



# Examiners' Report/ Principal Examiner Feedback

## Summer 2015

Pearson Edexcel International GCSE  
Biology (4BI0) Paper 1B  
Science Double Award (4SC0) Paper 1B

Pearson Edexcel Level 1/Level 2 Certificate  
Biology (KBI0) Paper 1B  
Science Double Award (KSC0) Paper 1B

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## Chief Examiner's Report International GCSE Biology 4B10 1B

The examiners were impressed by the range of knowledge and understanding demonstrated by many of the candidates on the papers.

Candidates were also able to apply their knowledge and understanding, analysis and evaluation and investigative skills to some unfamiliar experiments or situations. Many centres have worked hard to carefully prepare candidates for the examination and this was evident in the responses of many candidates. Very few candidates failed to attempt questions. There was little evidence of candidates running out of time on any paper.

### Question 1

Question 1 required candidates to complete a diagram linking the characteristics of living organisms to their descriptions. Almost all candidates scored full marks.

### Question 2

Question 2 shows a section through a rat. Some of the rat's organs had been labelled.

In part (a) (i) most candidates were able to give the meaning of the term organ. Some failed to gain the mark for imprecise language such as 'something that carries out a specific function'.

In a part (ii) almost all correctly identified the organ as the heart.

In part (iii) most responses earned all 3 marks with popular correct responses being nervous, breathing and digestive.

In part (iv) many of the candidates identified reproductive, immune or lymphatic as systems not shown on the diagram.

In (b) candidates needed to complete the table by naming the correct organ process named. Most responses gained 5 or 4 marks with the organ for insulin secretion and bile production being the most common errors.

### Question 3

Question 3 provided candidates with information about a recessive genetic condition that affects vision in dogs. The paper gave students a series of crosses and their offspring.

In (a) (i) almost all candidates could identify the crosses that produced all offspring with good vision.

However a substantial minority of candidates failed to recognise the term phenotype so in part (ii) stated the genotype rather than giving the

phenotype. They fared better in parts (iii) – (iv) with almost all gaining credit.

In part (b) almost all could name the gametes produced by males but some named ovule as the female gamete and a few candidates named the vagina as the organ in which the offspring develops.

#### **Question 4**

Question 4 (a) required candidates to describe how smoking damages the lungs. The majority of candidates were able to gain credit with many response gaining all 5 marks for describing how smoking damages cilia, causes bronchitis, leads to bacterial build up, emphysema, damage to alveolar walls and reduction in surface area and thus less diffusion. Credit was also given for reference to tar build up and carcinogens in smoke.

Likewise in part (b) most candidates could write about how carbon monoxide will increase the risk of producing a smaller baby, with most gaining full credit.

#### **Question 5**

In question 5 (a) candidates had to describe the two chemical tests that could be used to identify glucose and starch. Many candidates did well and scored full marks but a small proportion described adding the unknown substance to starch and then adding iodine. Some even described testing a leaf. Candidates must learn to answer the question not merely rewrite their notes.

In part (b) a table needed to be completed to show an example from each group of organisms and the molecule they use to store carbohydrate. Almost all responses gave a correct example of a fungus but fewer gained full credit for naming the correct storage carbohydrate. Only the best candidates could identify glycogen as the storage carbohydrate in fungi.

#### **Question 6**

Question 6 described how water can be tested for cloudiness and thus pollution using a Secchi disk.

In part (a) students were asked to suggest two reasons why the conclusion that the scientists reached may not be correct. Most scored at least 1 mark usually for referring to for example other pollutants, lack of repeat measures, light conditions or variation within a lake.

In part (b) candidates needed to examine two graphs and use them to describe the relationship between phosphate levels and Secchi depth. Most could gain the first mark for stating that as the phosphate level in the lake rose the Secchi depth fell. However only the better response then described the levelling in Secchi depth and quoted data from the graph.

In part (b) (ii) candidates had to explain how the changes in phosphate levels might cause the decrease in the number of fish. This item produced a full range of responses earning from 5 right down to 0. The best candidates were able to earn full marks for explaining how the algal bloom will block sunlight, preventing photosynthesis, leading to the death of plants, and subsequent decomposition by bacteria that deplete oxygen in the lake.

In part (c) candidates had to interpret the chart provided to count the number of times the depth was measured and decide in which month most measurements were made. Almost all could successfully count to 22 and most could identify October as the month.

In part (d) (i) students needed to assess the evidence and Give a reason to support the conclusion that April was the only month in which it was unsafe to swim and then in (ii) suggest a reason to reject this conclusion. Most responses could give a reason to support such as depth was less than the safe swimming depth but fewer were able to identify a reason to reject the conclusion. The better candidates noted that only one of the two readings taken in April was less than the safe depth.

### **Question 7**

Question 7 gave students a graph showing the effect of a growth hormone on milk production.

In part (a) (i) candidates needed to state how much hormone should be given to the control group and a surprising number got this item wrong.

