

# Mark Scheme (Results)

Summer 2015

Pearson Edexcel Certificate GCSE  
Biology (KBI0) Paper 2B

Pearson Edexcel International GCSE  
Biology (4BI0) Paper 2B

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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 (a)	(organism that) causes disease / causes infection;	Ignore causes harm Ignore causes illness	1
(b)	1. mutation; 2. (involves) gene / DNA / allele / genetic material / eq; 3. random / chance / rare / spontaneous;	Ignore evolution / natural selection	2 max
(c)	<i>Candida (albicans)</i> / HIV;		1
(d)	superbugs;		1
(e)	make sure <u>all</u> killed / make sure <u>all</u> destroyed / to find antibiotic that is effective / works / kills them <u>all</u> / eq;	Ignore immune Ignore infection killed Ignore killed alone	1

(f)	<p>1. antigen OR dead / weakened / attenuated / inactive pathogen bacterium / virus;</p> <p>2. <u>memory cells</u> / <u>memory lymphocytes</u>;</p> <p>3. antibody;</p> <p>4. soon(er) / fast / quick / more of antibody / eq;</p>	<p>Mp 1 ignore microorganism / microbe Mp1 Ignore harmless</p> <p>Mp 3 allow antibody whatever the source Mp 3 ignore antitoxin</p> <p>Mp 4 ignore idea that pathogen has less time to cause disease</p>	3 max
(g)	<p>1. those with alligacin survive / not killed / live / eq;</p> <p>2. reproduce / breed / produce offspring;</p> <p>3. pass on allele / gene / DNA <u>for alligacin</u>;</p>	<p>Mp 1 ignore numbers</p> <p>Mp1 ignore survival of the fittest alone</p> <p>Mp 3 ignore characteristic</p>	3
(h)	<p>1. protect food / prey / eq;</p> <p>2. protect mates / females / eq;</p> <p>3. protect nests / protect young / protect eggs / protect offspring / eq;</p>	<p>Ignore protect habitat / protect territory / from other alligators / predators</p>	2 max

Total 14 marks

Question number	Answer	Notes	Marks
2 (a)	fair test / allows (valid) comparison / control gender / control age / control fitness / control body mass / control different sweating rates / people have different sweating rates / eq;	Ignore control health / genes  Ignore control alone  Ignore reliable	1
(b)	1. <u>both</u> increase in sweat production;  2. smaller increase when resting / greater increase when running / increases at a lower temperature when running / increases at a higher temperature when resting / eq;  3. (correct reference to data) increases 4 times when resting / increases 11 times when running / stays at 2 when resting between 31.5 and 33.0 / eq;	Mp 2 ignore faster increase	3
(c)	1. muscles;  2. respiration;  3. <u>heat / thermal energy</u> produced / eq;  4. <u>evaporation</u> ;  5. cooling / body temperature falls / maintain body temperature / prevent over heating / removes heat from body / eq;	Mp 3 ignore body warms / body temperature increases / body gets hot	4 max

(d)	<ol style="list-style-type: none"><li>1. measure mass / weight / area / volume / moisture / colour change (of cobalt chloride);</li><li>2. apparatus used to measure: clothing / shirt / paper towel / cotton wool / measuring cylinder / moisture sensor / cobalt chloride / eq;</li><li>3. reference to time;</li><li>4. repeat / average (mean);</li></ol>	Mp 2 ignore if person	3 max
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Total 11 marks

Question number	Answer	Notes	Marks
3(a)	<ol style="list-style-type: none"> <li>1. <u>bacteria / fungi / saprotrophs / saprophytes;</u></li> <li>2. use enzymes;</li> <li>3. break down / digest;</li> </ol>	<p>Mp 1 ignore microorganisms / microbes / decomposers / animals / woodlice / detritivores / maggots / slugs / nitrifying bacteria / denitrifying bacteria / nitrogen fixing bacteria /</p> <p>Mp 3 ignore eat / feed</p>	2 max
(b)(i)	<ol style="list-style-type: none"> <li>1. explants;</li> <li>2. agar;</li> <li>3. sterile / aseptic / method of sterilisation;</li> <li>4. nutrients / ions / minerals / named mineral / glucose / carbohydrate / amino acids;</li> <li>5. hormones / named hormone / rooting powder;</li> <li>6. callus;</li> <li>7. provide light / water / humidity / fogging;</li> </ol>	<p>Mp 2 ignore jelly / in vitro / Petri dish / culture medium</p> <p>Mp 3 allow if for apparatus</p> <p>Mp 4 ignore fertiliser</p> <p>Mp 7 ignore temperature / sun</p>	<p>5 max</p> <p>2</p>



