

Mark Scheme (Results)

Summer 2013

International GCSE  
Biology (4BI0) Paper 1BR

Science Double Award (4SC0)  
Paper 1BR

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| Question number | Answer  |                    |                            |                       |                            | Notes                 | Marks   |         |             |       |                    |          |  |            |  |   |            |        |     |        |       |  |  |  |  |  |   |
|-----------------|---|--------------------|----------------------------|-----------------------|----------------------------|-----------------------|---------|---------|-------------|-------|--------------------|----------|--|------------|--|---|------------|--------|-----|--------|-------|--|--|--|--|--|---|
| 1 (a)           | <table border="1"> <thead> <tr> <th>Group</th> <th>Example</th> </tr> </thead> <tbody> <tr> <td>animals</td> <td>human / eq;</td> </tr> <tr> <td>fungi</td> <td><i>Mucor</i> / eq;</td> </tr> <tr> <td>bacteria</td> <td><i>Lactobacillus</i> /<br/><i>Pneumococcus</i> /<br/><i>Salmonella</i> / eq;</td> </tr> <tr> <td>protocists</td> <td><i>Amoeba</i> / <i>Chlorella</i> /<br/><i>Plasmodium</i> / seaweed /<br/>algae / eq;</td> </tr> </tbody> </table>  |                    |                            |                       |                            | Group                 | Example | animals | human / eq; | fungi | <i>Mucor</i> / eq; | bacteria | <i>Lactobacillus</i> /<br><i>Pneumococcus</i> /<br><i>Salmonella</i> / eq; | protocists | <i>Amoeba</i> / <i>Chlorella</i> /<br><i>Plasmodium</i> / seaweed /<br>algae / eq; | allow mammals / birds / eq<br>allow mushroom / yeast / mould<br>toadstool / ignore named disease / athlete's foot<br>ignore malaria | 4          |        |     |        |       |  |  |  |  |  |   |
| Group           | Example   |                    |                            |                       |                            |                       |         |         |             |       |                    |          |  |            |  |   |            |        |     |        |       |  |  |  |  |  |   |
| animals         | human / eq;   |                    |                            |                       |                            |                       |         |         |             |       |                    |          |  |            |  |   |            |        |     |        |       |  |  |  |  |  |   |
| fungi           | <i>Mucor</i> / eq;  |                    |                            |                       |                            |                       |         |         |             |       |                    |          |  |            |  |   |            |        |     |        |       |  |  |  |  |  |   |
| bacteria        | <i>Lactobacillus</i> /<br><i>Pneumococcus</i> /<br><i>Salmonella</i> / eq;  |                    |                            |                       |                            |                       |         |         |             |       |                    |          |  |            |  |   |            |        |     |        |       |  |  |  |  |  |   |
| protocists      | <i>Amoeba</i> / <i>Chlorella</i> /<br><i>Plasmodium</i> / seaweed /<br>algae / eq;  |                    |                            |                       |                            |                       |         |         |             |       |                    |          |  |            |  |   |            |        |     |        |       |  |  |  |  |  |   |
| (b)             | <table border="1"> <thead> <tr> <th>Group</th> <th>Are multicellular</th> <th>Cells have nucleus</th> <th>Cells contain chloroplasts</th> <th>Cells have cell walls</th> </tr> </thead> <tbody> <tr> <td>fungi</td> <td>some</td> <td>(all)</td> <td>none</td> <td>(all);</td> </tr> <tr> <td>bacteria</td> <td>none</td> <td>none</td> <td>(some)</td> <td>(all);</td> </tr> <tr> <td>protocists</td> <td>(none)</td> <td>all</td> <td>(some)</td> <td>some;</td> </tr> </tbody> </table> | Group              | Are multicellular          | Cells have nucleus    | Cells contain chloroplasts | Cells have cell walls | fungi   | some    | (all)       | none  | (all);             | bacteria | none   | none       | (some)   | (all);  | protocists | (none) | all | (some) | some; |  |  |  |  |  | 3 |
| Group           | Are multicellular   | Cells have nucleus | Cells contain chloroplasts | Cells have cell walls |                            |                       |         |         |             |       |                    |          |  |            |  |   |            |        |     |        |       |  |  |  |  |  |   |
| fungi           | some  | (all)              | none                       | (all);                |                            |                       |         |         |             |       |                    |          |  |            |  |   |            |        |     |        |       |  |  |  |  |  |   |
| bacteria        | none  | none               | (some)                     | (all);                |                            |                       |         |         |             |       |                    |          |  |            |  |   |            |        |     |        |       |  |  |  |  |  |   |
| protocists      | (none)  | all                | (some)                     | some;                 |                            |                       |         |         |             |       |                    |          |  |            |  |   |            |        |     |        |       |  |  |  |  |  |   |

