edexcel

# Mark Scheme (Results)

## Summer 2016

## Pearson Edexcel GCSE in Biology (5BI3F) Paper 01 Unit 3: Using Biology

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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.

Full marks will be awarded if the candidate has demonstrated the above abilities.

Questions where QWC is likely to be particularly important are indicated (QWC) in the mark scheme, but this does not preclude others.

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 1 (a) (i) | An explanation linking two of the following:<br><br>increased chance of young surviving (1)<br><br>passing on parental genes (1)<br><br>example of parental care (1) | Accept: protection (from predators) / leaning life skills / parent feeds the young. | (2) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 1 (a) (ii) | sound/facial expression /pheromone/chemical signal (1) | | (1) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 1 (a) (iii) | **D** imprinting (1) | | (1) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 1 (b) | rewarded (1)<br><br>operant (1) | | (2) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 1 (c) | An explanation linking two of the following:<br><br>exposed to loud noises (1)<br><br>repeated exposure (1)<br><br>ignores harmless stimulus (1) | | (2) |

**Total for question 1 = 8 marks**

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 2 (a) | **D** aseptic precaution (1) | | (1) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 2 (b) (i) | temperature (1)<br><br>(rate of) stirring (1) | <br><br>**Accept** mixing<br><br>Accept pressure (1)<br>nutrient concentration (1)<br>yeast concentration (1)<br>oxygen (1)<br>volume of solution (1) | (2) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 2 (b) (ii) | **A description including two of the following:**<br><br>(collection of) carbon dioxide gas (1)<br><br>(over a) unit of time (1)<br><br>repeat (1) | Accept other method of measuring growth | (2) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 2 (c) (i) | A description including the following<br><br>rate of growth is highest/optimum at pH7 (1)<br><br>correct manipulation of data (1) | **ORA** | (2) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 2 (c) (ii) | (pH) affects enzymes (1) | Accept kills yeast | (1) |

**Total for question 2 = 8 marks**

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 3 (a) (i) | Any two from the following:<br><br>cheese has more fat (1)<br><br>cheese has more protein (1)<br><br>cheese has less carbohydrate (1)<br><br>cheese has less other nutrients and water (1) | ORA for yogurt | (2) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 3 (a) (ii) | (100/25) ÷4 (1)<br><br>4.5 (g) | two marks for correct answer | (2) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 3 (b) | A description including two of the following<br><br>chymosin (1)<br><br>coagulates milk protein/clots milk/forms curds (1)<br><br>compressed to form cheese (1) | | (2) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 3 (c) (i) | lactic acid (1) | Accept lactate | (1) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 3 (c) (ii) | **A** The number of bacteria increases and the pH decreases (1) | | (1) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 3 (d) | A description including the following<br><br>urea (1)<br><br>formed in the liver (1) | | (2) |

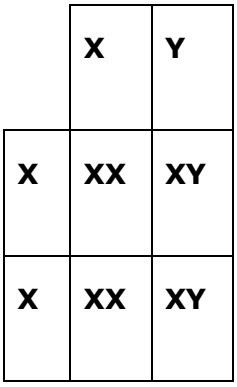
**Total for question 3 = 10 marks**

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 4 (a) | 100 ÷ 40 (1)<br><br>2.5 (times) | **Two marks for correct answer** | (2) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 4 (b) (i) | A description including the following<br><br>as length increases the swimming speed increases (1)<br><br>reference to correct readings from the graph (1) | ORA | (2) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 4 (b) (ii) | **An explanation linking three of the following:**<br><br>longer middle region (1)<br><br>more mitochondria (1)<br><br>more (aerobic) respiration (1)<br><br>more energy (released/available) (1) | | (3) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 4 (c) | **B** haploid (1) | | (1) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 4 (d) | correct parents gametes (1)<br><br>correct offspring genotypes shown (1)<br><br><br> | | (2) |

**Total for question 4 = 10 marks**

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 5 (a) (i) | 200 x 2 x 2 x 2 / (20 min) x3 (= 1 hour) (1)<br><br>= 1600 | 2 marks for correct answer | (2) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 5 (a) (ii) | **B** exponential (1) | | (1) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 5 (b) (i) | blue | | (1) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 5 (b) (ii) | An explanation linking two of the following:<br><br>more bacteria/faster growing bacteria (1)<br><br>more respiration (1)<br><br>low oxygen levels in the milk (1) | | (2) |

| Question Number | | Indicative Content | Mark |
|---|---|---|---|
| **QWC** | ***5c** | A description to include some of the following points<br><br>Edward Jenner<br>• developed vaccinations<br>• noticed milkmaids did not develop smallpox<br>• inoculated small boy with cowpox<br>• tried to infect the boy with smallpox<br>• the boy was immune to smallpox<br>• led to the eradication of smallpox<br><br>Louis Pasteur<br>• germ theory<br>• developed pasteurisation<br>• credited with development of aseptic techniques<br>• pasteurisation extends the shelf life of food products<br>• milk heated to 72°C for 15 seconds<br>• kills bacteria<br>• found that micro-organisms caused food and drinks to spoil<br>• also worked on development of immunisations to other diseases<br>• reference to Pasteur's work on rabies | **(6)** |
| **Level** | **0** | No rewardable content | |
| **1** | **1 - 2** | • a limited description linking at least one scientist with their major development<br>• the answer communicates ideas using simple language and uses limited scientific terminology<br>• spelling, punctuation and grammar are used with limited accuracy | |
| **2** | **3 - 4** | • a simple description linking both scientists with their major development OR a detailed description of the development of one scientist<br>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately<br>• spelling, punctuation and grammar are used with some accuracy | |
| **3** | **5 - 6** | • a detailed description of the major developments of both scientists<br>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately<br>• spelling, punctuation and grammar are used with few errors | |

**Total for question 5 = 12 marks**

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 6 (a) (i) | P (proximal/first) convoluted tubule<br><br>Q loop of Henle<br><br>R collecting duct | | (3) |

| Question Number | | Indicative Content | Mark |
|---|---|---|---|
| **QWC** | ***6a(ii)** | Explanation to include some of the following points<br><br>Glomerulus/Bowman's capsule<br>• filtration<br>• due to pressure changes<br>• eg glucose / urea<br><br>Convoluted tubules<br>• re-absorption of glucose/amino acids<br>• selective<br><br>Loop of Henle<br>• re-absorption of water<br>• osmosis / osmoregulation<br><br>Collecting duct<br>• re-absorption of water<br>• urine formation | **(6)** |
| | | | |
| **Level** | **0** | No rewardable content | |
| **1** | **1 – 2** | • A limited explanation which includes at least one named structure OR one function<br>• the answer communicates ideas using simple language and uses limited scientific terminology<br>• spelling, punctuation and grammar are used with limited accuracy | |
| **2** | **3 – 4** | • A simple explanation of at least two functions OR a detailed explanation of one structure with its function<br>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately<br>• spelling, punctuation and grammar are used with some accuracy | |
| **3** | **5 – 6** | • a detailed explanation of two structures with their functions<br>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately<br>• spelling, punctuation and grammar are used with few errors | |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 6 (b) | **C** ureter (1) | | (1) |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 6 (c) | A description including the following<br><br>organ donation (to replace diseased kidney) (1)<br><br>dialysis (1) | | (2) |

**Total for question 6 = 12 marks**

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