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Examiners' Report/ Principal Examiner Feedback

January 2015

Pearson Edexcel International GCSE in Biology (4BI0) Paper 1B

Or

Pearson Edexcel Certificate in Biology (4BI0) Paper 1B

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The examination in January showed, once again, the knowledge and understanding of the candidates and the hard work put in by the centres to prepare for the examinations.

Question 1

The first question 1 (a) required candidates to complete a table showing the effects of hormones by naming and giving the sources of the hormones. Most candidates were able to name testosterone and name and give the source of ADH. Some candidates failed to identify oestrogen but correctly gave the source as the ovaries.

In 1(b) candidates were asked to suggest why cells do not store glucose. Some responses noted that glucose is soluble and the very best responses identified that this would have an osmotic effect on the cell.

In 1 (c) most candidates could identify the correct line from a graph that showed the change in insulin, glucose and glycogen following a meal.

Question 2

Question2 showed two photographs of red onion cells viewed under a microscope. One showed epidermal cells immersed in distilled water and the other cells immersed in salt solution. In part (a) most could suggest why red onions are used as they are easier to see down a microscope. In (b) (i) almost all candidates could explain what is meant by the term osmosis. Students can use any suitable description that clearly indicates that water moves from a dilute solution to a more concentrated solution. In (b) (ii) only the very best candidates were able to fully explain why the cells in distilled water look different when compared to the cells in salt solution. The best responses included, for the distilled water, the entry of water into the cell from a dilute to a more concentrated solution causing the cell to become turgid with the cell membrane pushed against the cell wall. In part (c) many candidates were able to explain why no cells would be seen when red blood cells are placed in distilled water and examined under a microscope. They mentioned the lack of cell wall allowing the cell to burst as water enters down an osmotic gradient.

Question 3

Question 3 described a student investigating the effect of temperature on the rate of starch digestion by amylase. It included a photograph showing his results for 20^{o}C at the end of the experiment when all the wells have mixture added.

In part (a) candidates needed to give one safety precaution they would carry out and state the number of minutes the samples of mixture added to the spotting tile in the photograph represents. Almost all could give a sensible precaution such as wearing

safety glasses but fewer were able to correctly identify that the results showed 11 minutes.

In part (b) candidates were asked to explain the purpose of some the experimental steps. Some could explain why the student rinses the outside of the syringe with water from a tap. Many could explain why he then rocks the syringe containing the mixture gently backwards and forwards for one minute. Almost all could explain why the student keeps the syringe containing the mixture in the water bath at 40 °C between drops.

In part (c) (i) most candidates could identify two variables that should be controlled such as volume and concentration of starch and volume and concentration of amylase. Centres should discourage the use of the word 'amount'. Most candidates could also identify in (ii) the name of the independent variable as temperature.

In part (d) candidates had to use the photograph of the results to explain how many minutes it took for the reaction to be completed at 20 °C. The best candidates earned 3 marks by noting that the reaction took 6 minutes; as at 6 minutes the iodine stayed yellow; showing that no starch was present; as it had all been digested by the amylase.

In part (e) (i) candiadtes were asked to describe how the results would appear different if the trial was carried out at 40 °C rather than 20 °C. The best responses described how there would be fewer blue-black wells and more yellow wells as the starch would be digested faster. In part (e) (ii) candiadtes were then asked to explain why these results would be different. Most candidates were able to explain that the reaction at 40 °C is closer to the enzyme's optimum temperature and so the reaction will be faster. The better responses also described more kinetic energy for the enzyme and substrate molecules and therefore more collisons. This question illustrated the need for centres to go through the experiments described in the specification. Those centres in which candidates had carried out this or a similar experiment performed better in this question.

Question 4

In question 4 (a) candidates had to describe two ways in which the structure of an artery differs from the structure of a vein. Most were able to do this correctly.

In 4(b) candidates had to identify blood vessels from a diagram and state which had most glucose, least urea and least oxygen.

Question 5

Question 5 required candidates to explain how the rate of transpiration is affected by changes in the environment. Most could describe the changes in rate but only the best candidates gaine dfull marks by explaining the reasons for the changes.

Question 6

Question 6 asked about leaf miner feeding on tomato leaf tissue. In part (a) candidates had to explain how feeding on mesophyll tissue will affect tomato production. many candiadtes earned full credit for noting that the mesophyl contains chloroplasts which are required for photosynthesis so fewer chloroplasts would mean less glucose produced so less growth.

6(b) (i) required candidates to use their knowledge of natural selection to explain why the population of resistant forms of the leaf miner has increased. Many could describe variation and explain how a random mutation enables some miners to survive and reproduce. This would increase the frequency of the allele confering resistance in the next generation.