| Question number | Answer  | Notes  | Marks    |
|-----------------|---|--|----------|
| 1 (c) (i)       | smaller;<br>protein coat / no cell wall / eq;<br>no cell membrane;<br>no cytoplasm / no organelles / no plasmids / no ribosome / eq;<br>no <u>flagellum</u> ; | ignore<br>reference to<br>shape and<br>reproduction<br>ignore<br>nucleus /<br>Golgi /<br>mitochondria<br>/ eq<br>allow<br>converse<br>ignore HIV | 1        |
|                 |   |  |          |
|                 |   | <b>Total</b>   | <b>9</b> |

| Question number | Answer  | Notes   | Marks    |
|-----------------|---|---|----------|
| 2 (a) (i)       | correctly labelled;                               | ignore other labels if label line goes to wall and membrane = 0 | 1        |
| (ii)            | cell wall;<br>chloroplast;<br>vacuole;            | ignore chlorophyll  | 3        |
| (b) (i)         | LHS / water level lower than RHS / sucrose level; | labelling not required  | 1        |
| (ii)            | <u>osmosis</u> ;                                  | ignore diffusion  | 1        |
|                 |   | <b>Total</b>  | <b>6</b> |

| Question number             | Answer   | Notes        | Marks    |               |     |                      |         |         |                            |                             |         |                           |         |                      |                            |   |   |
|-----------------------------|--|--------------|----------|---------------|-----|----------------------|---------|---------|----------------------------|-----------------------------|---------|---------------------------|---------|----------------------|----------------------------|---|---|
| 3                           | <table border="1"> <thead> <tr> <th>event</th> <th>letter</th> </tr> </thead> <tbody> <tr> <td>fertilisation</td> <td>(P)</td> </tr> <tr> <td>release of oestrogen</td> <td>Q; ONLY</td> </tr> <tr> <td>meiosis</td> <td>Q and V; ONLY in any order</td> </tr> <tr> <td>repair of the uterus lining</td> <td>R; ONLY</td> </tr> <tr> <td>implantation of an embryo</td> <td>R; ONLY</td> </tr> <tr> <td>formation of gametes</td> <td>Q and V; ONLY in any order</td> </tr> </tbody> </table> | event        | letter   | fertilisation | (P) | release of oestrogen | Q; ONLY | meiosis | Q and V; ONLY in any order | repair of the uterus lining | R; ONLY | implantation of an embryo | R; ONLY | formation of gametes | Q and V; ONLY in any order | <p>only give mark if correct letter(s) given<br/> one correct and one wrong = 0<br/> allow lower case letters</p> | 5 |
| event                       | letter   |              |          |               |     |                      |         |         |                            |                             |         |                           |         |                      |                            |   |   |
| fertilisation               | (P)  |              |          |               |     |                      |         |         |                            |                             |         |                           |         |                      |                            |   |   |
| release of oestrogen        | Q; ONLY  |              |          |               |     |                      |         |         |                            |                             |         |                           |         |                      |                            |   |   |
| meiosis                     | Q and V; ONLY in any order   |              |          |               |     |                      |         |         |                            |                             |         |                           |         |                      |                            |   |   |
| repair of the uterus lining | R; ONLY  |              |          |               |     |                      |         |         |                            |                             |         |                           |         |                      |                            |   |   |
| implantation of an embryo   | R; ONLY  |              |          |               |     |                      |         |         |                            |                             |         |                           |         |                      |                            |   |   |
| formation of gametes        | Q and V; ONLY in any order   |              |          |               |     |                      |         |         |                            |                             |         |                           |         |                      |                            |   |   |
|                             |  | <b>Total</b> | <b>5</b> |               |     |                      |         |         |                            |                             |         |                           |         |                      |                            |   |   |

| Question number | Answer   | Notes   | Marks     |
|-----------------|--|---|-----------|
| 4 (a) (i)       | all names present and parakeet in middle;<br>arrows in right direction;          |   | 2         |
| (ii)            | digested / broken down;<br>amylase / carbohydrase;<br>maltose / glucose / sugar; | ignore enzyme<br>ignore maltase<br>ignore absorbed in small intestine | 3         |
| (b) (i)         | 25.5;;   | allow one mark for 2 or 27.5 in working                               | 2         |
| (ii)            | increase (volume of oxygen) / eq;<br>(more) respiration;<br>heat loss / eq;      | ignore keep warm<br>ignore reference to maintain body temperature     | 3         |
|                 |  | <b>Total</b>  | <b>10</b> |

