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Examiners' Report/ Principal Examiner Feedback

Summer 2015

Pearson Edexcel International GCSE in Biology (4BI0) Paper 2BR

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Examiner's Report International GCSE Biology 4BI0 2BR

Question 1

The passage provided for question 1 in this examination concerned Pavlov's work on conditioned reflexes. It provided an appropriate stimulus to cover a range of topics from across the specification material.

In part (a) candidates were asked about the function of saliva in humans. Almost all gained credit with many gaining full marks for reference to amylase and its role to digest starch into maltose.

In part (b) candidates had to complete the table by giving two sense organs that the dogs use to detect the arrival of food and the stimulus that each sense organ detects. Most candidates were able to score one or both marks.

Part (c) required candidates to explain how reflex responses, such as blinking, differ from other nerve responses, such as picking up a pencil. Most scored 1 mark for reference to reflexes being automatic and the best candidates were also able to state that reflexes are innate or not learned.

In part (d) (i) candidates had to suggest why notes G and D produce a greater response in the dogs than notes E and F. Most could link the greater response to the fact that G and D were of a similar frequency to the note originally presented. Weaker students wrote about dogs not hearing these notes.

In part (ii) students needed to suggest a method of measuring the size of the conditioned response. Students who have had the chance to undertake a range of practical work in their course will be better prepared to answer these kinds of items. Only the best candidates were able to gain both marks for collecting the saliva in a measuring cylinder and recording its volume.

Part (e) required candidates to suggest why the conclusions from animal experiments may not be valid for humans. Although most candidates cored 1 mark only the best gained both for noting differences in the behaviours exhibited by humans and animals or the stimuli they respond to and the differences in their brains and nervous systems.

Finally part (f) required candidates to explain the structure and functioning of a simple reflex arc, using the example of the withdrawal of a finger from a hot object. Most responses earned good credit with the majority scoring full marks. Very few responses failed to score on this item.

Question 2

Question 2 presented a diagram showing a human foetus developing in the uterus.

In part (a) candidates were asked to describe the function of the amniotic fluid surrounding the foetus. Most responses gained both marks for describing how the fluid protects the foetus from physical damage acting as a shock absorber.

Part (b) (i) asked candidates to name two substances, required by the foetus, that move from the mother's blood into the blood of the foetus. Most were able to name oxygen, glucose or amino acids as suitable substances.

In part (b) (ii) almost all responses could name the two waste substances that move from the blood of the foetus into the mother's blood.

In part (c) candidates were required to Use information from the diagram to help explain how the placenta is adapted for the efficient exchange of substances. This item produced a full range of marks with most gaining all 3 for reference to villi increasing surface area, short diffusion distance and a rich capillary network that maintains the concentration gradient.

Question 3

In question 3 (a) candidates had to complete a table about food products produced by microorganisms. Most scored at least 3 out of the 5 marks available with the most difficult items proving to be the substrate used in yoghurt production (lactose) and the chemical product (lactic acid).

In part (b) most were able to explain a precaution to that should be taken when making yoghurt so that it is safe for humans to eat.

Question 4

Question 4 described an investigation using eggs to study osmosis.

In part (a) (i) students had to identify the dependent variable in the experiment. The majority were able to correctly identify mass.

In part (ii) most were able to explain the result for the egg placed in distilled water in terms of water entering down a water potential gradient.

In part (b) (i) students needed to use the data from the graph to calculate the percentage change in mass for the egg placed in 15% salt solution. Almost all gained 1 or 2 marks with the majority correctly calculating -10%. Some lost credit by not indicating a loss in mass.

In part (ii) students then had to plot their calculated value on the axis provided. Most were able to do this but some having calculated -10% then plotted it as 10%.

In part (c) almost all candidates could correctly give one way in which osmosis differs from diffusion.

Question 5

Question 5 gave candidates a graph to show the biomass of the plants in 3 different areas in g per m^2 each year for a period of 20 years.

In part (a) candidates had to calculate the increase in biomass in g per m^2 per year for area C. Most gained full marks for this with the most frequent reason for error was failing to deduct the original mass of the plants of 200g per $m^{2.}$

In part (b) (i) candidates had to explain how abiotic (non-living) factors could cause the difference in biomass. A whole range of responses was seen with many gaining full marks for referring to more sunlight, more photosynthesis and higher temperatures for optimum enzyme action. Other credit was given for identifying a suitable mineral on and explaining its use.

In part (ii) candidates did less well at explaining how biotic factors could cause this difference. The best responses referred to fewer herbivores in A and to other species competing for light or other resources. A worrying number of candidates seem to believe that herbivores can be described as predators.

Finally part (c) gave candidates a formula requiring calculation of energy transfer efficiency. Most responses scored both marks.

Question 6

The last question 6 provided students with description of and data from an experiment on the effect of varying pH on the action of amylase on starch agar.

In part (a) candidates had to measure the diameter of the clear zones from the plate. Almost all gained the mark for this.

In (b) (i) most could explain why there is a clear zone around some of the wells containing amylase.

In part (ii) fewer gained high marks as they failed to refer to pH data to explain why the clear zones have a range of different diameters. Only the best responses mentioned that the optimum was at pH 7 or that the enzymes denatured at pH 2 or pH 13.

In part (c) most could identify pH as the independent variable in this investigation.

In part (d) candidates had to suggest 3 variables that should be controlled. Very few responses identified 3 variables correctly but most responses gained some credit for: the volume of amylase, the concentration of

amylase, the source of amylase, the depth of the agar and the time the plate was left for.

Finally part (ii) required students to draw on the diagram the results they would expect if the experiment was repeated at a higher temperature. Most gained both marks available.

Grade Boundaries

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