

# Mark Scheme (Results)

Summer 2015

Pearson Edexcel International GCSE  
Biology (4BI0) Paper 1B  
Science Double Award (4SC0) Paper 1B

Pearson Edexcel Level 1/Level 2 Certificate  
Biology (KBIO) Paper 1B  
Science (Double Award) (KSC0) 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.

Question number	Answer	Notes	Marks
1		<p>5 = 4</p> <p>4 = 3</p> <p>3 or 2 = 2</p> <p>1 = 1</p>	4

Total 4 marks

Question number	Answer	Notes	Marks
2(a)(i)	tissue(s) that carry out (same) function / <u>different</u> cell types that carry out (same) function / eq;		1
(ii)	heart;		1
(iii)	1. nervous / CNS; 2. breathing / respiratory / ventilation; 3. digestive; 4. excretory / urinary; 5. skeletal; 6. endocrine / hormonal;		3 max
(iv)	reproductive / immune / lymphatic;		1

(b)

Process	Name of organ
ultrafiltration	kidney;
ventilation	lung;
secretion of insulin	pancreas;
secretion of hydrochloric acid	stomach;
bile production	liver;

5

Total 11 marks

Question number	Answer	Notes	Marks
3(a) (i)	T; U;	T and any = 1 U and any = 1 U, T and any = 1 P, Q and T = 0 Ignore R so U, T and R = 2	2
(ii)	poor vision / CEA / Collie eye anomaly / defect;		1
(iii)	(cross) S / dd + Dd / Dd + dd;		1
(iv)	Dd / heterozygous / dD;	Allow Dd , Dd, Dd, Dd	1
(b) (i)	sperm(s) / spermatozoa;	Ignore X and Y	1
(ii)	egg(s) / ova / ovum;	Ignore X / Reject ovule	1
(iii)	fertilisation;		1
(iv)	uterus / womb;		1

Total 9 marks

Question number	Answer	Notes	Marks
4(a)	1. bronchitis; 2. cilia (ted cells) anaesthetised / damaged / eq; 3. bacteria / pathogens / microorganisms; 4. cancer / carcinogens / tumour; 5. tar; 6. emphysema; 7. less surface area / less gas exchange / less diffusion / eq; 8. idea that <u>alveoli</u> digested / damaged / fused / eq;	Ignore infection          lower SA of <u>alveoli</u> = 2 <u>alveoli</u> alone = 0	max 5
(b)	1. red blood cells; 2. (oxy)haemoglobin / carboxyhaemoglobin; 3. less oxygen; 4. (less) respiration / metabolism / energy / ATP;		max 3

Total 8 marks



Question number	Answer	Notes	Marks												
5(a)	1. iodine; 2. blue / black / blue black = starch; 3. Benedict's / eq; 4. heat / use water bath / eq; 5. red / orange / yellow / green = glucose;	if iodine for glucose goes blue black = 0  only award Mp1 and Mp3 if linked to correct test  heat must be linked to Benedict's	4 max												
(b)	<table><tr><th>Group</th><th>Example from the group</th><th>Molecule used to store carbohydrate</th></tr><tr><td>animals</td><td>(cat)</td><td>glycogen;</td></tr><tr><td>plants</td><td>(maize)</td><td>starch / sucrose;</td></tr><tr><td>fungi</td><td>mucor / yeast / mushroom / mould / eq;</td><td>glycogen;</td></tr></table>	Group	Example from the group	Molecule used to store carbohydrate	animals	(cat)	glycogen;	plants	(maize)	starch / sucrose;	fungi	mucor / yeast / mushroom / mould / eq;	glycogen;	Ignore in plants sugar / glucose / fructose  Allow <i>Fomes formentarius</i> / eq	4
Group	Example from the group	Molecule used to store carbohydrate													
animals	(cat)	glycogen;													
plants	(maize)	starch / sucrose;													
fungi	mucor / yeast / mushroom / mould / eq;	glycogen;													

Total 8 marks

Question number	Answer	Notes	Marks
6(a)	1. other pollutants / nitrate / sediment in lake / eq; 2. only done once / reliability / different part of lake may vary / eq; 3. different sized disks may have been used; 4. different light conditions / time of day / time of year / weather / ripples / eq; 5. different people / different eyesight / poor vision / eq;	Ignore plants in lake / microorganisms  Ignore human error	2 max
(b)(i)	1. as level of phosphate increases Secchi depth / visibility decreases / eq; 2. reference to Secchi depth levelling from 1990 / 5.0m / phosphate 140-142 onwards;	Allow 1993 / 4.5m / 155-157	2
(ii)	1. algae growth / plant growth / algal bloom / eq; 2. block light / eq; 3. plant death / no photosynthesis; 4. bacteria / microbes / decomposers / microorganisms / eq; 5. less oxygen / anoxic / eq; 6. respiration;	phosphate makes the water cloudy so no light can get through to plants = 1  Ignore eutrophication	5 max
(c)(i)	22;		1
(ii)	October;		1

Question number	Answer	Notes	Marks
(d)(i)	depth is 0.5 / depth is less than 1.0 / less than minimum depth / disk not seen below 1.0m / eq;	allow idea of 'above' if clearly writing about nearer surface	1
(ii)	only one below 1.0 / second reading above 1.0 / <u>result</u> not repeated / could be an anomaly / some other months only had one reading / not enough readings made / eq;	Ignore only one reading made  Ignore comments about change to turbidity / sand being disturbed  Ignore human error	1

