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Mark Scheme (Results)

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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)	goshawks / bird of prey / named bird of prey;		1
(b)	1. small(er) SA:VOL; 2. less heat loss / retain heat / keep warm; 3. more fat / food reserves; 4. (for) respiration / energy / insulation;	1. allow larger VOL:SA 4. must be linked to Mp3	2
(c)	1. more food / seeds / eq; 2. warmer / not cold / eq;	ignore in good condition ignore lack of predators	2
(d) (i)	(place/area/environment) where organisms/plants/animals/population/community live / eq;		1
(ii)	number / how many / all / amount OF same / a / one / the species;	allow number of red/grey squirrels ignore number of squirrels ignore number of species	1
(e)	5.3(03)%;;	one mark for 2 640 000 in working	2
(f)	1. better competitors / outcompete / eq; 2. more resistant to disease; 3. better camouflage / description of camouflage / eq; 4. fewer predators / not eaten by goshawks / eq; 5. fecundity / reproduce more / eq;		2

(g)	1. study area with red AND study area with grey squirrels; 2. count / record / compare number of woodland birds; 3. same area / type / sample of woodland / eq; 4. reference to time; 5. idea of repeating;	2. monitor = 0 allow count / record with any method	3
(h)	1. trap / shoot / poison / kill / hunt grey squirrels / eq; 2. (captive) breeding of red squirrels / cloning / zoos / selective breeding; 3. provide more food / pine cones / seeds; 4. set up nature reserves / fencing / move to place with no grey squirrels / eq; 5. biological control / shoot goshawk; 6. vaccination / antibiotic;	4. eg restrict human access	2

(Total for Question 1 = 16 marks)

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>2 (a)</td><td>
<table>
<tr><th>Process</th><th>genetic variation in offspring</th></tr>
<tr><td>runners producing new plants</td><td>(x)</td></tr>
<tr><td>micropropagation</td><td>x</td></tr>
<tr><td>wind-pollination</td><td>✓</td></tr>
<tr><td>taking cuttings</td><td>x</td></tr>
<tr><td>self-pollination of a flower</td><td>✓</td></tr>
</table>
</td><td></td><td>4 correct = 3
2 or 3 correct = 2
1 correct =1</td></tr>
<tr><td>(b)</td><td>1. male gamete/sperm/nucleus AND
female gamete/egg/nucleus /
haploid / 23 chromosomes;
2. fuse / join / combine / eq;
3. zygote / diploid / 46 chromosomes;
4. mitosis / cell division;
5. three times / 2, 4 then 8 / three divisions;</td><td></td><td>4</td></tr>
</table>

(Total for Question 2 = 7 marks)

Question number	Answer	Notes	Marks
3 (a) (i)	obtain light for photosynthesis;		1
(ii)	1. light / lamp; 2. dark room / even illumination / same light intensity everywhere / eq;	ignore temperature / species / water	2
(iii)	plant upright / clinostat / not on its side / eq;	allow answers that describe a clinostat	1
(b) (i)	less/no transpiration / less water loss / less evaporation / prevent wilting / prevent flaccid cells / eq;	ignore drying out	1
(ii)	1. less/no carbon dioxide; 2. photosynthesis; 3. less glucose / starch / carbohydrate; 4. less cooling / less transport of water / less transport of mineral ions;	ignore ref to gas exchange unqualified ignore respiration	2

(Total for Question 3 = 7 marks)

Question number	Answer	Notes	Marks
4 (a) (i)	<u>length</u> of egg white;		1
(ii)	1. repeated / five tubes used / eq; 2. similar pattern / no anomalies / small range / eq;		2
(iii)	ruler / scale / eq;	must state apparatus	1
(b) (i)	1. no enzyme / no protease / no named protease; 2. no digestion / no break down;	ignore no change in length allow converse	2
(ii)	1. enzyme denatured / changed active site / enzyme destroyed; 2. high temperature / heat / eq;	2. ignore boiled	2
(c)	1. acid and alkali / range of pH / different pHs / change pH; 2. no boiling of pancreas juice; 3. same <u>volume</u> of juice/enzyme / same <u>concentration</u> of juice/enzyme;	3. ignore amount	2

(Total for Question 4 = 10 marks)

Question number	Answer	Notes	Marks
5 (a) (i)	pancreas;	allow pancrease	1
(b)	1. lower / reduce / regulate / maintain / control / eq; 2. <u>blood</u> sugar / <u>blood</u> glucose; 3. glycogen;	blood glucose to glycogen = 2 excess glucose to glycogen =1 released when glucose levels are high = 1	2
(c) (i)	1. <u>human</u> gene / <u>human</u> DNA / <u>human</u> allele; 2. restriction / endonuclease; 3. <u>plasmid</u>; 4. <u>vector</u>; 5. <u>same</u> restriction enzyme; 6. recombinant; 7. ligase;	gene for insulin = 0 human gene for insulin = 1	5
(ii)	D - transgenic;		1
(d) (i)	1. oxygen / aerobic ; 2. respiration;		2
(ii)	1. less/no insulin / less production; 2. fewer bacteria / kill bacteria / eq; 3. enzymes; 4. (not) optimum pH; 5. denatured / changed active site / destroyed;		4

(Total for Question 5 = 15 marks)

Question number	Answer	Notes	Marks
6	1. magnesium; 2. chlorophyll / chloroplasts; 3. nitrate; 4. amino acids / proteins / DNA / genetic material; 5. minerals / ions / salts / other named mineral / fertiliser / eq; 6. (sun)light; 7. carbon dioxide; 8. warmth / temperature / eq; 9. enzymes;	ignore nutrients / water / pH / oxygen / herbivores NPK = 0 NPK fertiliser = 1 nitrogen for amino acids = 1	5

(Total for Question 6 = 5 marks)