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Mark Scheme (Results)

Summer 2012

GCSE Biology
5BI2F/01

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GCSE Biology 5BI2F/01 Mark Scheme – Summer 2012

Question Number	Answer	Acceptable answers	Mark
1(a)(i)	**A** root hair cells		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	**B** osmosis		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(b)	• roots (1) • active transport (1) • xylem (1)		**(3)**

Question Number	Answer	Acceptable answers	Mark
1(c)(i)	A comparison including **two** of the following points • sunflower contains more magnesium than nitrate (1) • sunflower contains more magnesium than wheat (1) • wheat contains more nitrate than sunflower (1) • magnesium and nitrate in wheat are similar (1)	**ORA** **ORA** **ORA** the total number of ions in sunflower is greater than the total number in wheat (1) credit correct manipulation of data (1)	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(c)(ii)	A description including two of the following points • to absorb {sunlight / energy} (1) • to make glucose (1) • for photosynthesis (1)	absorb light to make sugar/starch ignore food	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(a) (i)	• oxygen (1) • carbon dioxide (1)		**(2)**

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	An explanation linking **three** of the following points • needs more energy for training/race • carbohydrates contain/release energy • (carbohydrates) broken down to glucose (1) • by enzymes/amylase (1) • (during) respiration (1)	sugar for glucose	**(3)**

Question Number	Answer	Acceptable answers	Mark
2(b)(i)	**C** 5 mmol per dm^3		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(b)(ii)	An explanation linking **two** of the following points • more energy needed/energy needed quickly (1) • not enough oxygen (1) • to muscles (1) • anaerobic respiration (produces lactic acid) (1)		**(2)**

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	**D** cell membrane		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	A description including **two** of the following points • gives cell its shape (1) • provides strength/support to cell/plant (1) • provides a barrier (against microorganisms) (1)	keeps cell together/keeps contents inside Ignore protection if not qualified free passage of water and minerals/ions (1)	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(a)(iii)	A description including **two** of the following points • double helix (1) • containing (pairs) of bases (1) • linked by hydrogen bonds (1)	description of shape e.g. twisted ladder/two strands Reference to A / T / G / C Reference to sugar/phosphate 'backbone' (1)	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(b)(i)	16		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(b)(ii)	A description including **two** of the following points • increases up to midday (1) • decreases from midday to 6pm / midnight / 2 mg per g (1) • remains constant from 6pm to midnight (1)	increases then decreases (1) Correct manipulation of data e.g. trebles from 9am to midday (1)	**(2)**

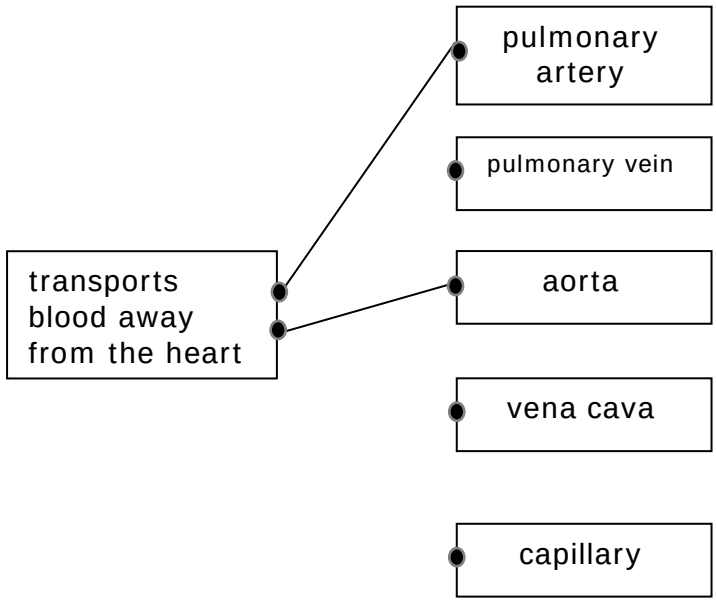
Question Number	Answer	Acceptable answers	Mark
3(b)(iii)	A suggestion including **two** of the following points • less photosynthesis(1) • less sunlight(1) • temperature decreases (1) • lack of water(1) • reference to named use of glucose e.g. respiration (1)	no light (at night) reference to enzyme activity	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	A description including **two** of the following points • increase in number up to {5-6} weeks/6.075 (x 10^{12} per dm^3) (1) • number stays constant from 6 weeks (1)	increases and levels off (1) credit manipulated figures (1)	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	6 weeks **Units must be stated**		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(a)(iii)	carry oxygen		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)	An explanation linking the following points • more blood pumped out (in one heart beat) (1) • (so) more {oxygen / glucose} (reaches the working muscles) (1)	more blood pumped around body/to muscles/blood travels faster (1) carbon dioxide / heat removed faster (1)	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(c)(i)	 **Accept lines crossing over** **If only one line drawn and correct then 1 mark** **No marks if more than 2 lines are drawn.**		**(2)**

