



# Mark Scheme (Results)

January 2013

International GCSE

Biology (4BI0) Paper 1B

Science Double Award (4SC0) Paper 1B

Edexcel Level 1/Level 2 Certificate

Biology (KBI0) Paper 1B

Science (Double Award) (KSC0) Paper 1B

## Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications come from Pearson, the world's leading learning company. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at [www.edexcel.com](http://www.edexcel.com) or [www.btec.co.uk](http://www.btec.co.uk) for our BTEC qualifications.

Alternatively, you can get in touch with us using the details on our contact us page at [www.edexcel.com/contactus](http://www.edexcel.com/contactus).

If you have any subject specific questions about this specification that require the help of a subject specialist, you can speak directly to the subject team at Pearson. Their contact details can be found on this link: [www.edexcel.com/teachingservices](http://www.edexcel.com/teachingservices).

You can also use our online Ask the Expert service at [www.edexcel.com/ask](http://www.edexcel.com/ask). You will need an Edexcel username and password to access this service.

## Pearson: helping people progress, everywhere

Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: [www.pearson.com/uk](http://www.pearson.com/uk)

January 2013

Publications Code UG034289

All the material in this publication is copyright

© Pearson Education Ltd 2013

| Question number | Answer                                                                  | Notes              | Marks    |
|-----------------|-------------------------------------------------------------------------|--------------------|----------|
| 1 (a) (i)       | trachea / wind pipe / cartilage;<br>alveoli / alveolus / air sacs;      | reject air pockets | 2        |
| (b) (i)         | X – oxygen / O <sub>2</sub> ;<br>Y - carbon dioxide / CO <sub>2</sub> ; |                    | 2        |
| (ii)            | 8.4;                                                                    |                    | 1        |
| (iii)           | B diffusion;                                                            |                    | 1        |
|                 |                                                                         | <b>Total</b>       | <b>6</b> |

| Question number | Answer                                                                                                                                                                                                                      | Notes                                                | Marks    |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------|
| 2               | humans / people / farmers / scientists / breeders / eq;<br><br>characteristics / features / named feature / traits / qualities / eq;<br><br>offspring / eq;<br><br>repeated / continued / done / carried on / ongoing / eq; | ignore genes / genetics<br><br><br>ignore successful | 4        |
|                 |                                                                                                                                                                                                                             | <b>Total</b>                                         | <b>4</b> |

| Question number | Answer                                                                                                                                                                   | Notes                                                                                                                                                        | Marks |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 3 (a) (i)       | rice;                                                                                                                                                                    |                                                                                                                                                              | 1     |
| (ii)            | (Asian) toad;                                                                                                                                                            |                                                                                                                                                              | 1     |
| (b)             | (sun)light;<br>water / rain / moisture / eq;<br>carbon dioxide / CO <sub>2</sub> ;<br>minerals / ions / nutrients / salts / named mineral / eq;<br>temperature / warmth; | ignore sun alone<br>ignore humidity<br>ignore weather /<br>climate / pollution /<br>global warming /<br>drought / flooding /<br>beetles / insects /<br>pests | 2     |
| (c)             | kills/destroys/reduce number of/remove<br>beetles/consumers/pests;<br><br>less rice eaten / eq;                                                                          | because the beetles<br>feed on the rice = 0<br>stop beetles eating rice<br>= 1                                                                               | 2     |

| Question number | Answer                                                                                                                                                                                        | Notes                                                                                      | Marks    |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------|
| 3 (d)           | idea of increasing number of toads/other organism/ predator;<br>eats <u>beetles</u> / eq;<br><br>OR<br><br>capture / hunt mongoose / eq;<br>increase toad population / less toads eaten / eq; | reduce the amount of beetles eating rice = 1<br><br>introduce predator to control pest = 1 | 2        |
|                 |                                                                                                                                                                                               | <b>Total</b>                                                                               | <b>8</b> |

