

Mark Scheme (Results)

Summer 2015

Pearson Edexcel International GCSE
Biology (4BI0) Paper 1B
Science Double Award (4SC0) Paper 1B

Pearson Edexcel Level 1/Level 2 Certificate
Biology (KBI0) Paper 1B
Science (Double Award) (KSC0) Paper 1B

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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 | <p style="text-align: center; font-size: small;">4BI0 2015 May/June Paper 1 GradenMax</p> | <p>5 = 4 4 = 3 3 or 2 = 2 1 = 1</p> | 4 |

Total 4 marks

| Question number | Answer | Notes | Marks |
|-----------------|--|-------|-------|
| 2(a)(i) | tissue(s) that carry out (same) function / <u>different</u> cell types that carry out (same) function / eq; | | 1 |
| (ii) | heart; | | 1 |
| (iii) | 1. nervous / CNS; 2. breathing / respiratory / ventilation; 3. digestive; 4. excretory / urinary; 5. skeletal; 6. endocrine / hormonal; | | 3 max |
| (iv) | reproductive / immune / lymphatic; | | 1 |

(b)

| Process | Name of organ |
|--------------------------------|----------------------|
| ultrafiltration | kidney; |
| ventilation | lung; |
| secretion of insulin | pancreas; |
| secretion of hydrochloric acid | stomach; |
| bile production | liver; |

5

| Question number | Answer | Notes | Marks |
|-----------------|--|--|-------|
| 3(a) (i) | T; U; | T and any = 1 U and any = 1 U, T and any = 1 P, Q and T = 0 Ignore R so U, T and R = 2 | 2 |
| (ii) | poor vision / CEA / Collie eye anomaly / defect; | | 1 |
| (iii) | (cross) S / dd + Dd / Dd + dd; | | 1 |
| (iv) | Dd / heterozygous / dD; | Allow Dd , Dd, Dd, Dd | 1 |
| (b) (i) | sperm(s) / spermatozoa; | Ignore X and Y | 1 |
| (ii) | egg(s) / ova / ovum; | Ignore X / Reject ovule | 1 |
| (iii) | fertilisation; | | 1 |
| (iv) | uterus / womb; | | 1 |

| Question number | Answer | Notes | Marks | | | | | | | | | | | | |
|-----------------|---|--|------------------------|-------------------------------------|---------|-------|-----------|--------|---------|-------------------|-------|--|-----------|--|---|
| 5(a) | 1. iodine; 2. blue / black / blue black = starch; 3. Benedict's / eq; 4. heat / use water bath / eq; 5. red / orange / yellow / green = glucose; | if iodine for glucose goes blue black = 0 only award Mp1 and Mp3 if linked to correct test heat must be linked to Benedict's | 4 max | | | | | | | | | | | | |
| (b) | <table border="1" data-bbox="320 722 1303 1126"> <thead> <tr> <th data-bbox="320 722 640 834">Group</th> <th data-bbox="640 722 983 834">Example from the group</th> <th data-bbox="983 722 1303 834">Molecule used to store carbohydrate</th> </tr> </thead> <tbody> <tr> <td data-bbox="320 834 640 903">animals</td> <td data-bbox="640 834 983 903">(cat)</td> <td data-bbox="983 834 1303 903">glycogen;</td> </tr> <tr> <td data-bbox="320 903 640 971">plants</td> <td data-bbox="640 903 983 971">(maize)</td> <td data-bbox="983 903 1303 971">starch / sucrose;</td> </tr> <tr> <td data-bbox="320 971 640 1126">fungi</td> <td data-bbox="640 971 983 1126">nucor / yeast / mushroom / mould / eq;</td> <td data-bbox="983 971 1303 1126">glycogen;</td> </tr> </tbody> </table> | Group | Example from the group | Molecule used to store carbohydrate | animals | (cat) | glycogen; | plants | (maize) | starch / sucrose; | fungi | nucor / yeast / mushroom / mould / eq; | glycogen; | Ignore in plants sugar / glucose / fructose Allow <i>Fomes formentarius</i> / eq | 4 |
| Group | Example from the group | Molecule used to store carbohydrate | | | | | | | | | | | | | |
| animals | (cat) | glycogen; | | | | | | | | | | | | | |
| plants | (maize) | starch / sucrose; | | | | | | | | | | | | | |
| fungi | nucor / yeast / mushroom / mould / eq; | glycogen; | | | | | | | | | | | | | |