In 6 (b) (ii) the best candidates were able to suggest that because the miner is within the leaf this would prevent pesticide being effective.

In 6 (c) (i) candidates had to name the type of pest control being used and almost all could correctly identify biological control. In part 6 (c) (ii) candidates found it difficult to clearly express why the release of sterile male tomato leaf miners has also been successful in controlling the leaf miner. Only the best candidates scored full credit for describing how matings would not result in fertilisation of eggs so fewer larvae would hatch. Other good responses included competiton between fertile and sterile males reducing successful matings.

Part 6(e) asked candidates to design an investigation to find out if a pheromone trap would help to control the leaf miner. Following the change to instructions on the paper most candidates wrote in full sentences and many scored well on this item. As written before in these reports centres should help candidates practise these items so they can apply their skills to a range of different topics.

Question 7

Question 7 (a) asked candidates to explain the term decompose and most could do this. In part 7(b) almost all candidates gained both marks for drawing a food chain with only a few drawing the arrows in the wrong direction.

In part 7(c) a table of data was provided and candidates needed to calculate the percentage humus using the formula provided. Most could do this but some failed to identify the correct match of humus content in part 7(c) (ii). In part 7 (c) (iii) many candiadtes could notice that the data was not reliable as no repeat readings ahd been taken.

Question 8

Question 8 (a) required candidates to complete a table on digestion and many could correctly identify all of the substrates , enzymes and products.

In part 8(b) students had to give three ways in which villi are adapted to absorb small food molecules. Most could gain 2 out of 3 marks with the better responses including reference to a large surface area for diffusion and thin walls and a capillary and lacteal for absorption.

Question 9

Question 9 (a) asked candiadtes to name two substances that are transported in the xylem. Most reponses identifed water and either mieral ions or a named mineral ion.

Part 9 (b) required candidates to draw and label a root hair cell. Those candidates familiar with these specialised cells had no problem doing this, others failed to earn full credit by drawing a generalised plant cell or poor labelling of the cell wall and membrane.

Question 10

Question 10 presented candidates with an abnormal human karyotype.In part (a) candidates had to count the chromosomes and identify the sex of the person from whom the sample was taken. Most responses correctly did this. In part (b) students needed to state how the chromosomes in the photograph differ from those found in a typical human body cell. Candidates again struggled to clearly express their answers. The best responses noted that the sample contained an extra chromosome and that it was an extra Y chromosome.

In part 10 (c) (i) candidates were usually able to identify the cell division that produces sperm cells as meiosis. In part 10 (c) (ii) only the most able were able to clearly suggest how an individual with the chromosomes shown could be produced.We expected a statemment about failure of chromosomes to separate and the production of a sperm cell containing YY that fertilises a normal egg cell.

Question 11

Question 11 concerned a genetic condition determined by a dominant allele. In part 11(a) candidates had to use a genetic diagram to show the parental genotypes, the gametes produced and the possible genotypes and phenotypes of the offspring. Most were able to do this with only a few candidates failing to earn full credit by not clearly identifying the gametes formed or by failing to include the phenotypes of the offspring.

11(b)(i) required candidates to use the information in the question to explain why it is difficult for the doctor to decide if the person has the condition. many correct answers noted that the symptoms are not always displayed or that being tall with long limbs does not mean you have Marfan syndrome. In part (b) (ii) many responses described

the other information the doctor could use to decide if the personhas Marfan syndrome. Answers that earned credit included lokking at the family history or using a genetic test or looking for a combination of symptoms.

11(c) asked candidates to explain how examining a family pedigree would enable you to tell if a condition was caused by a recessive allele. Again only the best candidates were able to clearly express their knowledge. Clear points credited were that if the condition is absent in both parents but present in offspring or that recessive conditions have carriers.

Question 12

Question 12 had a passage to complete on organisms and their ecology. Most candiadtes scored at least 4 marks with the most common errors being confusing reliability and accuracy and population with community.

Question 13

Question 13 (a) asked candidates to describe how the process of micropropagation (tissue culture) can be used to produce plants with desirable characteristics. A number of candidates thought this was about genetic modification and wrote detailed accounts about this. However ,many scored well. I part (b) most could give two advantages of of using micropropagation rather than using seeds to produce plants with desirable characteristics. Some responses failed to earn full credit by not refering to **genetic** variation.

Question 14

Question 14 required candidates to complete a table to indicate the structures present in bacteria , fungi and viruses. Most responses earned 1 or 2 marks out of 3.

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

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