



# 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

## **Edexcel and BTEC Qualifications**

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at [www.edexcel.com](http://www.edexcel.com) or [www.btec.co.uk](http://www.btec.co.uk). Alternatively, you can get in touch with us using the details on our contact us page at [www.edexcel.com/contactus](http://www.edexcel.com/contactus).

## **Pearson: helping people progress, everywhere**

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: [www.pearson.com/uk](http://www.pearson.com/uk)

Summer 2014

Publications Code UG038165

All the material in this publication is copyright

© Pearson Education Ltd 2014

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>event</th> <th>stage</th> </tr> </thead> <tbody> <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> </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; 2. thinner wall; 3. easier to see / nearer surface / easier to access / eq;	allow will not spurt out allow converse for artery	2
(ii)	4. wider lumen;  too small / eq;	ignore one cell thick	1
(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)



Pearson Education Limited. Registered company number 872828  
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2J