edexcel

Examiners' Report/ Principal Examiner Feedback

Summer 2016

Pearson Edexcel Certificate GCSE Biology (KBI0) Paper 2B

Pearson Edexcel International GCSE Biology (4BI0) Paper 2B

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2016
Publications Code 4HB0_01_1606_ER

Examiner's Report International GCSE Biology 4BI0 2B

The examiners were, once again, impressed by the knowledge and understanding shown by candidates on the papers. Candidates were able to apply their knowledge and understanding, analysis and evaluation and investigative skills to some unfamiliar experiments and to new contexts. Centres have worked hard to prepare students for the examination and this was evident in the responses of candidates. Few candidates failed to attempt all questions. There is no evidence of candidates being short of time on this paper.

Q1 The comprehension examined candidate understanding of carnivorous plants. Part (a) was a gentle introduction and most candidates appreciated that respiration is the process used by plants to release energy from glucose. Similarly, in part (b), most were able to deduce that the reason why non-carnivorous plants need to attract insects is to enable pollination. Part (c) was more challenging with many struggling to appreciate that the Venus fly trap could be placed at the producer, secondary consumer or tertiary consumer level. The term carnivore was not accepted, nor was the term secondary when used alone.

Part (d) rewarded those candidates who understood that the hair mechanism allows the trap avoid closing with wind, or if an inanimate object fell into the trap. Credit was also given to candidates who recognised that the mechanism encourages the trap to close only if an insect is present. As a result, credit was given to those candidates who appreciated that this avoids wasting energy or the enzymes in the digestive fluid. Most were able to comment sensibly on the former idea but only the better candidates acknowledged the idea of saving energy.

Part (e) troubled many candidates. One mark was available for quoting the term 'osmosis' in the correct context. This term was accepted even in a list containing the other usual suspects of diffusion and active transport. The second mark was only given to those candidates who made reference to the solution in the cells having a high concentration. The term 'low water potential' was accepted even though not expected at GCSE level. The term 'low water concentration' was not credited.

Part (f) was reasonably well-answered with many candidates making reference to reducing the chance of competition for the food in the trapped insect and also reducing the risk of the plant having a disease.

Part (g)(i) challenged candidates though most gained at least 1 mark, usually for a correct reference to mechanical digestion. The examiners rewarded the ideas of a lack of mechanical digestion resulting in less surface area for enzymes. Part (g)(ii) was well done with most candidates offering 'protease' as their answer. The examiners accepted any named digestive enzyme.

Part (h) was the most challenging part of question 1 with a mean mark of 1.31. The most common correct responses were temperature and the size of the insect, although a large number wrongly gave pH as an answer. Few candidates gave correct explanations after naming the factor and tended to give vague references to enzymes being affected or being denatured. The composition of the insect and the enzyme concentration were other responses that the examiners rewarded.

Q2 This question examined candidate understanding of water pollution. Part (a) required students to recall that nitrogenous waste is a product of protein in the diet. Therefore, credit was given to candidates who made reference to the two fish having different diets or that, as different species, they may have different metabolism. A range of responses linked to these ideas were accepted.

The calculation in part (b) posed little difficulty for most with a mean mark of 1.62. Candidates are encouraged to use sensible significant figures. As such, only 28.9 or 28.92 were accepted for both marks. If an unacceptable answer was given, one mark was available for seeing 0.4, 0.0723 or 2.5 in the working.

Part (c) expected candidates to describe the effect that eutrophication has on the environment. The examiners were pleased to note that many students were able to recall that algal blooms block light and prevent photosynthesis of other water plants. The subsequent decomposition by respiring bacteria depleting oxygen levels to the extent that fish die was also in evidence in many answers. Some candidates wrongly believe that nitrates are toxic and this is what kills the fish. The mean mark of 3.66 indicates that student knowledge of eutrophication is very good.

