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Mark Scheme (Results)

Summer 2014

Pearson Edexcel GCSE in Biology (5BI3F) Paper 01

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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.
- For questions worth more than one mark, the answer column shows how partial credit can be allocated. This has been done by the inclusion of part marks eg (1).
- 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.
-

Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:

- Write legibly, with accurate spelling, grammar and punctuation in order to make the meaning clear
- Select and use a form and style of writing appropriate to purpose and to complex subject matter
- Organise information clearly and coherently, using specialist vocabulary when appropriate.

Question Number	Answer	Acceptable answers	Mark
1(a)(i)	**A** courtship		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	• visual signal e.g. flapping wings, display red breast (1) • chemical signal (1)	Accept body language Accept pheromones Accept other methods of communication such as nest building/ tapping Ignore singing	**(1)**

Question Number	Answer	Acceptable answers	Mark
1(b) (i)	5 ÷ 12 (1) 42 (%) / 41.7 (%) /41.66 (%)	2 marks for the correct answer Accept 41.6%	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	A suggestion including two from • provides food (1) • protects from (named) predator (1) • provide warmth (1)	Accept incubate Ignore generalisations such as 'to keep safe'	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(c)	An explanation linking two of the following: • camouflage / to hide (1) • from (named) predators (1) OR • cooler (on the dark side) (1) • to prevent over-heating (1) OR • more damp (on dark side) (1) • to prevent drying out/ dehydration (1)		**(2)**

(Total for question 1 = 8 marks)

Question Number	Answer	Acceptable answers	Mark
2(a)	**C** sperm problems		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(b)	**two** of the following: • donation of eggs (1) • donation of sperm (1) • IVF treatment (1) • use of a surrogate mother (1) • hormone treatments (1)	Accept named example	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(c)(i)	A acrosome; B nucleus;	Answers must be in the correct order	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(c)(ii)	An explanation linking **three** of the following points: • mitochondria provide / supply energy (1) • by the process of respiration (1) • to enable the sperm to move / swim (to the egg) (1)	Reject mitochondria produce/create energy	**(3)**

(Total for question 2 = 8 marks)

Question Number	Answer	Acceptable answers	Mark
3 (a)(i)	• (antiseptic / plant extract) kills the bacteria	Inhibits bacterial growth	**(1)**

Question Number	Answer	Acceptable answers	Mark
3 (b)(i)	3.14 x 50 x 50 (1) 7850 (mm^2)	2 marks for correct answer Accept π x 50 x 50 (1) 7853 / 7853.98 / 7854 (mm^2)	**(2)**

Question Number	Answer	Acceptable answers	Mark
3 (b)(ii)	Any two of the following: • C is the most effective / best (1) • B is the least effective /worst (1) • A is more effective than B / less effective than C (1)	Ignore reference to size of area/size of circle/number of bacteria	**(2)**

Question Number	Answer	Acceptable answers	Mark
3 (c)	A suggestion linking the following: • antiseptics kill plant pathogens (1) • prevents damage to the plant / protection from damage (1)	accept pests for pathogens accept crops for plants	**(2)**

Question Number	Answer	Acceptable answers	Mark
3 (d)(i)	sun / light / day length / hours of darkness		**(1)**

Question Number	Answer	Acceptable answers	Mark
3 (d)(ii)	An explanation linking **two** of the following: • produce flowers/seeds at the correct time of the year (1) • to ensure it germinates at the right time (1) • stimulates growth (1) • open/close leaves / stimulates leaf-drop (1)	to ensure the plant reproduces at the correct time (1)	**(2)**

(Total for question 3 = 10 marks)

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	An explanation including **two** of the following linked points: • (40°C is) the optimum temperature(1) • (optimum temperatures) for enzymes to work (1) • if too hot then enzymes denatured (1) • if too cold the reaction will be slow (1)	Accept best temperature	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	lactose (1) thicken (1)	Answers must be in this correct order	**(2)**

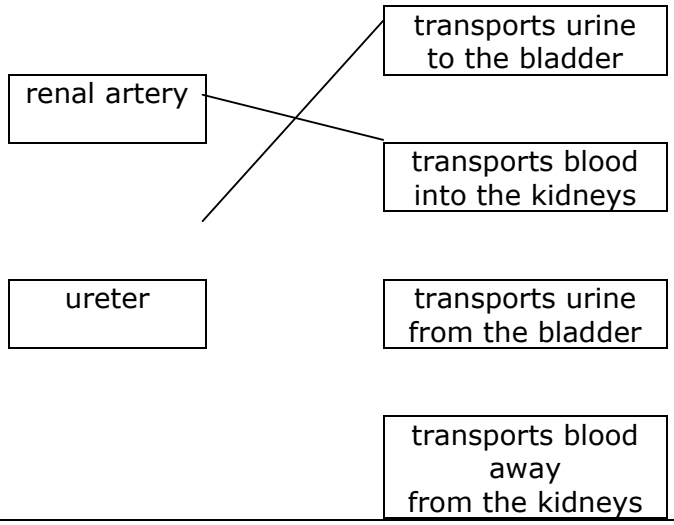
Question Number	Answer	Acceptable answers	Mark
4(a)(iii)	An explanation linking the following: • kill/ destroy (1) • microorganisms/bacteria (1)	Ignore 'get rid of' / remove	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(a)(iv)	**D** Louis Pasteur		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)	**B** invertase		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(c)	An explanation linking **three** of the following points: • (enzymes) can break down biological stains (1) • example of enzyme (1) • at low temperatures (1) • reduces energy use / cost	Accept a named biological stain e.g. blood, grass, fats Ignore 'dirt'	**(3)**

