

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

(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. <u>coronary artery</u> ; 3. clot; 4. fat / cholesterol; 5. less blood <u>to heart</u> ; 6. less oxygen / less oxygenated; 7. <u>muscle</u> (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 <u>and</u> 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)

Question number	Answer	Notes	Marks								
4 (a)	<table border="1"> <thead> <tr> <th data-bbox="280 371 663 411">event</th> <th data-bbox="663 371 1039 411">stage</th> </tr> </thead> <tbody> <tr> <td data-bbox="280 411 663 483">Cell division produces an embryo</td> <td data-bbox="663 411 1039 483">6;</td> </tr> <tr> <td data-bbox="280 483 663 555">An embryo is put into a surrogate mother</td> <td data-bbox="663 483 1039 555">7;</td> </tr> <tr> <td data-bbox="280 555 663 627">An egg cell is collected from a female sheep</td> <td data-bbox="663 555 1039 627">3;</td> </tr> </tbody> </table>	event	stage	Cell division produces an embryo	6;	An embryo is put into a surrogate mother	7;	An egg cell is collected from a female sheep	3;		3
event	stage										
Cell division produces an embryo	6;										
An embryo is put into a surrogate mother	7;										
An egg cell is collected from a female sheep	3;										
(b)	C (R);		1								
(c)	D (P and R);		1								

(Total for Question 4= 5 marks)

Question number	Answer	Notes	Marks
5 (a) (i)	<p>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;</p> <p>(ii)  1. level / no change (0 to 1000);  2. increase / eq;</p> <p>(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;</p>	<p>lose S mark if axis for data for Hb not truncated  max 3 for bar chart</p> <p>the higher the altitude the higher the haemoglobin = 1</p> <p>idea of more must be evident once</p> <p>not run faster</p>	<p>5</p> <p>2</p> <p>3</p>

Question number	Answer	Notes	Marks
(b) (i)	1. lower pressure / slower blood flow / less blood flow / eq;	allow will not spurt out allow converse for artery	2
	2. thinner wall; 3. easier to see / nearer surface / easier to access / eq;	ignore one cell thick	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 <sub>2</sub> /CO <sub>2</sub>	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 / <i>Penicillium</i> ;	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. <u>root hair cells</u> ; 4. xylem; 5. <u>transpiration / evaporation / diffusion</u> 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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