| Question number | Answer                                                                                                                       | Notes                                        | Marks     |
|-----------------|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-----------|
| 4 (a)           | (trap/absorb) light / eq;<br>chlorophyll;<br>photosynthesis / starch / glucose / eq;                                         | ignore trap energy                           | 2         |
| (b)             | A cell wall;<br>B vacuole;<br>C cytoplasm;                                                                                   |                                              | 3         |
| (c) (i)         | C;<br>A;                                                                                                                     |                                              | 2         |
| (ii)            | starch removed / starch used / no starch / eq;<br>(converted to) glucose;<br>respiration / energy;                           |                                              | 2         |
| (iii)           | boil (in ethanol) / heat (in ethanol)/ eq;<br>ethanol / alcohol;<br>no naked flame / water bath / hot water / in water / eq; | allow water mark if<br>linked to boil / heat | 3         |
| (iv)            | iodine / iodine;                                                                                                             |                                              | 1         |
|                 |                                                                                                                              | <b>Total</b>                                 | <b>13</b> |

| Question number | Answer                                                                                                                                                             | Notes                                               | Marks     |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-----------|
| 5 (a)           | constipation;<br>lack of <u>water</u> / lots of <u>water</u> absorbed/ drink less <u>water</u> ;<br>lack of fibre / less vegetables / eq;                          |                                                     | 1         |
| (b)             | diarrhoea;<br>less water absorbed;<br>food poisoning / infection / eq;                                                                                             |                                                     | 1         |
| (c)             | peristalsis;<br>contraction;<br>muscles;<br>pushed / squeezed / waves / eq;                                                                                        |                                                     | 3         |
| (d) (i)         | rectum;                                                                                                                                                            |                                                     | 1         |
| (ii)            | anus;                                                                                                                                                              |                                                     | 1         |
| (e)             | faeces versus named excretory product;<br>undigested food versus <u>metabolic</u> waste product;<br>anus versus kidney/lung/skin;<br>not in cells versus in cells; | excretion is removal of<br>faeces from the anus = 0 | 3         |
|                 |                                                                                                                                                                    | <b>Total</b>                                        | <b>10</b> |

| Question number | Answer                                                                                                                                                                                                  | Notes                                             | Marks  |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|--------|
| 6 (a)           | correct tally 1 mark; (15, 2, 1, 2)<br>correct transfer of tally to number 1 mark;                                                                                                                      |                                                   | 1<br>1 |
| (b)             | S scale linear on y axis and half grid used on both axes;<br>P bars plotted correctly;<br>A1 axis labelled <u>number</u> ;<br>A2 names of organisms;<br>K key for night and day;                        |                                                   | 5      |
| (c) (i)         | more organisms at night (in total);<br>more woodlice;<br>correct reference to one other organism;                                                                                                       |                                                   | 3      |
| (ii)            | nocturnal;<br><br>less predators (at night) / not seen (at night) / less chance of being eaten (at night) / eq;<br><br>cool (at night) / damp (at night) / eq;<br><br>less dehydration (at night) / eq; | allow converse for day<br>ignore safer idea alone | 2      |
| (d)             | results would be different / inaccurate / changed / described difference / eq;<br><br>escape;<br>eaten;<br>reproduce eq;                                                                                | ignore death                                      | 2      |

| Question number | Answer                                                                                     | Notes                                                   | Marks     |
|-----------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------|
| 6 (e) (i)       | number of named organism / number of <u>an</u> organism / number of <u>a</u> species / eq; | number of organisms = 0<br>allow amount as eq to number | 1         |
| (ii)            | different types / different species / different organisms;                                 |                                                         | 1         |
| (iii)           | (place) where an organism lives / (place) where organism lives described;                  |                                                         | 1         |
|                 |                                                                                            | <b>Total</b>                                            | <b>17</b> |