| Question number | Answer   | Notes   | Marks     |
|-----------------|--|---|-----------|
| 5 (a)           | S scale linear + use of at least half grid;<br>L lines on bars neat;<br>A axes correct way;<br>A axes labelled energy + kJ per m <sup>2</sup> per year and A,B,C,D / eq;<br>P bars at correct height;  | L lost if points plotted<br>allow yr or y for year<br>allow kJ m <sup>-2</sup> yr <sup>-1</sup>     | 5         |
| (b)             | temperature / heat;<br>(sun)light / light intensity;<br>wavelength / colour;<br>water / rain;<br>minerals / ions / salts / named mineral / nutrients;  | ignore humidity   | 3         |
| (c) (i)         | (less) pests / disease control / pesticides / eq;<br>biological control / predators;<br>fertiliser / fertile soil / crop rotation / legumes / eq;<br>irrigation / watered;<br>replanting / several plantings per year;<br>GM / species of plant / different strains / eq;<br>weed removal; | ignore pollution / CO <sub>2</sub> levels or other abiotic factors<br>ignore glasshouse / polythene | 2         |
| (ii)            | man / human / you / farmer;<br>desired characteristic / named feature / eq;<br>breed / produce offspring / eq;<br>many generations / eq;   |   | 4         |
| (d)             | several / use more than one / sample / repeat / eq;<br><u>random</u> ;<br>weigh / method of weighing / scales / eq;<br>remove animals / consumers / soil;<br>multiply to total area / scaling;   | allow if implicit<br>ignore count / measure biomass<br>ignore average                               | Max 4     |
|                 |  | <b>Total</b>  | <b>18</b> |



| Question number | Answer   | Notes         | Marks    |
|-----------------|--|---------------|----------|
| 6               | restriction (enzyme);<br><u>human</u> DNA / gene / allele;<br>ligase;<br>use <u>same</u> restriction enzyme;<br>plasmid;<br><u>recombinant</u> (DNA/plasmid);<br><u>vector</u> ;<br>insulin / factor VIII / named protein; | reject lipase | Max 5    |
|                 |  | <b>Total</b>  | <b>5</b> |

| Question number | Answer  | Notes                          | Marks    |
|-----------------|---|--------------------------------|----------|
| 7 (a)           | evaporation / loss of water / diffusion;<br>surface of plant / stomata / from leaves / from plant / eq;   |                                | 2        |
| (b)             | stop water loss (from soil) / stop evaporation (from soil) / water can only be lost through plant / eq;   | ignore prevent water into soil | 1        |
| (c)             | <u>kinetic</u> energy;<br>molecules move faster / eq;<br>stomata;<br>open in light / close in dark;<br>diffusion / evaporation / transpiration; | ignore guard cells             | 4        |
|                 |   | <b>Total</b>                   | <b>7</b> |

| Question number | Answer  | Notes   | Marks     |
|-----------------|---|---|-----------|
| 8 (a) (i)       | lungs;  |   | 1         |
| (ii)            | diaphragm;  | allow phonetic spelling   | 1         |
| (iii)           | trachea / windpipe;   | eg dyaphram   | 1         |
| (iv)            | bronchus / bronchi;   | ignore bronchioles / ignore right and left  | 1         |
| (b)             | balloons inflate / air into balloons / eq;<br><u>volume</u> (in model) increases / more space (in model) / eq;<br><u>pressure</u> decreases / eq;   | ignore vacuum<br>ignore area  | 3         |
| (c)             | (no) ribs / ribcage;<br>(no) (intercostal) muscles;<br>(no) pleural membranes;<br>(no) movement (of chest) / up and out / expansion;  | allow converse  | 2         |
| (d)             | 1 rest <u>and</u> exercise / range of exercise / jog and run / eq;<br>2 (how) count breaths / how many breaths / amount of breaths / volume / eq;<br>3 for time / seconds / minutes / eq;<br>4 quantification of exercise / jog for 5 minutes / do 10 press ups;<br>5 repeat (for reliability); | 1 allow if implied<br>2 ignore measure breathing - need method<br>3 is measure rate mark not exercise quantified<br>5 allow average | 4         |
|                 |   | <b>Total</b>  | <b>13</b> |

