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Mark Scheme (Results)
January 2015

Pearson Edexcel International GCSE in Biology (4BI0) Paper 1B

Pearson Edexcel Certificate GCSE in Biology (KBI0) 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.

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>1 (a)</td><td>
<table>
<tr><th>Effect</th><th>Name of hormone</th><th>Source</th></tr>
<tr><td>converts glucose to glycogen</td><td>(insulin)</td><td>(pancreas)</td></tr>
<tr><td>stimulates male secondary sexual characteristics</td><td>testosterone;</td><td>(testis)</td></tr>
<tr><td>increases permeability of the collecting duct</td><td>ADH;</td><td>hypothalamus / pituitary;</td></tr>
<tr><td>repairs uterus lining</td><td>oestrogen;</td><td>ovary;</td></tr>
</table>
</td><td>Allow reasonable spellings</td><td>5</td></tr>
</table>

Question number	Answer	Notes	Marks
(b)	1. soluble / dissolves; 2. osmotic effect / eq;	Ignore small	2
(c)	X;		1

Total 8 marks

Question number	Answer	Notes	Marks
2 (a)	easier to see / no need to stain / contrast / cytoplasm is red / eq;		1
(b) (i)	1. movement of <u>water</u>; 2. from dilute to more concentrated solution / eq; 3. through partially permeable membrane / eq;		2
(ii)	(in distilled water) 1. water into cells; 2. outside solution/distilled water more dilute / down concentration gradient / eq; 3. cell membrane against cell wall / eq; 4. <u>turgid</u>; (allow converse in salt solution for each point) 1. water leaves cell; 2. outside solution/distilled water less concentrated / eq; 3. cell membrane shrinks away from cell wall /eq 4. <u>plasmolysed</u> / <u>flaccid</u>;		4
(c)	1. water into red blood cell / eq; 2. cells burst / haemolysis / eq; 3. no cell wall;		2

Total 9 marks

Question number	Answer	Notes	Marks
3(a) (i)	safety glasses / wear gloves ;	Ignore lab coat / tie hair back / eq	1
(ii)	11/ eleven;		1
(b) (i)	remove starch / solution from surface of syringe / eq;	Ignore get into syringe	1
			1
(ii)	mix <u>contents</u> / mix <u>amylase and starch</u> / eq;	Mix alone = 0 Allow enzyme and starch	1
(iii)	keep at correct temperature / keep temperature constant / eq;	Ignore fair test	

(c) (i)	1. volume / concentration of amylase; 2. volume / concentration of starch; 3. volume / concentration of iodine / drops of iodine; 4. volume / concentration of mixture;	Allow amount only once	2
(ii)	temperature;	Ignore time	1
(d)	1. 6 minutes / between 5 and 6 minutes / eq; 2. iodine stays yellow / orange / brown / iodine stays same colour / colourless / not blue black; 3. no starch present; 4. digested/broken down ;	Reject 6-7 mins	3

Question number	Answer	Notes	Marks
(e)(i)	1. fewer wells with blue black colour / more wells yellow / orange / brown / colourless / eq; 2. starch digested sooner / quicker / reaction completed sooner / eq;		2
(ii)	1. enzymes work faster at 40^0C / ref to optimum / eq; 2. more (kinetic) energy / molecules move faster / eq; 3. more collisions / more enzyme substrate complexes /eq;	Ignore ref to denature	2

Total 15 marks

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>4
(a)</td><td>1. narrower lumen / eq;
2. thicker wall;
3. more muscle / stronger muscle / eq;
4. more elastic;
5. no valves;</td><td>Ignore blood flow

Allow converse</td><td>2</td></tr>
<tr><td>(b)(i)</td><td><table><tr><th>Name of blood vessel</th><th>Letter</th></tr><tr><td>vena cava</td><td>L or N</td></tr><tr><td>aorta</td><td>C;</td></tr><tr><td>pulmonary vein</td><td>B;</td></tr><tr><td>hepatic artery</td><td>D;</td></tr><tr><td>renal vein</td><td>I;</td></tr></table></td><td>Reject B and D and B or D</td><td>4</td></tr>
<tr><td>(b)(ii)</td><td><table><tr><th>Contents of blood vessel</th><th>Letter of blood vessel</th></tr><tr><td>contains the most glucose after a meal</td><td>J;</td></tr><tr><td>contains the least urea</td><td>I;</td></tr><tr><td>contains the least oxygen</td><td>M;</td></tr></table></td><td></td><td>3</td></tr>
</table>

Total 9 marks

Question number	Answer	Notes	Marks
5	1. high **humidity decreases rate;** 2. reduced concentration gradient / eq; 3. high **wind increases rate** ; 4. increased concentration gradient / eq; 5. high **temperature increases rate** ; 6. more (kinetic) energy / more evaporation / eq; 7. high **light increases rate** ; 8. stomata open / eq;	One mark for condition and change in transpiration second mark for explanation of change Allow converse throughout	5

