------------|
| 8        | (a) |  | renewable (1)<br>convection (1)<br>kinetic (1) | 3        |                |
|          | (b) |  | absorbed (1)                                   | 1        | ignore trapped |
|          |     |  | <b>Total</b>                                   | <b>4</b> |                |

| Question |     |      | Answer                | Marks    | Guidance                                                                                                                                                                                                                                                           |
|----------|-----|------|-----------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9        | (a) | (i)  | uranium (1)           | 1        | allow plutonium (1)                                                                                                                                                                                                                                                |
|          |     | (ii) | no global warming (1) | 1        | allow no greenhouse gases / named greenhouse gases (1)<br>allow does not deplete fossil fuels (1)<br>allow nuclear fuel lasts longer (than fossil fuels) (1)<br>ignore unqualified reference to pollution<br>ignore unqualified reference to improving environment |
|          | (b) | (i)  | power (output) (1)    | 1        | allow wattage (1)<br>allow 38 million watts (1)<br>ignore kilowatts<br>ignore unqualified reference to voltage / energy / amount of electricity                                                                                                                    |
|          |     | (ii) | fermentation (1)      | 1        | allow description of fermentation e.g.<br>mixed with yeast / bacteria (1)<br>placed in a fermenter / digester (1)<br><br>allow produces methane (1)<br>allow produces gas which can be burned (1)                                                                  |
|          |     |      | <b>Total</b>          | <b>4</b> |                                                                                                                                                                                                                                                                    |

| Question |     | Answer                                  | Marks | Guidance                                                                                                                                                                                                                                                                                                                                                        |
|----------|-----|-----------------------------------------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10       | (a) | distances (in space) are very large (1) | 1     | <b>allow</b> ideas that it takes a long time (1)<br><b>allow</b> idea that there may not be intelligent life forms in space (1)                                                                                                                                                                                                                                 |
|          | (b) | (i)                                     | 2     | <b>allow</b> no supplies needed if no other reference to food/ water / oxygen (1)<br><b>allow</b> can withstand extreme conditions / specific condition (1)<br><b>allow</b> no need to bring spacecraft back to Earth (1)<br><b>allow</b> no risk to life / safer (1)<br><b>ignore</b> unqualified reference to cost / distance travelled / time spent in space |
|          |     | (ii)                                    | 2     | <b>allow</b> weather / heat (1)<br><br><b>allow</b> gas levels / reference to named gas (1)<br><b>ignore</b> take samples                                                                                                                                                                                                                                       |

| Question          |     | Answer                                                                                                                                                                                                                                                                                                                                                                       | Marks      | Guidance                                                                                  |      |                   |      |  |  |
|-------------------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------------------------|------|-------------------|------|--|--|
|                   | (c) | all correct (2)<br>two or three correct (1)<br>none or one correct (0)                                                                                                                                                                                                                                                                                                       | 2          | <b>allow</b> correct linking by numbering boxes in table if no lines or lines crossed out |      |                   |      |  |  |
|                   |     | <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="padding: 5px;">black hole</td> <td rowspan="4" style="text-align: center; vertical-align: middle;"> </td> </tr> <tr> <td style="padding: 5px;">moon</td> </tr> <tr> <td style="padding: 5px;">near-Earth object</td> </tr> <tr> <td style="padding: 5px;">star</td> </tr> </table> | black hole |                                                                                           | moon | near-Earth object | star |  |  |
| black hole        |     |                                                                                                                                                                                                                                                                                                                                                                              |            |                                                                                           |      |                   |      |  |  |
| moon              |     |                                                                                                                                                                                                                                                                                                                                                                              |            |                                                                                           |      |                   |      |  |  |
| near-Earth object |     |                                                                                                                                                                                                                                                                                                                                                                              |            |                                                                                           |      |                   |      |  |  |
| star              |     |                                                                                                                                                                                                                                                                                                                                                                              |            |                                                                                           |      |                   |      |  |  |
| <b>Total</b>      |     |                                                                                                                                                                                                                                                                                                                                                                              | <b>7</b>   |                                                                                           |      |                   |      |  |  |

| Question     |     | Answer                                                           | Marks    | Guidance                                                                    |
|--------------|-----|------------------------------------------------------------------|----------|-----------------------------------------------------------------------------|
| <b>11</b>    | (a) | direct current / constant voltage (implied) (1)                  | 1        | <b>allow</b> graph line is flat (1)<br><b>ignore</b> straight line          |
|              | (b) | 4V (1)                                                           | 1        | <b>allow</b> -4V (1)                                                        |
|              | (c) | transformer (1)                                                  | 1        | <b>ignore</b> step-up / step down                                           |
|              | (d) | magnet          coil / wire (1)                                  | 1        | either order<br>must have both correct                                      |
|              | (e) | heat / hot gases / lost to surroundings / lost to atmosphere (1) | 1        | <b>ignore</b> sound<br><b>ignore</b> unqualified reference to wasted / lost |
| <b>Total</b> |     |                                                                  | <b>5</b> |                                                                             |

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