4BI0 | 2015 | May/June | Paper 1 | GradeMax

Total 8 marks

| Question number | Answer | Notes | Marks |
|-----------------|---|---|-------|
| 6(a) | 1. other pollutants / nitrate / sediment in lake / eq; 2. only done once / reliability / different part of lake may vary / eq; 3. different sized disks may have been used; 4. different light conditions / time of day / time of year / weather / ripples / eq; 5. different people / different eyesight / poor vision / eq; | Ignore plants in lake / microorganisms Ignore human error | 2 max |
| (b)(i) | 1. as level of phosphate increases Secchi depth / visibility decreases / eq; 2. reference to Secchi depth levelling from 1990 / 5.0m / phosphate 140-142 onwards; | Allow 1993 / 4.5m / 155-157 | 2 |
| (ii) | 1. algae growth / plant growth / algal bloom / eq; 2. block light / eq; 3. plant death / no photosynthesis; 4. bacteria / microbes / decomposers / microorganisms / eq; 5. less oxygen / anoxic eq; 6. respiration; | phosphate makes the water cloudy so no light can get through to plants = 1 Ignore eutrophication | 5 max |
| (c)(i) | 22; | | 1 |
| (ii) | October; | | 1 |

| Question number | Answer | Notes | Marks |
|-----------------|--|--|-------|
| (d)(i) | depth is 0.5 / depth is less than 1.0 / less than minimum depth / disk not seen below 1.0m / eq; | allow idea of 'above' if clearly writing about nearer surface | 1 |
| (ii) | only one below 1.0 / second reading above 1.0 / <u>result</u> not repeated / could be an anomaly / some other months only had one reading / not enough readings made / eq; | Ignore only one reading made Ignore comments about change to turbidity / sand being disturbed Ignore human error | 1 |

| Question number | Answer | Notes | Marks |
|-----------------|---|---|-------|
| 7(a)(i) | none / zero / 0 / 0mg; | | 1 |
| (ii) | increase / eq; | | 1 |
| (b)(i) | lots of cows / group / eq; | repeat not qualified = 0 | 1 |
| (ii) | 1. species / breed / type of cow / eq; 2. age / mass / size; 3. food / grass / eq; 4. water; 5. (air) temperature; | Ignore gender Ignore number in group Ignore conditions / environment | 2 max |
| (c)(i) | <u>denatured</u> ; | Ignore broken down / stops working / active site changes shape Reject killed | 1 |
| (ii) | 1. <u>HCl</u> / <u>hydrochloric acid</u> ; 2. enzyme / protease / pepsin; 3. breakdown / digest 4. (acid) <u>denatures</u> growth hormone; | Mp1 Ignore low pH / acid | 3 |

| | | | |
|-----|---|--|-------|
| (d) | 1. gene / allele / DNA for growth hormone ; 2. restriction (endonuclease); 3. ligase; 4. plasmid; 5. vector; 6. recombinant; | | 4 max |
|-----|---|--|-------|

| Question number | Answer | Notes | Marks |
|-----------------|--|--|-------|
| 8(a) | 1. scale linear for numbers on y axis and uses half grid; 2. x axis labelled year(s) or 1969-73; 3. y axis labelled number of heart attacks; 4. units as per 100 000; 5. plotted correctly; 6. key for men and women; | Line graph lose 1 for plotting Allow Mps 1, 2 and 3 if plotted horizontally | 6 |
| (b) | men higher / women lower / eq; men decreased / little change in women / women increased in recent years / women fluctuate / eq; | | 2 |
| (c) | less smoking / less fat in diet / less alcohol / less salt / more exercise / eq; 4BI0 2015 May/June Paper 1 GradeMax | Ignore better healthcare / medicine / education / alone Ignore stress eat more healthily = 0 Allow more aware of effects of smoking | 1 |

| | | | |
|-----|--|----------------|-------|
| (d) | <ol style="list-style-type: none">1. less oxygen;2. less (aerobic) respiration;3. <u>anaerobic</u> respiration;4. lactic acid / low pH;5. enzymes denatured; | Ignore glucose | max 3 |
|-----|--|----------------|-------|

