Mark Scheme (Results)

Summer 2014

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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Summer 2014
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<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>name of process</th><th>description of process</th></tr>
<tr><td><u>ingestion</u>;</td><td>food enters the mouth</td></tr>
<tr><td>digestion</td><td>break down <u>large</u> molecules / large molecules to small molecules / insoluble to soluble molecules;</td></tr>
<tr><td><u>absorption</u>;</td><td>small molecules move from small intestine into the blood</td></tr>
<tr><td><u>assimilation / synthesis</u>;</td><td>small food molecules are used to build large molecules</td></tr>
<tr><td>egestion</td><td>removal of undigested food / faeces / waste <u>from anus</u>;</td></tr>
</table>
</td><td></td><td>5</td></tr>
<tr><td>(b)</td><td>1. amylase;
2. starch;
3. maltose / glucose;
4. physical digestion / mechanical digestion / chewing eq;</td><td>ignore carbohydrase</td><td>3</td></tr>
<tr><td>(c)</td><td>(yes) A is starch;
B is glucose;</td><td>max 1 if A starch and B glucose but say no one is starch and one is glucose =1 mark</td><td>2</td></tr>
</table>

(Total for Question 1= 10 marks)

Question number	Answer	Notes	Marks
2 (a) (i)	250 000;		1
(ii)	32;; allow one mark for 80 000 in working		2
(b)	1. rare / random; 2. change / damage / eq; 3. DNA / gene / allele / genetic code / eq;	random change in cells = 2	2
(c)	1. less surface area; 2. slower diffusion / less diffusion / less gas exchange; 3. less oxygen / less carbon dioxide;	ignore less room allow converse for X	2
(d)	1. blocked / narrowed / clogged / eq; 2. coronary artery; 3. clot; 4. fat / cholesterol; 5. less blood to heart; 6. less oxygen / less oxygenated; 7. muscle (cells); 8. less respiration / anaerobic respiration; 9. lactic acid / angina; 10. heart attack / heart stops / cardiac arrest / eq;		5

(Total for Question 2 = 12 marks)

Question number	Answer	Notes	Marks
3 (a)	1. total decreased; 2. high and middle altitude decreased; 3. low altitude increased;		3
(b) (i)	1. less growth / lower yield / smaller plants / eq; 2. enzymes / reactions / kinetic energy / collisions / less photosynthesis / less respiration / eq;	allow converse for lower	2
(ii)	1. (sun)light; 2. minerals / named mineral; 3. carbon dioxide; 4. water / rain;	ignore sun weather soil pH humidity oxygen nutrients fertiliser	Max 2
(c)	1. weigh / use a balance / eq; 2. repeat / several quadrats / calculate average; 3. random / eq; 4. scale / multiply / eq;	ignore measure mass / counting plants	Max 3

(Total for Question 3= 10 marks)

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>4 (a)</td><td>
<table>
<tr><th>event</th><th>stage</th></tr>
<tr><td>Cell division produces an embryo</td><td>6;</td></tr>
<tr><td>An embryo is put into a surrogate mother</td><td>7;</td></tr>
<tr><td>An egg cell is collected from a female sheep</td><td>3;</td></tr>
</table>
</td><td></td><td>3</td></tr>
<tr><td>(b)</td><td>C (R);</td><td></td><td>1</td></tr>
<tr><td>(c)</td><td>D (P and R);</td><td></td><td>1</td></tr>
</table>

(Total for Question 4 = 5 marks)

Question number	Answer	Notes	Marks
5 (a) (i)	S – scale linear and half of both grids; L – lines straight and through points; A1 – axes correct way around – (altitude on x axis); A2 – axes labelled: (mass of) haemoglobin in g per litre and altitude/height in metres / eq; P – correct plotting of all points;	lose S mark if axis for data for Hb not truncated max 3 for bar chart	5
(ii)	1. level / no change (0 to 1000); 2. increase / eq;	the higher the altitude the higher the haemoglobin = 1	2
(iii)	1. more haemoglobin / more red blood cells; 2. (more) oxygen; 3. (more) respiration; 4. (more) energy / (more) ATP; 5. less lactic acid / oxygen debt / less anaerobic respiration;	idea of more must be evident once not run faster	3

Question number	Answer	Notes	Marks
(b) (i)	1. lower pressure / slower blood flow / less blood flow /eq; 2. thinner wall; 3. easier to see / nearer surface / easier to access / eq;	allow will not spurt out allow converse for artery ignore one cell thick	2 1
(ii)	4. wider lumen; too small / eq;		
(iii)	1. no pathogens / bacteria / virus / microorganism / parasite / named virus / HIV / eq; 2. infection / disease / illness / AIDS;	ignore sickness	2

(Total for Question 5 = 15 marks)

Question number	Answer	Notes	Marks
6 (a)	A – Dd / dD; L - DD;		2
(b)	11 / eleven;		1
(c) (i)	0 / zero; 50;		2
(ii)	1. no fusion of recessive gametes / eq; 2. random / probability / chance / luck / eq; 3. no children who are dd / each child has at least one dominant allele / eq; 4. embryo selection / IVF / eq;		1

