

Mark Scheme (Results)

Summer 2013

GCSE Biology (5BI2F)
Paper 01

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- For questions worth more than one mark, the answer column shows how partial credit can be allocated. This has been done by the inclusion of part marks eg (1).
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:

- Write legibly, with accurate spelling, grammar and punctuation in order to make the meaning clear
- Select and use a form and style of writing appropriate to purpose and to complex subject matter
- Organise information clearly and coherently, using specialist vocabulary when appropriate.

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|--------|--|------------|
| 1(a)(i) | | <p>Do not allow more than one line from each box</p> <p>pooter</p> <p>sweep net</p> <p>filter funnel</p> <p>pond net</p> <p>pitfall trap</p> | (2) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|--|---|------------|
| 1(a)(ii) | <p>5 (x 20) (1)</p> <p>= 100 (daisies)</p> | award two marks for correct bald answer | (2) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|--|---|------------|
| 1(b) | <p>A suggestion including two of the following points:</p> <ul style="list-style-type: none"> • (more) light (1) • (more) photosynthesis (1) • (more) water (1) • (more) mineral ions / nutrients (1) • faster growth (1) • less competition (1) | <p>Allow reverse argument (plants closer to the wood) for all marking points</p> <p>warmer / (more)Sun</p> <p>Ignore grow taller / more growth</p> <p>Ignore more space</p> | (2) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|---|---|------------|
| 1(c) | Any two of the following: <ul style="list-style-type: none"> • chlorophyll / chloroplasts (1) • carbon dioxide (1) • water (1) | if formula used it must be correct Ignore heat and light | (2) |

Total for Question 1 = 8 marks

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|--------------------------|--------------------|------------|
| 2(a)(i) | C small intestine | | (1) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|-----------------|--------------------|------------|
| 2(a)(ii) | B lipase | | (1) |

| Question Number | Answer | Acceptable answers | Mark |
|------------------|--|---|------------|
| 2(a)(iii) | <p>An explanation including two of the following points</p> <ul style="list-style-type: none"> • peristalsis (1) • <u>contraction</u> (of muscles) (1) • move/push (digested) food along (1) • (from mouth) to stomach (1) | <p>ignore squeeze</p> <p>ignore breakdown of food</p> | (2) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|-------------------------------------|--|------------|
| 2(b)(i) | <p>10 and 15 (1)</p> <p>= 5 (%)</p> | <p>two marks for bald correct answer</p> <p>Ignore negative sign</p> | (2) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|---|--------------------|------------|
| 2(b)(ii) | <p>A description including two of the following points</p> <ul style="list-style-type: none"> • decreases (1) • (then) remains constant (1) • correct reference to data from the graph (1) | | (2) |

Total for Question 2 = 8 marks

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|---|--------------------|------------|
| 3(a)(i) | D similar cells working together | | (1) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|---|--|------------|
| 3(a)(ii) | A suggestion including the following: <ul style="list-style-type: none"> • divide / mitosis (1) • (stem cells) differentiate / specialise (1) | multiply /replicate / copy / clone allow description of differentiation e.g. can change into any type of cell/named cell/named tissue | (2) |

| Question Number | Answer | Acceptable answers | Mark |
|------------------|----------------------|--------------------|------------|
| 3(a)(iii) | C respiration | | (1) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|------------------------------------|---|------------|
| 3(b)(i) | 10.8 and 2.5 (1) = 8.3 (kg) | award two marks for correct bald answer | (2) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|--------------------------|--|------------|
| 3(b)(ii) | (increase in) length (1) | height other valid measurements e.g. head circumference (1) allow named equipment that could be used to measure growth e.g. ultrasound (1) | (1) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|--|--|------------|
| 3(c) | amylase (1) sugars (1) small intestine (1) | answers must be in this order accept phonetic spellings | (3) |

Total for Question 3 = 10 marks

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|-------------------------------------|--|------------|
| 4(a) | double(1) hydrogen(1) gene(1) | answers must be in this order accept phonetic spellings | (3) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|---------------------------|--------------------|------------|
| 4(b) | C Watson and Crick | | (1) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|---|--|------------|
| 4(c)(i) | A description including two of the following points: <ul style="list-style-type: none"> • (coded for by a) different base sequence (1) • (made up of) different types of amino acid (1) • (made up of) a different number of amino acid (1) • (made up of) a different order of amino acid (1) | accept (coded for by) different genes / DNA code accept different amino acids | (2) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|--|---|------------|
| 4(c)(ii) | A suggestion including two of the following points: <ul style="list-style-type: none"> • (DNA) mutated (1) • change in base/base order (1) • correct reference to cause of mutation e.g. radiation / tar (1) | accept named change e.g. insertion ignore references to base-pairing | (2) |

| Question Number | Answer | Acceptable answers | Mark |
|-------------------|-------------------------------|--------------------|------------|
| 4(c) (iii) | A biological catalysts | | (1) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|---|--|------------|
| 4(d) | <ul style="list-style-type: none"> • clone (s) | <u>identical</u> twins Accept phonetic spelling | (1) |