Question Number	Answer	Acceptable answers	Mark
4(c)(ii)	valve	named heart valve(s)	**(1)**

Question Number	Answer	Acceptable answers	Mark
5(a)(i)	**C** proteins		**(1)**

Question Number	Answer	Acceptable answers	Mark
5(a)(ii)	**B** speeds up a chemical reaction		**(1)**

Question Number	Answer	Acceptable answers	Mark
5(b)(i)	Any **two** from the following points • contain different amino acids (1) • different sequence/order (of amino acids) (1)	State a difference in an amino acid e.g. black circle in amylase	**(2)**

Question Number	Answer	Acceptable answers	Mark
5(b)(ii)	Any **two** from the following points • different shape (enzyme/protein) • work with different substrates • ref to active sites/lock and key (1)	named substrates enzymes are specific	**(2)**

Question Number		Indicative Content	Mark
QWC	***5(c)**	An explanation including some of the following points • more oxygen given off at pH 7 • pH 7 is the optimum pH for this enzyme • reaction is faster/enzyme more active in neutral solution • very little oxygen given off at pH 5 and pH 9 • enzyme / catalase less active • no oxygen given off at pH 1 and pH 14 • no enzyme activity • enzyme denatured • shape of active site is changed • due to strong acid / low pH/strong alkali / high pH • no longer binds to hydrogen peroxide / substrate	**(6)**
Level	**0**	No rewardable content	
1	**1 -2**	• a limited description is given on the results of the investigation that covers one aspect of the results e.g. identifies best pH or recognises when a reaction has or has not taken place. • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 -4**	• a simple explanation is given on at least one aspects of the results of the investigation **and** links this to enzyme activity e.g. enzymes work better at pH7 as more bubbles are released or inactive at pH1 as no bubbles are released. • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 -6**	• a detailed explanation of how pH affects enzyme activity (linking this to number of bubbles/oxygen production) including reference to denaturation and/or shape change of enzyme/active site • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Question Number	Answer	Acceptable answers	Mark
6(a)(i)	• (165) x 2 (1) • 330 (cm) (1)	a range from 1.8 to 2.2 Accept a height value between 297 – 363 (cm) with no working shown (2)	**(2)**

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	• mitosis/cell division/cell differentiation		**(1)**

Question Number	Answer	Acceptable answers	Mark
6(b)	An explanation linking any **three** of the following points • many fossils found are only part of an animal or plant (1) • soft tissue has decayed(1) • fossils are often broken (into pieces)(1) • many fossils are yet to be found / fossil record incomplete (1) • fossils do not always form (1)		**(3)**

Question Number		Indicative Content	Mark
QWC	***6(c)**	An description including some of the following points • leaves have a large surface area • contain (many) chloroplasts/chlorophyll • for maximum absorption of light • waxy cuticle to reduce water loss • stomata/pores • gas exchange/to take in carbon dioxide and release oxygen • guard cells that control size of stoma • xylem vessels throughout the leaf deliver water and mineral ions	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited description of the structure of a leaf that gives either one adaptation or one function not linked e.g. large surface area or takes in carbon dioxide • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple description of how leaf is adapted for photosynthesis that gives one structure linked to its function in photosynthesis/or two or more adaptations/structures not linked • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed description of how leaf is adapted for photosynthesis with two or more structures related to functions of photosynthesis e.g. the role of stomata in gas exchange and the presence of xylem/vessels that deliver water • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

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