(Total for Question 6 = 6 marks)

Question number	Answer	Notes	Marks
7 (a)	broad bean → aphid → lacewing / larvae ;;	arrows correct; aphid in middle; ignore sun before bean and organisms beyond lacewing one for pyramid	2
(b) (i)	1. all aphids eaten / numbers fall to zero / remove all pest / eq; 2. lacewings remain / lacewings reproduce more / eq;	allow converse for hoverfly	2
(ii)	quicker / faster / shorter period of time to reduce aphid numbers / eq;		1
(c) (i)	1. disease / eq; 2. plant availability / food ; 3. competition;	ignore reproduction / ignore predators	2
(ii)	1. temperature / cold / heat; 2. humidity / water / rain / snow / drought; 3. (sun)light; 4. pesticide / insecticide / pollution;	ignore wind / weather / climate change / sun ignore fertiliser / herbicide / O_2 /CO_2	2

(Total for Question 7 = 9 marks)

Question number	Answer	Notes	Marks
8	gametes; sperm / male; egg / female; tail / flagellum / flagella; meiosis; testis / testes / testicles; urethra; oviduct / Fallopian tube;	reject penis / sperm duct	

(Total for Question 8 = 8 marks)

Question number	Answer	Notes	Marks
9 (a) (i)	fungi / bacteria / *Penicillium*;	allow named correct organism	1
(ii)	bacteria;		1
(b)	1. <u>mutation</u>; 2. <u>variation</u>; 3. gene / allele / DNA; 4. survive / not killed / eq; 5. <u>resistant</u>; 6. reproduce / multiply / replicate / breed / produce offspring / eq; 7. pass on <u>gene / allele / DNA</u>;	allow resist pass on resistance = 1 for resistance MP 5 only pass on gene = 2 = Mp3 and Mp7	5

(Total for Question 9 = 7 marks)

Question number	Answer	Notes	Marks
10 (a)	1. named feeding level such as producer / consumer; 2. stage / position / place / level in food chain / pyramid / food web / eq;	ignore herbivore / carnivore	1
(b)	1. shape; 2. order; 3. names;	max 1 if food chain	3
(c)	1. fewer caterpillars; 2. fewer nettles / less food / eq; 3. colder / less light / eq; 4. become cocoon / pupa / butterfly / eq;	ignore hibernation	2
(d)	1. energy loss / not all transferred / eq; 2. respiration; 3. excretion / urine; 4. egestion / not digested / faeces / eq; 5. not all of each organism eaten / eq; 6. some organisms die / decompose / eq; 7. <u>movement</u>; 8. heat loss / thermoregulation / eq;	ignore heat loss in Mp 1 ignore waste for Mp 3 and Mp 4	4

(Total for Question 10 = 10 marks)

Question number	Answer	Notes	Marks
11 (a) (i)	maintain/control/balance water/salt/concentration (of blood / of body / of cells) / eq;	ignore detects	1
(ii)	lungs / skin / liver;		1
(b) (i)	water / urea / salt / mineral / named ion / eq;	ignore nitrogen / phosphorus	1
(ii)	1. large molecules / too big (to pass through); 2. (ultra) filtration / pressure / eq; 3. glomerulus / Bowman's capsule; 4. stay in blood / eq;	not filtered out of blood =2marks for MP4 and MP 2	3
(iii)	1. respiration / eq; 2. energy / ATP; 3. (selective) reabsorption / back into blood / eq; 4. <u>proximal</u> convoluted tubule / <u>first</u> coiled tubule / eq; 5. active transport / active uptake;	ignore absorbed alone	3

(Total for Question 11 = 9 marks)

Question number	Answer	Notes	Marks
12 (a)	1. osmosis; 2. dilute solution to concentrated solution / eq; 3. root hair cells; 4. xylem; 5. transpiration / evaporation / diffusion of water from leaves;		4
(b)	(named) mineral / mineral ion / salt / eq;	ignore nutrients / nitrogen / phosphorus	1
(c) (i)	water/air-tight / dry leaves / cut under water / cut stem at an angle / eq;	ignore safety glasses / prevent falling over / parallax	1
(ii)	1. wind + how varied / eq;; eg fan at high and low speed 2. light + how varied / eq;; eg lamp close and far 3. humidity + how varied / eq;; eg clear plastic bag 4. temp + how varied / eq;; eg air conditioning / room thermostat	must state / describe method not just hot and cold room or light and dark max 2 for conditions	4

(Total for Question 12 = 10 marks)

Question number	Answer	Notes	Marks
13 (a) (i)	plasmid;		1
(ii)	restriction / endonuclease; ligase;		2
(b)	C different temps / range of temps; O same species / same bacteria / mass / amount / number of bacteria; R repeat; M1 measure insulin; M2 concentration / mass / volume; S1 + S2 same pH / food / oxygen / time period / type of fermenter / sterile / eq;;	ignore light / carbon dioxide	6

(Total for Question 13 = 9 marks)

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