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Mark Scheme (Results)

Summer 2014

Pearson Edexcel Certificate GCSE Biology (KBI0) Paper 2B

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

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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.

Placing a mark within a level mark band

- The instructions below tell you how to reward responses within a level. Follow these unless there is an instruction given within a level. However, where a level has specific guidance about how to place an answer within a level**, always** follow that guidance.

- **2 mark bands**
  Start with the presumption that the mark will be the higher of the two.
  An answer which is poorly supported gets the lower mark.

- **3 mark bands**
  Start with a presumption that the mark will be the middle of the three.
  An answer which is poorly supported gets the lower mark.
  An answer which is well supported gets the higher mark.

- Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

  i) ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear

  ii) select and use a form and style of writing appropriate to purpose and to complex subject matter

  iii) organise information clearly and coherently, using specialist vocabulary when appropriate.

Question number	Answer	Notes	Marks
1 (a)	(transfer) pollen from anther to stigma;	ignore stamen to carpel/style ignore male to female gamete	1
(b)	1. to make honey / food; 2. sugar(y) / sucrose / glucose / fructose; 3. energy / respiration;	 2. ignore carbohydrate	2
(c)	(can) produce offspring / (can) reproduce / eq;	ignore egg / gamete / babies / children production ignore fertilisation	1
(d)	1. mutation; 2. (different) allele / different version of a gene / DNA / genetically different / eq; 3. resistant / resistance; 4. idea of survival; eg not all die from disease	 2. ignore different gene 3. ignore immune	2
(e)	16;		1

Question number	Answer	Notes	Marks
(f)	1. the number of drones the queen mates with / queen may mate with different drones; 2. each drone has a different set of alleles / is genetically different; 3. (queen's eggs made by) meiosis / have different alleles / eq;	ignore bees ignore mutation ignore genes	2
(g)	1. disease resistant; 2. large quantity of honey / beeswax ; 3. ability to collect nectar; 4. fecundity / more bees / eq; 5. less aggressive / eq;	1. ignore immune / combat disease / live longer / hardier 2. ignore taste / flavour / quality of honey	2

(Total for Question = 11 marks)

Question number	Answer	Notes	Marks
2 (a)	A nitrogen fixation / nitrogen fixing; B decomposition / decomposing / decay; C nitrification / nitrifying; D denitrification / denitrifying;	No mark if list given A. allow nitrogen fixing bacteria B. ignore decomposers / rotting / breakdown C. allow nitrifying bacteria D. allow denitrifying bacteria	4
(b)	1. bacteria; 2. fungi;	ignore nitrogen fixing / nitrifying bacteria / denitrifying bacteria / mushroom / toadstool / protoctists / detritivores / worms	2
(c)	1. absorption by roots / root hair cell; 2. active transport / active uptake; 3. (make) amino acids / (plant) protein; 4. assimilation / assimilate; ONCE 5. eaten / ingested by animal / herbivore; 6. digestion / digests / digested / eq; 7. protease / named protease;	1. ignore root nodules 7. ignore enzyme	4

Question number	Answer	Notes	Marks
2 (d)	1. cheaper / readily available / less transport needed / renewable / sustainable / recycles / eq; 2. less eutrophication / leaching / run off / pollution / slow release of ions / less soluble / eq; 3. improves soil structure / holds water / stops erosion / eq;	allow converse ignore less harm to environment / damage to wildlife / more natural / idea that chemicals harm humans	2

(Total for Question = 12 marks)

Question number	Answer	Notes	Marks
3 (a) (i)	heart beat(s) / heart rate;		1
(ii)	1. temperature / light / oxygen / eq; 2. age / size / sex / species / type of *Daphnia*; 3. <u>volume</u> of water / <u>volume</u> of caffeine / <u>volume</u> of solution / <u>concentration</u> of caffeine;	1. ignore water / time 3. ignore amount	1
(iii)	1. accurate / less error / fewer mistakes / less chance of losing count / initial rate consistent / eq; 2. more readings (for replication) / quicker to collect results / less time to collect results / eq; 3. less harm/stress to *Daphnia* / caffeine effect may wear off / eq;	ignore precision allow converse	1
(b)	increases / eq;		1
(c)	(yes) repeated / done 10 times <u>AND</u> similar results (in water/caffeine) / no anomalies;	allow same	1
(d)	adrenalin(e);	allow epinephrine	1

