Mark Scheme (Results)

Summer 2018

Pearson Edexcel International GCSE

In Biology (4BI0) Paper 2BR

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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. protein <u>coat</u> / capsid; 2. nucleic acid / RNA / DNA;		2
(b)	placenta;		1
(c)	1. attenuated virus / harmless virus / weakened virus / inactive virus / attenuated pathogen / harmless pathogen / weakened pathogen / inactive pathogen or antigen; 2. <u>secondary immune response</u>; 3. memory cells; 4. antibodies produced more / faster / sooner / eq; 5. destroy <u>virus</u> / destroy <u>pathogen</u>;	1. Ignore dead virus / dead pathogen 3. Allow memory lymphocytes 5. Ignore kill virus	max 4
(d)	kill <u>species</u> / kill <u>mosquito</u>;	Ignore insects	1

(e)	1. males do not produce sperm / less mating with fertile males; 2. no fertilization / no offspring produced / fewer offspring produced / less reproduction;		2
(f)	1. some feed on nectar / plants / flowers / producers; 2. some feed on blood / humans / animals;		2
(g)	1. distinguish correct species / mosquito / <u>only</u> those that spread Zika; 2. <u>kill</u> / <u>reduce</u> mosquitoes that spread Zika / virus / pathogens / disease / harmful mosquitoes; 3. use less pesticide; 4. affect on food chains; 5. <u>humans</u> not needed / eq;	only kills mosquitoes that spread Zika = 2 2. Allow converse	max 3

Total 15 marks

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>2(a)</td><td>(flower A)

1. large(r) petals / large(r) flower;

2. stamens enclosed / anther enclosed / eq;

3. stigma enclosed / style short(er) / eq;

4. non-feathery stigma / eq;

5. guide lines;</td><td>Allow converse

Ignore colour / nectar / features of pollen</td><td>max 3</td></tr>
<tr><td>(b)</td><td><table><tr><th>Stage</th><th>Order</th></tr><tr><td>pollen tube grows down style</td><td>3</td></tr><tr><td>nuclei move down pollen tube</td><td>4</td></tr><tr><td>pollen grain germinates</td><td>2</td></tr><tr><td>zygote formed</td><td>5</td></tr><tr><td>petals wither</td><td>(6)</td></tr><tr><td>pollen grain lands on stigma</td><td>1</td></tr></table></td><td>4 or 5 correct = 4

3 correct = 3

2 correct = 2

1 correct = 1</td><td>4</td></tr>
</table>

Total 7 marks

Question number	Answer	Notes	Marks
3 (a)	1. Coal tit; 2. needs most energy (per day) / small(est) / least body mass; 3. large(st) surface area to volume ratio; 4. (most) heat loss / hard to stay warm / cannot keep warm / cools faster; 5. (more) respiration;	 4. Ignore if linked to fat / insulation 5. Ignore if linked to fat / insulation	max 4
(b)	1. oxygen for complete <u>food</u> combustion / more <u>food</u> burnt / increases burning of <u>food</u> / <u>complete</u> energy transfer; 2. food enclosed so less energy lost (in transfer); 3. insulation so less heat loss / trap heat / less cooling; 4. lid so less heat loss / trap heat / less cooling; 5. copper pipe / coiled pipe transfers heat (to water) / conducts heat (to water); 6. stirrer distributes heat / distributes temperature;	Allow converse	max 5

Total 9 marks

Question number	Answer	Notes	Marks
4 (a)	27.9% / 27.94 / 28(%);;	Allow one mark for 38 / 0.279 / 0.28 / any more than two decimal places in working	2
(b)	(number of) insect(s) / (population of) insect(s) / eq;		1
(c)	1. several samples / repeat; 2. random; 3. method of randomization; 4. sample at same depth of soil; 5. sample at same time (of year / day / season); 6. same stage of wheat growth / same variety of wheat / same species of wheat;	1. Ignore quadrats alone 3. e.g. number generator	Max 4

(d)	1. breed / cross / mate plants with <u>large grains</u> / eq; 2. use offspring (with large grains) to breed; 3. continue over several generations;	1. Ignore characteristic 1. Allow normal crossed with large grain	max 3

Total 10 marks

Question number	Answer	Notes	Marks
5(a) (i)	1. obesity / overweight / eq; 2. (fat / cholesterol) build up in <u>arteries</u> / block <u>arteries</u>; 3. lead to CHD / high blood pressure / stroke / diabetes / eq;	2. Ignore increase mass / size / get fat 3. Ignore veins	max 2
(ii)	1. contains fibre / roughage; 2. aid peristalsis / movement through gut / prevent constipation;		2
(iii)	1. calcium / vitamin <u>D</u>; 2. bones / skeleton;	milk for bones = 1 Ignore teeth	2
(b)	1. correct proportion / correct amount / suitable amount / sufficient amount / eq; 2. carbohydrate, protein, lipid, vitamins, minerals, fibre and (water)		2

(c)	1. (more) carbohydrate / (more) named carbohydrate / (more) lipid for <u>energy</u> / <u>calories</u> / <u>joules</u>; 2. more protein for <u>muscle</u>;	Allow converse	max 2

Total 10 marks

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>6(a)</td><td>
<table>
<tr><th>Component</th><th>Function</th></tr>
<tr><td>(lymphocytes)</td><td>antibodies / antitoxins / memory cells;</td></tr>
<tr><td>(phagocytes)</td><td>engulf pathogens / named pathogen / phagocytosis / digest pathogens / eq;</td></tr>
<tr><td>plasma;</td><td>(transport urea)</td></tr>
<tr><td>platelets / plasma</td><td>(help in clotting)</td></tr>
<tr><td>(red blood cells)</td><td>transport oxygen;</td></tr>
</table>
</td><td>Reject antigens

Allow ingest

Allow named clotting factors

Allow transport carbon dioxide</td><td>5</td></tr>
</table>

(b)	Red blood cell: 1. no nucleus means more haemoglobin; 2. haemoglobin to transport oxygen; 3. (bi)concave shape / large SA:Vol to absorb oxygen; White blood cell: 4. has nucleus so can divide; 5. large(r) to engulf pathogens / change shape to engulf pathogens; 6. has nucleus so can produce antibodies;		max 4

Total 9 marks

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