



Mark Scheme (Results)

Summer 2018

Pearson Edexcel International GCSE
In Biology (4BI0) Paper 2B

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Publications Code 4B10_2B_1806_MS

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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.
- 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.

| Question number | Answer | Notes | Marks |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1(a) | 1. less surface area; 2. (fewer) stomata; 3. (less) <u>transpiration</u> / <u>evaporation</u> ; | because they won't have leaves which have lots of stomata used in water loss = 1 leaves have stomata which allow water to pass through in transpiration = 2 without leaves the surface area for transpiration is reduced = 2 | max 2 |
| (b) | 1. obtain (more) water from <u>deep</u> / eq; 2. anchorage; | 1. Ignore underground | max 1 |
| (c) (i) | 1. (less) light (absorbed) / (less) chlorophyll / (fewer) chloroplasts; 2. (less) carbon dioxide (absorbed); 3. (less) photosynthesis; | 2. Ignore gas exchange | max 2 |

| | | | |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-------|
| (ii) | <ol style="list-style-type: none"> 1. chlorophyll / chloroplasts / photosynthesis in <u>stem</u>; 2. more (sun)light / high temperature / warmer; | Ignore water loss idea / conserve water | max 1 |
| | | | |
| (d) (i) | <ol style="list-style-type: none"> 1. <u>activates enzymes</u> / <u>enzymes</u> in solution / <u>enzymes</u> dissolved; 2. digestion / breakdown / hydrolysis of <u>starch</u> / <u>lipid</u>; 3. respiration; 4. softens testa / allow seed coat to split; | | max 2 |
| (ii) | <ol style="list-style-type: none"> 1. temperature / warmth / heat / eq; 2. oxygen; 3. (sun)light; | 1. Ignore <u>high</u> temperature | max 2 |
| (e) | water / rain available for short time / rains for short duration / eq; | Ignore frequency of rain e.g. doesn't rain often = 0 | 1 |

| | | | |
|-----|-------|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| (f) | (i) | <u>asexual</u> ; | 1 |
| | (ii) | 1. survive drought / lack of water / eq; 2. no need for insects / pollinator; 3. <u>adapted</u> (to the desert); | 2. Ignore pollination 2. Allow insect (pollination) max 1 |
| | (iii) | runner / corm / rhizome / tuber / eq; | Ignore budding / cuttings 1 |

| Question number | Answer | Notes | Marks |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 2(a) | faeces / excrement; | | 1 |
| (b) | 1. (more) bacteria / microorganisms; 2. respiration (by bacteria / microorganisms); 3. use oxygen / less oxygen / anoxic / eq; 4. death of organisms; | 1. Ignore decomposers / fungi 2. only give if linked to bacteria / microorganisms 4. do not award if linked to disease / poisoning | max 3 |

| Question number | Answer | Notes | Marks |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-------|
| 3 (a) | 1. <u>kill insects</u> / <u>pests</u> / death of <u>insects</u> / <u>pests</u> ; 2. prevent eating; 3. (increase) growth / yield; | 1. Ignore reduce predation 2. Ignore prevent damage | max 2 |

| | | | |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---|
| (b) (i) | <ol style="list-style-type: none">1. restriction (enzyme) / restriction (endonuclease) to cut gene / allele / DNA <u>for pyrethrin</u> / <u>pesticide</u>;2. use of <u>plasmid</u>;3. use of ligase (to join DNA); | 1. Allow restrictive | 3 |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---|

| | | | |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|--------------|
| (ii) | <ol style="list-style-type: none"> 1. supply air / oxygen for respiration; exclude oxygen for anaerobic respiration 2. use air filter to remove microorganisms / to prevent contamination / to prevent competition; 3. nutrients / named nutrient for growth / <u>glucose</u> for respiration; 4. stirrer / paddles to mix contents / prevent settling / distribute heat; 5. cooling (water) jacket to maintain temperature / control temperature / avoid getting too hot; 6. acid/alkali/buffer addition to control pH / maintain pH / provide optimum pH; 7. steam to sterilise / steam to produce aseptic conditions / to remove microorganisms / to prevent contamination / to prevent competition; | <p>4. Ignore distribute temperature</p> | <p>max 4</p> |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|--------------|

Total 9 marks

| Question number | Answer | Notes | Marks |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|-------|
| 4(a) | 1. starch; 2. cellulose; 3. sucrose / glucose / maltose / fructose / eq; | 3. Ignore sugar | max 2 |
| (b) | secondary consumers / 2 ⁰ consumers; | | 1 |
| (c) (i) | (21 ÷ 20 810 x 100) 0.1 / 0.10 / 0.101;; | Allow one mark for 21 ÷ 20 810 in working or 0.1009130226 / 0.1009 | 2 |
| (ii) | 1. heat loss / respiration; 2. movement / muscle contraction; 3. (not) eaten / teeth / bones / hair / death / eq; 4. (not) digested / egestion / faeces / assimilated / absorbed / eq; 5. excretion / urine; | 4. excrete faeces = 1 | max 3 |

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|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| (d) | <ol style="list-style-type: none"> 1. fill tube with stated volume / stated mass of water; 2. hold burning plants beneath water; 3. allow plant to burn completely / relight; 4. measure temperature before and after; 5. energy content is temp change x mass of water (x 4.2); 6. repeat / calculate average; 7. measure mass of sample / plants / calculate energy value per g; | <ol style="list-style-type: none"> 1. must give number 5. Allow temp rise / difference / increase 5. Allow volume of water | max 5 |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|

Total 13 marks

| Question number | Answer | Notes | Marks |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------|
| 5(a) (i) | 1. control; 2. compare with A and B / show changes are due to <u>leaf</u> / see if colour changes with no <u>leaf</u> / see if no change without <u>leaf</u> / eq; | Allow organism / plant | 2 |
| (ii) | temperature affects photosynthesis / to see if temperature changes / stays the same / stays constant; | Ignore control temperature / monitor temperature | 1 |
| (iii) | light (intensity); | | 1 |
| (b) (i) | 1. photosynthesis; 2. absorbs CO ₂ / eq; | there is less CO ₂ because plant is photosynthesising = 2 | 2 |
| (ii) | 1. respiration; 2. releases CO ₂ / eq; | | 2 |

| | | | |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-------|
| (c) | <ol style="list-style-type: none"> 1. in light + in dark / range of light intensities / colours; 2. (measure) starch / glucose / oxygen; 3. iodine / Benedict's / count bubbles / volume; 4. control <u>species</u> / named species / leaf area / carbon dioxide / temperature / eq; | <ol style="list-style-type: none"> 4. Allow Canadian Pondweed / Elodea 4. Ignore pondweed | max 4 |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-------|

Total 12 marks

| Question number | Answer | Notes | Marks |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 6 (a) | A sweat glands / sweat duct; B capillary / shunt vessel / blood vessel / arteriole; C hair / follicle; | A Ignore sweat pore C Ignore hair muscle / hair cell | 3 |
| (b) | 1. <u>vasoconstriction</u> ; 2. less <u>blood</u> to skin (surface) / more blood to body; 3. hair / C erects / eq; 4. <u>contraction</u> of (erector) muscle / eq; 5. traps air / insulates; 6. less heat loss / less radiation / less convection; | 1. Allow for any blood vessel 2. do not award if blood vessel moves away from surface 5. Ignore traps heat 6. do not award if linked to sweating | max 5 |

Total 8 marks

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