(ii)	1. less minerals / leaching / less humus / less dead organic matter from leaf fall / fewer dead trees / less decomposition of trees;  2. less soil / soil erosion / unstable soil / flooded soil / waterlogged soil / soil washed away / eq;	Mp 1 ignore nutrients / nitrogen	
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Total 9 marks

Question number	Answer	Notes	Marks
4	1. phagocytes; 2. enzymes / named digestive enzyme; 3. lymphocytes; 4. <u>clot</u> ; 5. blood loss / bleeding; 6. bacteria / microorganisms / microbes / viruses / pathogens;	Mp 1 allow macrophage      Mp 5 ignore infection	6

Total 6 marks

Question number	Answer	Notes	Marks
5 (a)	1. <u>at low light / up to A</u> carbon dioxide released; 2. carbon dioxide absorbed; 3. levels off / flattens / plateaus / stays constant / <u>light</u> no longer limiting factor;		2 max
(b)	<u>respiration = photosynthesis</u> ;		1
(c)	1. hydrogen-carbonate (indicator);  2. yellow in dark / yellow more CO <sub>2</sub> / yellow release of CO <sub>2</sub> ;  OR  red/purple in light / red/purple less CO <sub>2</sub> / red/purple absorption of CO <sub>2</sub> ;	Mp 1 ignore other indicators  Mp 2 ignore other colours  Mp 2 correct for light but incorrect for CO <sub>2</sub> = 0	2 max

Total 5 marks

Question number	Answer	Notes	Marks
6(a) (i)	0.52 / 0.5 / 0.521;;	Allow one mark for correct use of 8863 as numerator (ie not if in list)  Ignore 0.52135	2  1
(ii)	<u>light</u> misses plant / <u>light</u> misses chloroplast / <u>light</u> not absorbed / <u>light</u> reflected / eq;	Ignore reference to heat / energy / respiration / rays	
(b)	1. respiration; 2. not digested / cellulose / egested / faeces; 3. not eaten / eq;	Ignore growth / active transport / heat loss / movement / heat loss by consumer / excretion	2 max

Total 5 marks

Question number	Answer	Notes	Marks
7(a)	1. contains gene / allele / DNA; 2. from different <u>species</u> ;	Mp 2 ignore organism  Mp 2 allow if both organisms are named and are clearly different species	2
(b)	insulin production / gene therapy / herbicide resistance / golden rice / organ transplants / human organs / named drug production / anti-freeze gene into strawberries / bioluminescence / goats and spider silk / eq;	Allow any transgenic example  Allow hormone production	1

Total 3 marks

Question number	Answer	Notes	Marks
8(a)(i)	all burnt / more burnt / complete combustion / all energy released / eq;	Ignore speed of burning Allow converse	1
(ii)	1. less <u>heat</u> loss / prevent <u>heat</u> loss / eq; 2. (more) <u>accurate</u> ;	1. Ignore energy 2. Ignore precise / reliable / valid	2
(b) (i)	1. starch / cellulose / glycogen / polysaccharide; 2. protein;	Mp 1 Ignore carbohydrate Mp1 Reject sugar / glucose / maltose	2
(ii)	(yes) food E contains most energy / food with least fat/food A contains least energy / as fat increases energy increases / indication of correlation / indication of trend / eq;	Ignore food with more fat contains more energy alone	1
(iii)	result that does not fit pattern / odd result / outlier / wildly out / rogue value / eq;	Ignore wrong / unexpected / inaccurate / random	1

Total 7 marks



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