Part (d) tested understanding of vaccination. Only the better candidates were able to write clear, erudite prose to explain that treatment with an attenuated pathogen would expose the fish to pathogen antigens which would stimulate the eventual production of memory cells and that these cells would assist with a secondary immune response in which antibody production would be sooner, faster and in greater quantity. Many candidates seemed to struggle with this question, often confusing antigens and antibodies, or failing to recall the pattern of events. These weaker candidates gave general suggestions of how the fish would have more energy to grow, or wouldn’t infect other fish. Many candidates referred to weakened diseases and many gave vague references to kill infection faster rather than faster immune responses. Many candidates described the immune response but not in the context of a vaccine. The mean mark was 1.09.

Q3 This question tested candidate understanding of the inheritance and biological consequences of familial hypercholesterolemia.

Part (a) (i) required candidates to analyse a family pedigree to determine the number of people in the pedigree with a homozygous recessive genotype and a homozygous dominant genotype. The correct answer of 11 for the homozygous recessive genotype was more commonly seen than the correct answer of zero for the homozygous dominant genotype. Part (a) (ii) was challenging for candidates and only the better students were able to correctly calculate the probability as 0.125. Many gave 0.5 as their answer.

Part (b) required students to explain what would happen to muscle cells if cholesterol builds up in an artery. The examiners rewarded candidates who acknowledged that the muscle cells would revert to anaerobic respiration due to deprivation of oxygen needed for aerobic respiration. Credit was then given to those who stated that the lactic acid produced would denature cellular enzymes and prevent contraction of the muscle cells. Many candidates included these ideas in their answers. Marks were lost be referring to respiration alone rather than being more precise and referring to aerobic or anaerobic. This question discriminated well and had a mean mark of 2.39.

Q4 This question examined the use of plastic sheets on the growth of plants. Part (a) (i) required students to name plastic as the independent variable. Weaker students confuse the idea of an independent variable with that of a control variable. In part (a) (ii), most candidates produced good answers that made reference to the ideas of replication, treatment of anomalies and concordant results. Part (a) (iii) required candidates to name three abiotic factors that should be controlled to allow a valid comparison of plant growth. Most candidates were able to score highly by naming carbon dioxide, temperature, water or mineral content of the soil. Credit was not given for nutrients or light intensity.

Part (b) required students to suggest why plants grow better when the soil is covered by black plastic. The examiners credited answers that were relevant to black plastic such as preventing light access to impede the growth of weeds, or references to heat retention that would affect reactions in plant cells. The examiners also credited answers that were relevant to any plastic such as preventing evaporation to increase availability of water in the soil, or prevent pest access that may damage plants. A surprisingly large number suggested that black plastic would absorb more light energy for the plants and thus increase the rate of photosynthesis.

Q5 The first part of this question required the analysis of data about gestation periods in different deer. In part (a) (i), most candidates were able to describe the relationship between size and body mass and part (ii) was also well-answered, with most recognising that the roe deer has the longest gestation period despite having a small mass.

Part (b) required candidates to describe the role of the placenta. The question discriminated between those who write detailed prose rather than general ideas. For example, stating that the placenta allows exchange of substances is not as credit worthy as stating the names of these substances. Thus, weaker candidates state that the placenta allows wastes to be removed but better candidates name these wastes as carbon dioxide or urea. The examiners credited the idea that oxygen and glucose diffuse across the placenta to enable respiration, amino acids diffuse across to allow proteins to be made and that vitamins or mineral ions also pass from the mother to the developing embryo. The term ‘nutrients’ was is the stem of the question, so was not credited. This question discriminated well with a mean mark of 1.65.

Q6 This question tested understanding of how the eye responds to changes in light intensity. Part (a) was a straightforward introduction and most candidates scored by giving an answer within the range of 6 to 7 mm. The units were provided on the answer line so an answer of 0.7 was not credited.

Part (b) required simple recall of the term ‘retina’ and most candidates scored this mark. The ‘fovea’ was also credited but not the naming of rods or cones as the wording in the question negates these responses.

Part (c) required students to make reference to the events that occur during the pupil reflex. Many excellent answers made correct reference to contraction of radial muscles and relaxation of circular muscles causing dilation of the pupil to allow more light into the eye. There is confusion in the minds of some candidates about the muscles involved as the examiners saw many references to ciliary muscles and suspensory ligaments. Many candidates began their answer by writing about events that take place in bright light, thus wasting valuable time.

Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE