edexcel

Examiners' Report/ Principal Examiner Feedback

January 2016

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

Or

Pearson Edexcel Certificate in 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

January 2016
Publications Code UG043000

Question 1

The comprehension allowed students to demonstrate their understanding of cloning. Most students were able to score on the first question by noting the correct meaning of the term 'enucleated'. The few who failed to score wrote about the removal of DNA rather than a nucleus or were confused about fertilisation of gametes.

Part (b) was also well answered with most noting the retina as the part of the eye containing photoreceptors. Students who hedged their bets by naming two structures such as the retina and the iris lost the mark.

Part (c) was more challenging. Most appreciated that a lack of oxygen would inhibit aerobic respiration and many explained that this would result in a reduction in ATP synthesis. Only a few of the better candidates appreciated that the cells would have to revert to anaerobic respiration with the consequent production of lactic acid. The resulting fall in pH and the effect of this on enzymes was seldom seen.

Part (d) illustrated the importance of reading questions carefully. This question asked about the structure of capillaries, so answers that only discussed the function of capillaries failed to gain credit. The examiners credited answers that made it clear that capillaries are thin, have pores and have a short diffusion distance.

Part (e) was a challenging question that tested comprehension of the benefits of organs produced by therapeutic cloning. The examiners rewarded students who appreciated that these organs are less likely to be rejected by the recipient, do not pose the problem of donor shortage and are likely to be free from disease.

Part (f) discriminated well with many candidates providing excellent answers. Sadly many confuse cloning with genetic modification and wrongly mention the use of restriction and ligase enzymes, and also mention that genetically modified DNA is inserted into an enucleated egg.

Question 2

This question examined understanding of the use of a mass potometer to measure the rate of transpiration. In part (a) (i), examiners rewarded candidates for appreciating that mass had to be measured, but to get the second mark, candidates needed to measure rate and so mention of a time period was required. It was surprising to note that part (a) (ii) posed considerable challenge to many. The examiners rewarded the drawing of a balance, a conical flask showing water with an oil layer and the absence of a plant. A variety of variations were seen. Many left out the balance or failed to include the oil layer. Many simply drew the apparatus as it appeared in the paper. There were also drawings of irrelevant apparatus such as stop watches and rulers.

In part (b), most were able to note the increase in warmer air and the decrease with increased humidity. The explanations were more challenging, though the examiners did see excellent answers describing increased kinetic energy in warmer air, stomatal closure in the dark and an increased concentration gradient with increased wind.

Candidates struggled to give two reasons why transpiration is important to plants in their answer to part (c). The examiners allowed credit for supply of mineral ions, support, cooling and the supply of water for photosynthesis.

Question 3

Many candidates answered part (a) by making reference to energy loss rather than concentrating on energy absorption. The examiners rewarded those candidates who appreciated that cows eat plants and understood that plant tissue is difficult to digest as it contains cellulose.

Candidates had more success with part (b). The most common acceptable answer made reference to the larger size of a cow. The examiners also accepted ideas linked to heat loss or that a larger animal will use more energy in movement.

In part (c), many candidates were able to comment on the benefit of keeping animals indoors and restricting movement. Some also commented on the advantage of feeding the animals with easily digested food. Linking these ideas to productivity and energy transfer was more problematic.

Question 4

This question examined knowledge and understanding of a fermenter. Part (a)(i) rewarded candidates for understanding that paddles play an important role in mixing the contents to allow microorganisms to access oxygen and food, and that they also distribute heat. Some candidates seem to think that the paddles are involved in the regulation of temperature. Part (a)(ii) was well answered with many candidates appreciating the need to provide an optimum pH to avoid denaturation of enzymes. In part (a)(iii), the examiners awarded any named product that could be manufactured in aerobic conditions. The most common correct answers were antibiotics and insulin. The most common incorrect answer was beer.

Part (b) expected candidates to modify the design of the fermenter so it could be used to produce biogas by anaerobic respiration. Candidates were rewarded for stating that the air supply should be prevented. This mark was not awarded if the answer implied that there should be a reduction in the air supply. Another mark was available for indicating that there had to be an exit pipe for the biogas.

Question 5

There were a vast array of colours suggested in answer to part (a)(i). The examiners only accepted red or orange for flask X and yellow for flask Y. To gain the mark in part (a)(ii), candidates needed to make it clear that carbon dioxide was responsible for the colour change.

Part (b)(i) was more challenging. However, the examiners noted some excellent responses in which candidates made it clear that the colour change is faster with a small hamster because its larger surface area to volume ratio would result in more heat loss, and that to maintain body temperature the hamster would need to respire more. The converse argument was credited if candidates answered from the point of view of a big hamster. Many candidates gained credit in (b)(ii) by acknowledging the need to provide an optimum temperature for enzyme function.

Part (c)(i) was well answered and it is pleasing to note that many candidates appreciate the need to replicate to achieve reliability. Understanding of accuracy proved more challenging, and in part (c)(ii) only the better candidates understood that subjectivity is involved with measuring time using a colour change seen by eye. Answers to part (c)(iii) showed good understanding of the variables that should be controlled. The examiners rewarded the biotic variables of age or species of hamster, and the abiotic variables of temperature and volume or concentration of indicator. Candidates are encouraged to use proper scientific terms and should note that the examiners gave no credit if candidates made mention of the 'amount' of indicator.

Question 6

Most were able to give an acceptable description of germination by mentioning the appearance of a plumule or a radical. In part (b), most were able to give some of the factors that affect germination but only the better candidates offered satisfactory explanations.

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

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