Total 5 marks

Question number	Answer	Notes	Marks
6 (a)	1. lower production / fewer fruit / less growth / eq; 2. (fewer) chloroplasts / less chlorophyll; 3. (less) photosynthesis; 4. (less) carbohydrate / glucose / starch;		3
(b) (i)	1. variation; 2. mutation; 3. rare / random: 4. survive / not killed; 5. reproduce / mates; 6. pass on <u>gene</u> / <u>allele</u> / eq;	4. Ignore resist 6. Ignore characteristic	4
(ii)	inside leaf / not reach all parts / eq;		1
(c)	<u>biological</u>;		1
(d)	1. no sperm / less reproduction / less breeding / eq; 2. fewer eggs/females fertilised / fewer larvae; 3. sterile male compete for resources / mates;		2

Question number	Answer	Notes	Marks
(e)	C plus pheromone/smell and minus pheromone/smell / traps in field / no traps / eq; O same species of insect/males (trapped) / same species/size of crop / eq; R several traps / repeat / many fields; M1 count number trapped / measure damage / measure yield / eq; M2 time period <u>stated</u>; S1 and S2 same temperature / light / water / time of year / location/size of field / number of plants / size of trap / eq;;		6

Total 17 marks

Question number	Answer	Notes	Marks
7(a)	1. broken down / digested; 2. bacteria / fungi / microorganisms / saphrophytes / eq;	Ignore eaten	2
(b)	1. (dead) plants / humus then earthworms then birds; 2. arrows correct;	Earthworms in middle =1	2
(c) (i)	20;		1
(ii)	C;		1
(iii)	(yes) not enough repeats / may be anomalous / eq;	Ignore not enough soil	1

Total 7 marks

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>8 (a)</td><td>
<table>
<tr><th>Large food molecule</th><th>Enzyme involved in digestion</th><th>Small food molecule produced</th></tr>
<tr><td>starch</td><td>amylase</td><td>glucose / maltose;</td></tr>
<tr><td>protein;</td><td>protease</td><td>amino acids / polypeptides / peptides;</td></tr>
<tr><td>lipid</td><td>lipase;</td><td>fatty acids / glycerol;</td></tr>
</table>
</td><td>Ignore simple sugars</td><td>5</td></tr>
<tr><td>(b)</td><td>1. large surface area / microvilli;
2. thin / short diffusion distance / eq;
3. blood / capillaries / eq;
4. permeable;
5. lacteal;</td><td>Ignore many villi / long villi</td><td>3</td></tr>
</table>

Total 8 marks

Question number	Answer	Notes	Marks
9(a)	1. water; 2. minerals / ions / salts / named mineral ion / eq;	 Ignore nutrients Allow 2 marks for 2 named minerals;	2
(b)	1. shape; Then max 4 from: 2. cell wall; 3. cell membrane; 4. cytoplasm; 5. nucleus; 6. vacuole;	Palisade cell labelled = max 4	5

Total 7 marks

Question number	Answer	Notes	Marks
10(a) (i)	47;		1
(ii)	male;		1
(b)	1. has more than 46 / has extra chromosome / trisomy; 2. (which is) sex chromosome / Y / eq;	Ignore 47 alone Has an extra sex chromosome =2	2
(c) (i)	meiosis;		1
(ii)	1. failure of chromosomes to separate / eq; 2. (gamete) has an extra chromosome / YY; 3. normal egg/gamete fertilised by abnormal sperm/gamete;		2

Total 7 marks

Question number	Answer	Notes	Marks
11(a)	P mm Mm; G m M m; O Mm mm; Ph Marfan / eq unaffected;	G. Clear separation of gametes Ph. Allow half Marfan and half unaffected even if not linked to genotypes Allow max from Punnett square Allow 3 max for TE Allow other symbols	4
(b) (i)	some people do not have obvious symptoms / some people with symtoms/long fingers/tall do not have condition / heart problems/eyesight problems may have other causes / eq;		1
(ii)	1. look at parents / family history; 2. genetic test / analyse DNA / eq; 3. look for combination of symptoms / look for tall and eyesight / eq;	3. Allow any 2 symptoms	2

Question	Answer	Notes	Marks
(c)	1. condition present in offspring but not in parents; 2. it skips generations / eq; 3. carriers (present);		3

Total 10 marks

Question number	Answer	Notes	Marks
12	environment; population; community; quadrat; random / different; average / mean; reliability; anomalous / unusual / odd ;		8

Total 8 marks

Question number	Answer	Notes	Marks
13(a)	1. explants; 2. small pieces of tissue / small pieces of plant / eq; 3. agar / jelly; 4. contains nutrients / amino acids / glucose; 5. plant hormones / named hormone / eq; 6. minerals / named mineral; 7. sterile; 8. control light; 9. control humidity;		Max 5
(b)	1. quick / eq; 2. many produced; 3. any time of year; 4. no genetic variation / genetically identical / produce clones;	Allow converse	Max 2

Total 7 marks

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>14</td><td>
<table>
<tr><th rowspan="2">Structure</th><th colspan="3">Organism</th></tr>
<tr><td>bacteria</td><td>fungi</td><td>viruses</td></tr>
<tr><td>cell wall</td><td>✓</td><td>✓</td><td>×;</td></tr>
<tr><td>nucleus</td><td>×</td><td>✓</td><td>×;</td></tr>
<tr><td>chloroplast</td><td>(✓)</td><td>×</td><td>×;</td></tr>
</table>
</td><td>If no X s and all ✓ in correct places allow Max 2</td><td>3</td></tr>
</table>

Total 3 marks

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