Total for Question 4 = 10 marks

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|--|--------------------------|------------|
| 5(a)(i) | <ul style="list-style-type: none"> Xylem (vessel) | Accept phonetic spelling | (1) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|-----------------------|--------------------|------------|
| 5(a)(ii) | B mitochondria | | (1) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|---|--|------------|
| 5(b)(i) | <p>An suggestion including three of the following points:</p> <ul style="list-style-type: none"> (greater blood flow) muscles work harder / need more energy(1) to provide oxygen /glucose (1) for (aerobic) respiration (1) to remove CO₂ (1) less blood flow to brain / liver (1) | <p>accept reference to reducing build up of lactic acid / reduce rate of anaerobic respiration / reduce oxygen debt / EPOC (1)</p> | (3) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|--|------------------------------------|------------|
| 5(b)(ii) | <p>Any one from</p> <ul style="list-style-type: none"> provides less energy build up of lactic acid causes cramp / muscle fatigue | accept muscles ache / tire quickly | (1) |

| Question Number | | Indicative Content | Mark |
|-----------------|---------------|---|------------|
| QWC | * 5(c) | <p>A description including some of the following points in a logical sequence</p> <ul style="list-style-type: none"> • heart / ventricle pumps blood • through blood vessels/arteries/veins/capillaries • to lungs and to the rest of the body • arteries/named arteries transport blood away from heart • veins / named veins transport blood to the heart • valves prevent backflow • capillaries exchange materials/named material with tissues/cells • red blood cells carry oxygen • plasma transports nutrients/waste/hormones | (6) |
| Level | 0 | No rewardable content | |
| 1 | 1 - 2 | <ul style="list-style-type: none"> • A limited description of one structure OR one function of the circulatory system e.g. the heart pumps blood or the blood carries oxygen • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy | |
| 2 | 3 - 4 | <ul style="list-style-type: none"> • A simple description of two structures and their functions of the circulatory system e.g. arteries carry blood away from the heart and red blood cells transport oxygen. • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy | |
| 3 | 5 - 6 | <ul style="list-style-type: none"> • A detailed description of at least three structures and their functions of the circulatory system which MUST include relevant information on red blood cells OR plasma OR the exchange of material at capillaries. • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors | |

Total for Question 5 = 12 marks

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|--|---|------------|
| 6(a) | <p>A suggestion including any two from:</p> <ul style="list-style-type: none"> • new gene / DNA located(1) • inserted (into plant DNA) (1) • (by) genetic engineering (1) | <p>any named GM characteristic e.g. pest resistant</p> <p>accept reference to correct GM procedure e.g. restriction enzymes / use of plasmid (1)</p> <p>accept <u>DNA</u> has been changed / modified (1)</p> | (2) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|---|---|------------|
| 6(b)(i) | <ul style="list-style-type: none"> • 62 and 15 (1) • 47 (%) | award two marks for correct bald answer | (2) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|---|--|------------|
| 6(b)(ii) | <p>A description including two of the following points</p> <ul style="list-style-type: none"> • overall increase(1) • by 62 (%) (+/-2)(1) • relevant point mentioned from graph between 1996 and 2000(1) • increases between 2000 and 2008(1) | Accept relevant point mentioned from graph between 2000 and 2008 | (2) |

| Question Number | Indicative Content | Mark |
|------------------|---|---|
| QWC *6(c) | <p>A discussion including some of the following points in a logical sequence</p> <p><u>Advantages</u></p> <p><u>reference to GM crops</u></p> <ul style="list-style-type: none"> • named GM characteristic e.g. herbicide resistance/longer shelf life/faster growth • increased yield • less use of chemical pesticides • less harm to living things • ref to beta carotene/golden rice • reduction in vitamin A deficiency/improvement in health <p><u>reference to GM bacteria</u></p> <ul style="list-style-type: none"> • rapid population growth • increased yield (of product) • named GM characteristic e.g. insulin production • no animals harmed/used in production • less side effects (than bovine insulin) • suitable for use by vegans (no animal products) <p><u>reference to GM animals</u></p> <ul style="list-style-type: none"> • production of hormones / named GM product <p><u>Disadvantages</u></p> <ul style="list-style-type: none"> • reference to cross-pollination/gene transfer • production of superweeds/plants with GM characteristics • greater competition between plant species • reduction in biodiversity/non-target organisms harmed/ negative impact on food chains • long term effects on human health unknown/side effects/allergies • expensive to produce/buy • reliance on GM companies (for GM seeds) • farmers cannot afford to buy them • risks in culturing microorganisms | (6) |
| Level | 0 | No rewardable content |
| 1 | 1 - 2 | <ul style="list-style-type: none"> • a limited discussion including one advantage OR one disadvantage e.g bacteria can produce insulin or genes can transfer to other plants • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy |
| 2 | 3 - 4 | <ul style="list-style-type: none"> • a simple discussion including at least one advantage and one disadvantage OR two advantages OR two disadvantages • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy |
| 3 | 5 - 6 | <ul style="list-style-type: none"> • a detailed discussion including at least two advantages and two disadvantages • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors |

Total for Question 6 = 12 marks

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