| Question number | Answer  | Notes   | Marks     |
|-----------------|---|---|-----------|
| 9 (a)           | faeces / stool / urine / urea / ammonia / carbon dioxide / eq;  | ignore <u>excretion</u> / poo                               | 1         |
| (b) (i)         | (maintain) oxygen;<br>(less) decomposition / respiration;<br>bacteria / fungi / microbes / eq;  | allow respiration for fish<br>or bacteria<br>ignore disease | 2         |
| (ii)            | less nutrients / algal growth / eutrophication / eq;<br><br>kill/less bacteria / pathogens / microbes / eq;<br>(less) disease / infection;  | reject kill viruses<br>ignore healthy                       | 2         |
| (c)             | bacteria / fungi / microbes / eq;<br>decompose(rs) / decay / rot / breakdown / eq;<br>mineral ions / nutrients / named mineral ion / nitrate / eq;<br>amino acids / proteins;<br>respiration (by bacteria);<br>carbon dioxide;<br>photosynthesis; | ignore fertiliser   | Max 4     |
| (d)             | separate species / nets / cages / fences / shooting / eq;   | ignore intraspecific<br>ignore feed lots<br>separate = 0    | 1         |
|                 |   | <b>Total</b>  | <b>10</b> |

| Question number | Answer  | Notes  | Marks                   |
|-----------------|---|--|-------------------------|
| 10 (a)          | 1 ZZ ZW; (gender must be clear)<br>2 Z Z (and) W;<br>3 ZZ ZW;<br>4 male female;   | X and Y alone = 0<br>allow 2 and 3 in Punnett square and 1 and 4 if labelled | 4                       |
| (b) (i)         | protein;<br>amino acids / muscles / bone / enzymes / cells / tissues / eq;<br>(ii) fats / lipids / cholesterol / (named) carbohydrate;<br>energy / cell membrane;<br>(iii) respiration;<br><br>(less) dehydration / eq;<br>protection / less chance of breaking / prevents cracking / eq;<br><br>cheese / fish / eggs / milk / low-fat spreads / yoghurt / liver / carrots / sweet potatoes / eq;<br>immunity / vision (in dim light) / healthy skin / bone <u>metabolism</u> / gene transcription / embryo development / eq; | ignore calcium<br>ignore vitamins  | 2<br><br>Max 1<br><br>2 |
| (c)             | meiosis;<br>gametes / sex cells / sperm <u>and</u> egg;<br>haploid / n / half / 23;<br>fertilization / fuse / combine / join / eq;<br>diploid / 2n / full set / 46;   |  | Max 3                   |
|                 |   | <b>Total</b>   | <b>12</b>               |

| Question number | Answer  | Notes        | Marks    |
|-----------------|---|--------------|----------|
| 11              | <u>nucleus</u> from body cell / <u>nucleus</u> from adult cell /<br><u>nucleus</u> from adult / eq;<br>egg / ovum;<br>remove nucleus (from egg) / enucleate (from egg);<br>nucleus into (empty) <u>egg</u> cell;<br>electricity;<br><u>mitosis</u> ;<br><u>embryo</u> ;<br>uterus / womb;<br><u>surrogate</u> (mother); |              | Max 5    |
|                 |   | <b>Total</b> | <b>5</b> |

| Question number | Answer  | Notes   | Marks    |
|-----------------|---|---|----------|
| 12 (a)          | vessel entering is wider / eq;<br>(increased) <u>pressure</u> ;<br><u>ultrafiltration</u> ;                       | ignore thicker<br>ignore references to<br>capillary structure | 2        |
| (b)             | capillary / capillaries;  |   | 1        |
| (c) (i)         | active transport / active uptake;<br>low to high concentration / against conc. gradient /<br>eq;<br>energy / ATP; | reject if in list   | 2        |
| (ii)            | respiration;<br><br>energy / ATP;<br><br>osmotic effect;  |   | Max 2    |
|                 |   | <b>Total</b>  | <b>7</b> |

| Question number | Answer  | Notes                                   | Marks    |
|-----------------|---|---|----------|
| 13 (a)          | right;<br>atrium <u>and</u> ventricle;  | allow plural of atria<br>and ventricles | 2        |
| (b) (i)         | X same <u>and</u> Y up;   |   | 1        |
| (ii)            | right and left side separate / septum / aorta<br>connected to the left side / no water in LHS / eq; |   | 1        |
|                 |   | <b>Total</b>                            | <b>4</b> |



| Question number | Answer  | Notes        | Marks    |
|-----------------|---|--------------|----------|
| 14              | pancreas / Islets of Langerhans / eq;<br>insulin;<br>lower levels;<br>glycogen; |              | Max 3    |
|                 |   | <b>Total</b> | <b>3</b> |

| Question number | Answer   | Notes                  | Marks      |
|-----------------|--|------------------------|------------|
| 15              | C different calcium / range of calcium / eq;<br>O same age / strain / species / gender / eq;<br>R several rats / different groups / eq;<br>M1 mass / eq;<br>M2 one day plus / eq;<br>S1 + S2 same mass food / type of food / diet /<br>water / same cage / temperature / eq; |                        | 6          |
|                 |  | <b>Total</b>           | <b>6</b>   |
|                 |  | <b>Total for paper</b> | <b>120</b> |



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