Total 13 marks

Question number	Answer	Notes	Marks
7(a)(i)	none / zero / 0 / 0mg;		1
(ii)	increase / eq;		1
(b)(i)	lots of cows / group / eq;	repeat not qualified = 0	1
(ii)	1. species / breed / type of cow / eq; 2. age / mass / size; 3. food / grass / eq; 4. water; 5. (air) temperature;	Ignore gender Ignore number in group  Ignore conditions / environment	2 max
(c)(i)	<u>denatured</u> ;	Ignore broken down / stops working / active site changes shape  Reject killed	1
(ii)	1. <u>HCl</u> / <u>hydrochloric acid</u> ; 2. enzyme / protease / pepsin; 3. breakdown / digest; 4. (acid) <u>denatures</u> growth hormone;	Mp1 Ignore low pH / acid	3

(d)	1. gene / allele / DNA <u>for growth hormone</u> ; 2. restriction (endonuclease); 3. ligase; 4. plasmid; 5. vector; 6. recombinant;		4 max
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Question number	Answer	Notes	Marks
8(a)	1. scale linear for numbers on y axis and uses half grid; 2. x axis labelled year(s) or 1969-73; 3. y axis labelled number of heart attacks; 4. units as per 100 000; 5. plotted correctly; 6. key for men and women;	Line graph lose 1 for plotting  Allow Mps 1, 2 and 3 if plotted horizontally	6
(b)	men higher / women lower / eq;  men decreased / little change in women / women increased in recent years / women fluctuate / eq;		2
(c)	less smoking / less fat in diet / less alcohol / less salt / more exercise / eq;	Ignore better healthcare / medicine / education / alone  Ignore stress  eat more healthily = 0  Allow more aware of effects of smoking	1

(d)	<ol style="list-style-type: none"><li>1. less oxygen;</li><li>2. less (aerobic) respiration;</li><li>3. <u>anaerobic</u> respiration;</li><li>4. lactic acid / low pH;</li><li>5. enzymes denatured;</li></ol>	Ignore glucose	max 3
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Total 12 marks

Question number	Answer	Notes	Marks
9(a)(i)	1. <u>upper</u> epidermis; 2. transparent / lets light through / no chloroplasts;	waxy cuticle is transparent = 1	2
(ii)	1. palisade; 2. densely packed / aligned vertically / eq; 3. idea of <u>many</u> / <u>lots</u> of chloroplasts; 4. absorb / take in / trap light;	ignore lots of chlorophyll	3 max
(iii)	1. spongy; 2. <u>air</u> spaces; 3. diffusion / movement of gases / gas exchange / eq; 4. xylem / vascular bundle; 5. transport water;	Ignore phloem	3 max
(iv)	1. guard cell; 2. open / close; 3. let in carbon dioxide / water loss / transpire / evaporate / eq;	Ignore stomata Ignore gas exchange	2 max
(b)	1. lower surface in water / upper surface exposed to air; 2. allows carbon dioxide in; 3. allows transpiration / evaporation / water loss / eq;	Ignore gas exchange Allow converse for Mps 2 and 3	2 max
(c)(i)	20;		1
(ii)	fewer/no stomata / holes / pores / guard cells;		1

Total 14 marks



Question number	Answer	Notes	Marks
10 (a)	A urethra; B vas deferens / sperm duct / seminal duct; C testis / testes / testicle / epididymis;	Reject ureter / ureta  Reject scrotum	3
(b)	1. prevent sperm leaving penis / leaving urethra; 2. no fertilisation / fusion / sperm can't reach / eq;	Allow no sperm in semen	2 max
(c)	1. testes outside / ovaries inside; 2. can use local anaesthetic / no major surgery / less risk/ safer / less invasive/does not affect other organs/ eq; 3. possible to reverse / eq;	not just easier to access	2 max
(d)	1. testosterone; 2. sperm development / production / eq; 3. secondary sexual characteristics / one named secondary sexual characteristic; 4. sex drive / aggression / eq;	If name of hormone incorrect max 2	3 max

Total 10 marks

Question number	Answer	Notes	Marks
11(a) (i)	nitrate;		1
(ii)	1. amino acids; 2. protein;		2
(b)	rye;		1
(c)	different species / different soil contents in lowland and upland / soil erosion / leaching / eq;	Allow different minerals as eg soil contents	1
(d) (i)	fresh mass includes water / dry mass excludes water / water content may vary / eq;	Allow moisture	1
(ii)	1. weigh sample (before or after) / use a balance ; 2. heat / oven / warm place / eq; 3. until mass stays same / eq;		2
(e)	1. % allows for comparison; 2. of different sized plants / of different (starting) masses / weights / of different yield / eq;		2

(f)	42 / 41.7 / 41.67 / 41.6 recurring;;	Allow $5 \div 12 = 1$ for working  $41.667 = 1$  41.6 alone with no working =0	2
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Total 12 marks

Question number	Answer	Notes	Marks
12	<p>C garlic and no garlic / different amount / mass of garlic;</p> <p>O same age / species / same gender of <u>mosquito</u> / eq;</p> <p>R lots of people / repeat / eq;</p> <p>M1 count number of mosquito bites / landing / eq;</p> <p>M2 per hour / day / same time period stated;</p> <p>S1 and S2 same light / same temperature / same time of year / same diet of people / same gender or age or mass of people / same clothing or exposure of skin / same number of mosquitoes / eq;;</p>	Ignore location / place / room/ environment	6 max

Total 6 marks