| Question number | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                     |                  |                   | Notes          | Marks                        |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------|-------------------|----------------|------------------------------|------------------|-------------------|------------------------|-------------|---|---|--------------|------------------------------------|---|---|----------------|----------------------|---|---|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|--|--------------------|-------------------------------------|--|--|-----------|--------------------------------------------------------------------------------|--|--|--|---|
| 7 (a)           | <table><tr><td>Group</td><td>Can carry out photosynthesis</td><td>Have a cell wall</td><td>Can be pathogenic</td></tr><tr><td>bacteria</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>fungi</td><td>X</td><td>✓</td><td>✓</td></tr><tr><td>viruses</td><td>X</td><td>X</td><td>✓</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                     |                  |                   | Group          | Can carry out photosynthesis | Have a cell wall | Can be pathogenic | bacteria               | ✓           | ✓ | ✓ | fungi        | X                                  | ✓ | ✓ | viruses        | X                    | X | ✓ | hybrid cross<br>tick = 0<br><br>blank = 0<br><br>8 = 4<br>7/6 = 3<br>5/4 = 2<br>3/2 = 1<br>1/0 = 0 | 4                                                                                   |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 | Group                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Can carry out photosynthesis                                                        | Have a cell wall | Can be pathogenic |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 | bacteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ✓                                                                                   | ✓                | ✓                 |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 | fungi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | X                                                                                   | ✓                | ✓                 |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 | viruses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | X                                                                                   | X                | ✓                 |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |                  |                   |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |                  |                   |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |                  |                   |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |                  |                   |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
| (b)             | <table><tr><td>Characteristic</td><td colspan="3">Example of this process</td></tr><tr><td>they require nutrition</td><td colspan="3">eating food</td></tr><tr><td>they respire</td><td colspan="3">releasing energy from carbohydrate</td></tr><tr><td>movement / eq;</td><td colspan="3">some animals can fly</td></tr><tr><td>they control their internal conditions</td><td colspan="3">blood glucose / blood pressure / body temperature / sweating / osmoregulation / eq;</td></tr><tr><td>reproduction / eq;</td><td colspan="3">increase of the population of foxes</td></tr><tr><td>they grow</td><td colspan="3">cells divide / increase in mass / size / get bigger / increase in height / eq;</td></tr></table> |                                                                                     |                  |                   | Characteristic | Example of this process      |                  |                   | they require nutrition | eating food |   |   | they respire | releasing energy from carbohydrate |   |   | movement / eq; | some animals can fly |   |   | they control their internal conditions                                                             | blood glucose / blood pressure / body temperature / sweating / osmoregulation / eq; |  |  | reproduction / eq; | increase of the population of foxes |  |  | they grow | cells divide / increase in mass / size / get bigger / increase in height / eq; |  |  |  | 4 |
|                 | Characteristic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Example of this process                                                             |                  |                   |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 | they require nutrition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | eating food                                                                         |                  |                   |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 | they respire                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | releasing energy from carbohydrate                                                  |                  |                   |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 | movement / eq;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | some animals can fly                                                                |                  |                   |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 | they control their internal conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | blood glucose / blood pressure / body temperature / sweating / osmoregulation / eq; |                  |                   |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 | reproduction / eq;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | increase of the population of foxes                                                 |                  |                   |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
| they grow       | cells divide / increase in mass / size / get bigger / increase in height / eq;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                     |                  |                   |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |                  |                   |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |                  |                   |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |                  |                   |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |                  |                   |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |                  |                   |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |
|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |                  |                   |                |                              |                  |                   |                        |             |   |   |              |                                    |   |   |                |                      |   |   |                                                                                                    |                                                                                     |  |  |                    |                                     |  |  |           |                                                                                |  |  |  |   |

| Question number | Answer                                                                                                                                                                                                                            | Notes                                                                                                  | Marks     |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------|
| 7 (c)           | receptor / nerve ending;<br>sensory neurone / sensory nerve;<br>impulse / message / signal;<br>CNS / spinal cord / grey matter;<br>synapse;<br>relay neurone / relay nerve;<br>motor neurone ;<br>muscle / effector;<br>contract; | sensory or motor not in correct order = 0<br><br>ignore brain<br><br>allow intermediate / association; | 5         |
|                 |                                                                                                                                                                                                                                   | <b>Total</b>                                                                                           | <b>13</b> |