(Total for question 4 – 11 mark)

Question Number	Answer	Acceptable answers	Mark
5 (a)			**(2)**

Question Number	Answer	Acceptable answers	Mark
5 (b)	C liver		**(1)**

Question Number	Answe	Acceptable answers	Mark
5 (c)(i)	3600 ÷ 3 / 3600 x 1/3 (1) 1200	2 marks for the correct answer	**(2)**

Question Number	Answer	Acceptable answers	Mark
5 (c)(ii)	people have two kidneys / only need one kidney to survive (1)		**(1)**

<table>
<tr><th colspan="2">Question Number</th><th>Indicative Content</th><th>Mark</th></tr>
<tr><td>QWC
5(d)</td><td>*</td><td>An explanation linking the following

• male is XY
• female is XX
• male genotype is X^HY / H-
• female genotype X^HX^h / X^hX / Hh
• correct Punnett square or genetic diagram

<table><tr><td></td><td>X^H</td><td>X^h</td></tr><tr><td>X^H</td><td>X^HX^H</td><td>X^HX^h</td></tr><tr><td>Y</td><td>X^HY</td><td>X^hY</td></tr></table>
• 50% / 1 in 2 males are affected/have haemophilia
• 50% / 1 in 2 males are unaffected/no disease
• 50% / 1 in 2 females are carriers of the haemophilia allele
• 50% / 1 in 2 females are homozygous dominant/ unaffected</td><td>(6)</td></tr>
<tr><td>Level</td><td>0</td><td colspan="2">No rewardable content</td></tr>
<tr><td>1</td><td>1 - 2</td><td colspan="2">• a limited explanation which includes the genotype of at least one parent
• the answer communicates ideas using simple language and uses limited scientific terminology
• spelling, punctuation and grammar are used with limited accuracy</td></tr>
<tr><td>2</td><td>3 - 4</td><td colspan="2">• a simple explanation which includes the genotype of both parents and the offspring
• 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</td></tr>
<tr><td>3</td><td>5 - 6</td><td colspan="2">• a detailed explanation which includes the genotypes of both the parents and the offspring and includes probabilities of haemophilia inheritance
• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately
• spelling, punctuation and grammar are used with few errors</td></tr>
</table>

(Total for question 5 = 12 marks)

Question Number	Answer	Acceptable answers	Mark
6(a)(i)	**D** 3- 4 million years before present		**(1)**

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	*Australopithecus afarensis* had a smaller brain (1)	*ORA Homo erectus* had a larger brain	**(1)**

Question Number	Answer	Acceptable answers	Mark
6(a)(iii)	A description of an observable structural feature. The description must identify which skull is being referred to.	e.g. *A. afarensis* has a more protruding jaw *A. afarensis* has a narrower forehead *A. afarensis* has larger teeth *A. afarensis* has lower jaw angled forwards ORA *H. erectus*	**(1)**

Question Number	Answer	Acceptable answers	Mark
6(b)	A suggestion to include two of the following points: • (later tools) show more complex manufacturing methods(1) • to allow more specialised tasks(1)	later tools show more developed thought/dexterity in their manufacture Accept examples e.g. arrow heads for hunting, sharp edges for cutting	**(2)**

Question Number		Indicative Content	Mark
QWC 6(c)	*	A description of how fossils provide evidence of human evolution including: • fossils can be dated • different fossil evidence occurs at different periods of time • comparison of fossils indicates how humans changed over time • human fossils have been found dating back to 4.4 million years ago • the oldest known human fossil is known as Ardi • Ardi is a fossil of *Ardipithecus ramidus* • Lucy is another fossil that was discovered • Lucy is a fossil of *Australopithecus afarensis* • Lucy has been dated at 3.9 to 2.9 million years ago • more recent discoveries by Leakey • have dated fossils of human origin up to 1.6 million year ago	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• A limited description of general fossil evidence • 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 which includes general fossil evidence and reference to one or more named human fossil finds, e.g. *A. africanus*, *A. afarensis* • 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 which includes general fossil evidence and reference to the 'Lucy', 'Ardi' or Leakey fossil finds (Turkana boy). • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

(Total for question 6 = 11 marks)

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