



Mark Scheme (Results)

Summer 2015

Pearson Edexcel International GCSE
in Biology (4BI0) Paper 2BR

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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)	1. amylase; 2. digests starch / breaks down starch; 3. maltose; 4. lubricates / moisten / soften food / eq;	Mp 3 allow glucose Mp 4 ignore makes it easier to swallow	2 max								
(b)	<table><tr><th>Sense organ</th><th>Stimulus</th></tr><tr><td>eye</td><td>sight (of food / sight of lab attendant / eq);</td></tr><tr><td>ear</td><td>sound (of food arriving / sound of lab attendant / tuning fork / eq);</td></tr><tr><td>nose</td><td>smell (of food / eq);</td></tr></table>	Sense organ	Stimulus	eye	sight (of food / sight of lab attendant / eq);	ear	sound (of food arriving / sound of lab attendant / tuning fork / eq);	nose	smell (of food / eq);		2 max
Sense organ	Stimulus										
eye	sight (of food / sight of lab attendant / eq);										
ear	sound (of food arriving / sound of lab attendant / tuning fork / eq);										
nose	smell (of food / eq);										

(c)	1. fast(er) / quick / rapid / immediate / eq; 2. involuntary / unconscious / without thinking / automatic / does not involve brain/ eq; 3. instinctive / inherited / inborn / innate / not learnt; 4. protects the body from damage / eq;		2 max
(d)	(i) closer to B / similar to B / closer to original stimulus / eq; (ii) 1. measure <u>volume</u> / <u>mass</u> / <u>weight</u> of saliva; 2. measuring cylinder / suitable scaled container / scales / syringe / eq;	Ignore cannot hear E and F Ignore reference to time Allow idea of cotton wool being weighed by scales	1 2 max
(e)	1. different behaviours / different responses / respond to different stimuli / eq; 2. different nervous systems / brains / eq;	Mp 1 Allow different hearing ability / different sensitivity Mp 2 Ignore different intelligence	2 max

(f)	1. receptors; 2. impulse / signal; 3. sensory neurone; 4. to spinal cord / grey matter / CNS; 5. synapse; 6. relay neurone / intermediate neurone / interneurone ; 7. motor neurone; 8. muscle / effector;	Mp 2 ignore message	5 max
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Total 16 marks

Question number	Answer	Notes	Marks
2(a)	1. protects fetus; 2. cushions / shock absorber / supports / eq;		2
(b)(i)	1. oxygen; 2. glucose; 3. amino acids; 4. vitamins / named vitamins; 5. minerals / named mineral / ions / salts; 6. antibodies; 7 water;	Mineral ions and proteins on same line = 0 Minerals and proteins on different lines = 1 Mp 5 ignore nutrients / food	2 max
(ii)	1. carbon dioxide; 2. urea;	Mp 2 ignore urine	2
(c)	1. <u>villi</u> ; 2. large surface area; 3. blood supply / capillaries; 4. concentration gradient; 5. short distance / thin walled / eq;	blood vessels close to each other get Mp 3 and Mp 5	3 max

Total 9 marks

Question number	Answer						Notes	Marks
3(a)							Ignore alcohol as food product Ignore milk as substrate used	5
	Food product	Genus of organism used	Group organism belongs to	Substrate used	Type of respiration	Chemical product		
	beer / wine / bread / eq;	<i>Saccharomyces</i>	fungus	glucose	anaerobic	ethanol		
	yoghurt	<i>Lactobacillus</i> / <i>Streptococcus</i>;	bacteria	lactose;	aerobic	lactic acid / lactate;		
(b)	1. pasteurise / boil / sterilise / heat to high temperature / eq;						Mp 1 ignore heat milk alone	2 max
	2. kill / prevent growth of / remove bacteria / microorganisms / pathogens / eq;						Mp 2 reject germs	

Total 7 marks

Question number	Answer	Notes	Marks
4(a) (i)	<u>mass</u> ;		1
(ii)	1. water in; 2. high conc. (of water) to low conc. (of water) / from dilute solution to concentrated solution / eq;	Mp 2 allow correct reference to water potential Ignore osmosis	2
(b) (i)	minus 10;;	One mark for 10 alone	2
(ii)	bar drawn to minus 10 / answer in (i);		1
(c)	1. water (only); 2. membrane;	Ignore reference concentration gradient	1 max

Total 7 marks

Question number	Answer		Notes	Marks
5(a)	area	Increase in biomass in g per m ² per year	Allow one mark for 1700 in working	2
	A	125		
	B	110		
	C	?		
	85;;			

(b)(i)	1. (more) (sun)light; 2. water / rainfall; 3. photosynthesis; ONCE 4. warmer/ higher temperature; 5. enzymes; 6. (more) mineral ions / named mineral ion / eq; 7. <u>use of named</u> mineral ion;	Ignore carbon dioxide / oxygen / pollution Mp 6 ignore growth nitrate for amino acids = Mp 5 and Mp 6 Mp 5 ignore nutrients / fertiliser	4 max
(ii)	1. fewer herbivores / less grazing / fewer plants eaten / fewer consumers / fewer pests / eq; 2. fewer weeds / fewer different plants / less competition from other plants; 3. less disease / less infection; 4. more nitrogen fixing / nitrifying bacteria;	Mp 1 ignore predator	2 max
(c)	0.079 / 0.08 / 0.0791;	Ignore 0.0790625 Allow one mark for 2530 in working	2

Total 10 marks

Question number	Answer		Notes	Marks												
6(a)	<table><tr><th>pH of amylase solution</th><th>diameter in mm</th></tr><tr><td>2</td><td>10 ± 1</td></tr><tr><td>4</td><td>(15)</td></tr><tr><td>7</td><td>20 ± 1</td></tr><tr><td>9</td><td>14 ± 1;</td></tr><tr><td>13</td><td>(10)</td></tr></table>		pH of amylase solution	diameter in mm	2	10 ± 1	4	(15)	7	20 ± 1	9	14 ± 1;	13	(10)		1
	pH of amylase solution	diameter in mm														
	2	10 ± 1														
	4	(15)														
	7	20 ± 1														
	9	14 ± 1;														
	13	(10)														
(b) (i)	1. digestion / break down; 2. no starch;		Breaks down all the starch = 2 Breaks down starch = 1	2 max												
(ii)	1. (amylase/enzyme) denatured at pH 2 or 13 / low or high pH; 2. optimum / works best at pH 7; 3. enzymes work less well at pH 9 or pH 4;			2 max												
(c)	pH;			1												

(d) (i)	1. <u>volume</u> of amylase; 2. concentration of amylase; 3. same amylase / source of amylase; 4. depth of agar; 5. time;	Mp 1 ignore amount Ignore concentration of starch / agar / iodine	3 max
(ii)	1. 0 for pH 2 and pH 13; 2. wider for pH 7 than at 20 °C;	Check position of wells	2

Total 11 marks

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