| Question number | Answer                                                                                                                                                                                    | Notes                                                                                                                                | Marks |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------|
| 8 (a)           | purple;<br>(all) offspring are purple / no white;                                                                                                                                         |                                                                                                                                      | 2     |
| (b)             | separate from other flowers / pollen / insects / wind /<br>cover with bag / separate room;<br><br>transfer pollen by man / brush / eq;                                                    |                                                                                                                                      | 2     |
| (c) (i)         | Ff      Ff;<br><br>F      f      F      f;<br><br>FF and Ff (and Ff) and ff; (allow homozygous dominant / heterozygous / homozygous recessive)<br><br>purple (purple   purple) and white; | allow all marking points in Punnett square<br><br>allow other letters eg Pp or PW for heterozygote<br><br>if parents wrong allow ecf | 4     |
| (ii)            | 4.5:1 / 9:2 / 18:4 / 36:8;                                                                                                                                                                | 4.5 alone = 0                                                                                                                        | 1     |
| (iii)           | role of chance / probability / random (fertilisation);<br><br>small numbers / eq;<br>more purple pollen involved in fertilisation / eq;                                                   |                                                                                                                                      | 2     |

| Question number | Answer                                                                                                                                                                                                                                                                                               | Notes        | Marks     |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|
| 8 (d)           | <p>more purple pollen / less white pollen / eq;<br/>carried to other (purple) flowers;</p> <p>purple flowers (more likely to) reproduce / eq;<br/>allele for purple in passed on in seeds/offspring;</p> <p>more purple flowers;<br/>less white flowers;</p> <p>continues over generations / eq;</p> |              | 5         |
|                 |                                                                                                                                                                                                                                                                                                      | <b>Total</b> | <b>16</b> |

| Question number | Answer                                                                                                                                                                                                                                                                                     | Notes        | Marks    |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------|
| 9               | C different temperatures / eq;<br>O same species / size/ age/gender/eq;<br>R repeat / eq;<br>M1 mass / length / number / eq;<br>M2 time period <u>stated</u> ; (one day minimum)<br>S1 and S2 same food type / same food mass /<br>same oxygen / tank size /<br>fish density stated / eq;; |              | 6        |
|                 |                                                                                                                                                                                                                                                                                            | <b>Total</b> | <b>6</b> |

| Question number                          | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Notes             | Marks           |                   |                  |   |   |                   |   |    |                    |   |    |                 |   |    |                  |   |    |                                          |   |    |                                                                                                                            |   |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------|-------------------|------------------|---|---|-------------------|---|----|--------------------|---|----|-----------------|---|----|------------------|---|----|------------------------------------------|---|----|----------------------------------------------------------------------------------------------------------------------------|---|
| 10 (a)                                   | <table><tr><th>Statement</th><th>Red blood cells</th><th>White blood cells</th></tr><tr><td>transport oxygen</td><td>✓</td><td>X</td></tr><tr><td>contain a nucleus</td><td>X</td><td>✓;</td></tr><tr><td>produce antibodies</td><td>X</td><td>✓;</td></tr><tr><td>biconcave shape</td><td>✓</td><td>X;</td></tr><tr><td>ingest pathogens</td><td>X</td><td>✓;</td></tr><tr><td>numbers may increase following infection</td><td>X</td><td>✓;</td></tr></table> | Statement         | Red blood cells | White blood cells | transport oxygen | ✓ | X | contain a nucleus | X | ✓; | produce antibodies | X | ✓; | biconcave shape | ✓ | X; | ingest pathogens | X | ✓; | numbers may increase following infection | X | ✓; | <p>no mark if blank is left</p> <p>no marks for two crosses or two ticks in a row</p> <p>no mark for hybrid tick cross</p> | 5 |
| Statement                                | Red blood cells                                                                                                                                                                                                                                                                                                                                                                                                                                                 | White blood cells |                 |                   |                  |   |   |                   |   |    |                    |   |    |                 |   |    |                  |   |    |                                          |   |    |                                                                                                                            |   |
| transport oxygen                         | ✓                                                                                                                                                                                                                                                                                                                                                                                                                                                               | X                 |                 |                   |                  |   |   |                   |   |    |                    |   |    |                 |   |    |                  |   |    |                                          |   |    |                                                                                                                            |   |
| contain a nucleus                        | X                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ✓;                |                 |                   |                  |   |   |                   |   |    |                    |   |    |                 |   |    |                  |   |    |                                          |   |    |                                                                                                                            |   |
| produce antibodies                       | X                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ✓;                |                 |                   |                  |   |   |                   |   |    |                    |   |    |                 |   |    |                  |   |    |                                          |   |    |                                                                                                                            |   |
| biconcave shape                          | ✓                                                                                                                                                                                                                                                                                                                                                                                                                                                               | X;                |                 |                   |                  |   |   |                   |   |    |                    |   |    |                 |   |    |                  |   |    |                                          |   |    |                                                                                                                            |   |
| ingest pathogens                         | X                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ✓;                |                 |                   |                  |   |   |                   |   |    |                    |   |    |                 |   |    |                  |   |    |                                          |   |    |                                                                                                                            |   |
| numbers may increase following infection | X                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ✓;                |                 |                   |                  |   |   |                   |   |    |                    |   |    |                 |   |    |                  |   |    |                                          |   |    |                                                                                                                            |   |
| (b)                                      | <p>more oxygen;<br/>haemoglobin;<br/>muscles;<br/>respiration;<br/>(less) anaerobic respiration;<br/>(less) lactic acid / (less) oxygen debt / (less) fatigue / (less) cramp;<br/>more energy;<br/>run faster / run longer / run further / less tired / eq;</p>                                                                                                                                                                                                 |                   | 4               |                   |                  |   |   |                   |   |    |                    |   |    |                 |   |    |                  |   |    |                                          |   |    |                                                                                                                            |   |