(Total for Question = 6 marks)

Question number	Answer	Notes	Marks
4 (a)	A lens; B cornea; C retina;	A. allow lense C. ignore rods/cones/receptors/fovea	3
(b) (i)	same/similar cells / cells with the same function / all muscle <u>cells</u> / eq;	ignore group of cells alone allow group of cells working together	1
(ii)	1. radial muscles contract / circular muscles relax; 2. <u>pupil</u> dilates / widens / gets bigger / <u>iris</u> gets smaller / eq; 3. more light can enter;		3

(Total for Question = 7 marks)

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>5 (a) (i)</td><td>transfer oxygen / nutrients / named nutrient / water / carbon dioxide / waste / named waste / antibodies / release progesterone;

reject if linked to exchange of blood</td><td>allow examples of named nutrient eg protein
ignore food</td><td>1</td></tr>
<tr><td>(ii)</td><td>cushions / protects (from physical damage) / shock absorber / supports / eq;</td><td>protects must be qualified eg from bumps

ignore keeps fetus safe / insulated</td><td>1</td></tr>
<tr><td>(iii)</td><td>antibodies;</td><td></td><td>1</td></tr>
<tr><td>(b) (i)</td><td>46 / 23 pairs;</td><td></td><td>1</td></tr>
<tr><td>(ii)</td><td><table><tr><th>Sex chromosomes</th><th>tick</th></tr><tr><td>XX</td><td></td></tr><tr><td>X</td><td></td></tr><tr><td>XY</td><td>✓</td></tr><tr><td>YY</td><td></td></tr><tr><td>Y</td><td></td></tr></table></td><td>No mark if more than one tick</td><td>1</td></tr>
</table>

Question number	Answer	Notes	Marks
(c) (i)	1. calcium / Ca; 2. vitamin D; 3. protein;		2
(ii)	1. more mass / heavier / extra weight; 2. growth / development / division / respiration of fetus / eq;	she has a fetus alone = 0 / she needs to feed the fetus = 0 / more energy to carry baby = 0 / energy for fetus = 0 ignore prevent anaemia / more iron for baby	2
(iii)	1. <u>red</u> blood cells; 2. haemoglobin; 3. oxygen; 4. respiration;		3

(Total for Question = 12 marks)

Question number	Answer	Notes	Marks
6 (a)	1. (cut with) scalpel / razor / scissors / knife / eq; 2. (transfer with) tweezers / forceps / eq; 3. <u>sterile</u> apparatus / <u>sterile</u> samples;	1. a cutting is made = 0 3. ignore no microbes / no pathogens	2
(b)	1. nitrate/ammonium for amino acids / proteins / nucleic acid / DNA / genetic material / eq; 2. magnesium for chlorophyll / chloroplast; 3. phosphate for ATP / DNA / cell membranes / eq; 4. <u>glucose/sucrose</u> for energy / ATP / respiration;	1. ignore nitrogen / growth 3. ignore phosphorus allow other named mineral ion with correct function	2
(c)	1. <u>sterile/aseptic</u> conditions/apparatus/samples / fungicide / bacteriocide; 2. temperature / warmth / eq; 3. (sun)light; 4. humidity / water / moisture / eq; 5. plant growth regulators / auxins / eq;	ignore oxygen / CO_2 / pH / minerals / nutrients / pesticide / herbicide / space / overcrowding / protection from snails or predators	3

(Total for Question = 7 marks)

Question number	Answer	Notes	Marks
7 (a)	1. (ears) large surface area / increases SA:VOL; 2. heat loss / cools / eq; 3. have a blood supply / capillaries; 4. <u>vasodilation</u>; not if linked to capillaries/veins 5. flapping / fanning / eq;	ignore shade / thin 2. allow sweating / evaporation	3
(b)	1. enzymes/active site denatured / destroyed; 2. affects reactions / affects metabolism / affects digestion / affects respiration /eq;	ignore dehydration	2

(Total for Question = 5 marks)

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