Total 12 marks

| Question number | Answer | Notes | Marks |
|-----------------|--|---|-------|
| 9(a)(i) | 1. <u>upper</u> epidermis; 2. transparent / lets light through / no chloroplasts; | waxy cuticle is transparent = 1 | 2 |
| (ii) | 1. palisade; 2. densely packed / aligned vertically / eq; 3. idea of <u>many</u> / <u>lots</u> of chloroplasts; 4. absorb / take in / trap light; | ignore lots of chlorophyll | 3 max |
| (iii) | 1. spongy; 2. <u>air</u> spaces; 3. diffusion / movement of gases / gas exchange / eq; 4. xylem / vascular bundle; 5. transport water; | Ignore phloem | 3 max |
| (iv) | 1. guard cell; 2. open / close; 3. let in carbon dioxide / water loss / transpire / evaporate / eq; | Ignore stomata Ignore gas exchange | 2 max |
| (b) | 1. lower surface in water / upper surface exposed to air; 2. allows carbon dioxide in; 3. allows transpiration evaporation / water loss / eq; | Ignore gas exchange Allow converse for Mps 2 and 3 | 2 max |
| (c)(i) | 20; | | 1 |
| (ii) | fewer/no stomata / holes / pores / guard cells; | | 1 |

| Question number | Answer | Notes | Marks |
|-----------------|---|---|-------|
| 10 (a) | A urethra; B vas deferens / sperm duct / seminal duct; C testis / testes / testicle / epididymis; | Reject ureter / ureta Reject scrotum | 3 |
| (b) | 1. prevent sperm leaving penis / leaving urethra; 2. no fertilisation / fusion / sperm can't reach / eq; | Allow no sperm in semen | 2 max |
| (c) | 1. testes outside / ovaries inside; 2. can use local anaesthetic / no major surgery / less risk/ safer / less invasive/does not affect other organs/ eq; 3. possible to reverse / eq; | not just easier to access | 2 max |
| (d) | 1. testosterone; 2. sperm development production / eq; 3. secondary sexual characteristics / one named secondary sexual characteristic; 4. sex drive / aggression / eq; | If name of hormone incorrect max 2 | 3 max |

| Question number | Answer | Notes | Marks |
|-----------------|---|--|-------|
| 11(a) (i) | nitrate; | | 1 |
| (ii) | 1. amino acids; 2. protein; | | 2 |
| (b) | rye; | | 1 |
| (c) | different species / different soil contents in lowland and upland / soil erosion / leaching / eq; | Allow different minerals as eg soil contents | 1 |
| (d) (i) | fresh mass includes water / dry mass excludes water / water content may vary / eq; | Allow moisture | 1 |
| (ii) | 1. weigh sample (before or after) / use a balance ; 2. heat / oven / warm place / eq; 3. until mass stays same / eq; | | 2 |
| (e) | 1. % allows for comparison; 2. of different sized plants / of different (starting) masses / weights / of different yield / eq; | | 2 |

| | | | |
|-----|--------------------------------------|--|---|
| (f) | 42 / 41.7 / 41.67 / 41.6 recurring;; | Allow $5 \div 12 = 1$ for working $41.667 = 1$ 41.6 alone with no working =0 | 2 |
|-----|--------------------------------------|--|---|

Total 12 marks

| Question number | Answer | Notes | Marks |
|-----------------|---|---|-------|
| 12 | C garlic and no garlic / different amount / mass of garlic; O same age / species / same gender of <u>mosquito</u> / eq; R lots of people / repeat / eq; M1 count number of mosquito bites / landing / eq; M2 per hour / day / same time period stated; S1 and S2 same light / same temperature / same time of year / same diet of people / same gender or age or mass of people / same clothing or exposure of skin / same number of mosquitoes / eq;; | Ignore location / place / room/ environment | 6 max |

Total 6 marks

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