| Question number | Answer                                                                                                                                                      | Notes        | Marks     |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|
| 10 (c)          | <p>short race / quick race / short time / short distance / eq;</p> <p>oxygen not needed / no need to breathe / eq;</p> <p><u>anaerobic</u> respiration;</p> |              | 2         |
|                 |                                                                                                                                                             | <b>Total</b> | <b>11</b> |

| Question number | Answer                                                                                                                                                                                                                                                                                                                                | Notes                                                     | Marks |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-------|
| 11 (a)          | water / H <sub>2</sub> O;<br>mineral(s) / ion(s) / salt(s) / named mineral/ion/salt;                                                                                                                                                                                                                                                  | ignore sugar / alcohol / hormones                         | 2     |
| (b) (i)         | high conc. to low conc. / eq;                                                                                                                                                                                                                                                                                                         |                                                           | 1     |
| (ii)            | (partially permeable) membrane / small molecules / eq;<br><u>water</u> ;                                                                                                                                                                                                                                                              |                                                           | 1     |
| (iii)           | high conc. to low conc. / conc. gradient;<br>partially permeable (membrane/tubing) / eq;<br>diffusion;                                                                                                                                                                                                                                |                                                           | 2     |
| (iv)            | same conc. in fluid and blood / normal blood conc. in fluid / correct glucose conc. in fluid / eq;<br>if high in blood moves out of blood/into fluid;<br>if low in blood moves into blood/out of fluid;                                                                                                                               |                                                           | 2     |
| (v)             | <u>ultrafiltration</u> ;<br>small molecules or named small molecule out of blood / large molecules or protein stay in blood / pressure / Bowman's capsule / glomerulus / eq;<br>(selective) <u>reabsorption</u> ;<br>glucose / ions / amino acids / water;<br><u>active transport</u> ;<br>glucose / energy / low to high conc. / eq; | mark in pairs – only allow marks from two named processes | 4     |

| Question number | Answer                                                                                                                                        | Notes        | Marks     |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|
| 11 (c) (i)      | <u>renal vein</u> and <u>renal artery</u> ;<br><u>ureter</u> ;                                                                                |              | 2         |
| (ii)            | nearer to bladder / closer to where waste goes / eq;<br>easier access / closer to surface / eq;<br>ref. to length of tubes/blood vessels /eq; |              | 2         |
|                 |                                                                                                                                               | <b>Total</b> | <b>16</b> |

Further copies of this publication are available from  
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467  
Fax 01623 450481  
Email [publication.orders@edexcel.com](mailto:publication.orders@edexcel.com)  
Order Code UG034289 January 2013

For more information on Edexcel qualifications, please visit our website  
[www.edexcel.com](http://www.edexcel.com)

Pearson Education Limited. Registered company number 872828  
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE



Llywodraeth Cynulliad Cymru  
Welsh Assembly Government