In part (a) (ii) almost all candidates could correctly describe the effect of the growth hormone on milk production.

In (b) (i) students were asked what was done to make the results reliable but only the best candidates were able to gain the mark for stating that the experiment was carried out on groups of cows. Many responses merely stated that the study was repeated without specifying how this was done.

In (b) (ii) most could give two variables that would need to be controlled such as species or breed of cattle, mass or food.

Part (c) asked what will happen to the growth hormone when it is pasteurized (i) and when it enters the stomach (ii). In part (i) many thought that the hormone was an enzyme but the best could describe how the protein would be denatured by high temperature. The weaker responses wrote about killing bacteria or killing enzyme. In part (ii) more candidates gained credit by reference to the hydrochloric acid in the stomach denaturing the protein and that the growth hormone would be digested by protease enzymes.

Finally part (d) required candidates to describe how bacteria can be genetically modified and used to produce growth hormone. Many candidates that had learned the steps involved and could write about the isolation of the allele that codes for growth hormone and use of restriction enzymes,

bacterial plasmids and insertion using ligase gained full credit. Some candidates wrote about cloning.

### **Question 8**

Question 8 (a) required candidates to plot a bar graph to show the number of heart attacks from 1969 to 1998. Many gained full marks but a few lost credit for plotting inaccurately usually caused by a poor choice of scale or by failing to include units.

In part (b) almost all could gain one mark for stating that men had more attacks than women and the better responses also gained a second mark for noting that the rate for men had decreased while the rate for women fluctuated.

In part (c) a large proportion of candidates failed to answer the question and described the change in rate between 1969 and 1998 rather than explaining it.

In part (d) most responses gained some credit for explaining why a reduction in blood supply to the heart can cause a heart attack. The best responses linked less blood to heart with less oxygen and thus less aerobic and more anaerobic respiration along with production of lactic acid.

### **Question 9**

Question 9 provided candidates with a diagram of a transverse section through a leaf.

In part (a) candidates needed to identify and explain how different layers help the leaf in photosynthesis. Most could identify each layer and explain its role. Some responses failed to identify the upper epidermis and wrote about the waxy cuticle.

In (b) candidates were asked to suggest a reason why the stomata are found on the upper surface of the leaves of a water lily. Most candidates were able to gain 1 mark for noting that the lower surface would be submerged but only the better candidates linked this to absorption of carbon dioxide and transpiration.

In (c) (i) almost all could correctly count the stomata with only a few counting the guard cells.

In part (ii) again almost all candidates could suggest that the upper surface of a land plant would have fewer or no stomata.

### **Question 10**

Question 10 showed a diagram of the male reproductive organs.

In (a) candidates were required to name the urethra, the sperm duct and the testis. Most were able to do this with some incorrectly identifying the urethra as the ureter.

In part (b) candidates had to explain how cutting the sperm duct would prevent the man's partner becoming pregnant. Most responses earned at least 1 mark often for describing how sperm would not leave the urethra so be absent in semen. The best candidates went onto to describe that no sperm would therefore be able to fertilise the egg.

Part (c) asked candidates to suggest why the sterilisation operation is more common in men than the corresponding operation in women. This was a challenging item and discriminated well between candidates. The very best candidates noted that the testes lie outside the body and that the operation in women would therefore be more invasive and carry more risk. Some wrote about how the operation in women would interfere with hormone secretion or menstruation or that men only have one sperm duct.

In part (d) almost all candidates were able to identify testosterone as the hormone released and the best could give two functions of the hormone.

### **Question 11**

Question 11 provided some experimental data on the effect of different fertiliser regimes on different plant species.

In part (a) (i), most candidates could identify that the greatest reduction in yield was due to the absence of nitrate.

In part (ii) many also were able to explain the role of nitrate in producing amino acids and subsequent protein synthesis.

In (b) most candidates could identify, from the data, rye as the plant most affected by lack of potassium.

In part (c) students were asked to suggest why the minerals had different effects on lowland rice and upland rice. Only the better candidates gained this mark for noting that the soil may contain different mineral contents or that the rice may be different species.

In part (d) some candidates had no idea what dry mass was so were unable to suggest why it was used or suggest how it might be determined. The best candidates were able to describe dry mass as being unaffected by varying water content and describe a method for its determination using an oven and reweighing until the mass is constant.

In (e) candidates were asked to explain why a percentage is used rather than kg per m<sup>2</sup>. Those candidates who had used percentage calculations in their practical work or in previous assessments had no difficulty in gaining both marks.

Finally in (f) candidates were required to calculate the percentage of the maximum yield given data values. Most gained full credit for this calculation.

### **Question 12**

The last question was the experiment design item asking students to design an investigation to find out if people who have eaten garlic are less likely to attract mosquitoes than people who have not eaten garlic. This item produced a full range of responses earning from 6 right down to 0. Many students gained full credit and have obviously benefited from practising these items during examination preparation.



## Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>

