

Examiners' Report Summer 2008

IGCSE

IGCSE Biology (4325)

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Summer 2008

Publications Code UG020247

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4325 Biology Paper 1F

General

The paper was felt to be of a similar standard to those set previously. The candidates' performance was felt to be similar to that of the previous series. The paper discriminated well, with a very wide range of marks seen. The full range of marks was seen for each part of each question.

Question 1

The multiple choice questions were a gentle start to the paper - many candidates showed good knowledge and scored 7 marks or more. The questions that were answered less well were (h) where many were confused between respiration and photosynthesis and (j) where many did not calculate from the end of the race.

Question 2

This question tested the candidates' knowledge and understanding of the eye. Part (a) was answered well by some and less well by others. Most knew the retina, but many were confused between pupil, cornea, lens and iris. In part (b), most knew the letter that represented the part containing the light sensitive cells, although fewer knew the letter that represented the part that controls the amount of light entering the eye.

Question 3

This question tested the candidates' knowledge of food chains. In part (a), most candidates scored one or two marks. However, some had water plants at the top of the pyramid and others did not label the pyramid. The majority of candidates gained full marks in both parts of (b), showing a good knowledge of the interactions of the different members of the food chain.

Question 4

In this question, candidates were required to show their knowledge and understanding of the different parts of the water cycle and the part trees play in this. Part (a) was poorly answered, with very few candidates able to give the correct terms for the different processes shown in the diagram. Part (b) produced a mixed response. A significant number lost marks because they did not give a full enough answer, either relating to roots or to leaves.

Question 5

This question tested the candidates' understanding of the structure and function of the lungs. Most candidates gained the mark in part (a) for the labelling of the trachea. Part (b) discriminated well, with the full range of marks being seen. Few candidates knew about cartilage. Part (c) also discriminated well. The majority of candidates gained one or two marks, usually by saying that the diaphragm moved down and the volume of the lungs was increased.

Question 6

This question tested the candidates' understanding of the factors affecting photosynthesis. In parts (a) and (b) some candidates appeared confused about the relationship between the space occupied by the gas and photosynthesis. In part (c) most could identify at least one additional factor that could affect the amount of gas produced, the most common answer being carbon dioxide.

Question 7

This question tested the candidates' knowledge and understanding of the production of yoghurt. In part (a) most knew that the enzymes responsible would be denatured. In part (b) most candidates recognised that the pH was decreasing and would continue to decrease. Other common changes given were solidifying and the formation of lactic acid. Most candidates gained at least one mark in part (c), usually for saying that bacteria were killed.

Question 8

Candidates were given the opportunity to demonstrate their knowledge and understanding of the kidney in this question.

Part (a) was answered well. Many candidates got the idea in part (b) that protein is too large, but few could amplify their answer for the second part. Part (c) challenged many candidates. Some got the idea of reabsorption, but few could provide any further detail. Others went down the route of diabetes and scored marks there.

Question 9

Many candidates were able to score at least 3 or 4 marks here. Some could not give an example of a virus and gave a bacterium instead.

Question 10

This question tested the candidates' knowledge and understanding of deforestation and its effects.

Many candidates gained one mark in part (a) for explaining how building the road would improve access, few gained the second mark for suggesting how the road could enable development of farming, mining or other land use. In part (b) many candidates were able to gain credit for explaining two effects of deforestation. Suitable examples included loss of habitat leading to loss of species due to migration or extinction and less photosynthesis leading to increased carbon dioxide levels.

Question 11

This question of plants tested reproduction, growth and photosynthesis.

In part (a) most candidates were able to identify the anther as the part of the flower that produces pollen and label it on the diagram. A few responses pointed to the filament. Pollination was accurately described by many candidates as the transfer of pollen, but not many gained the second part by saying from the anther to the stigma. In part (b) almost all responses were able to identify light or gravity as the stimulus for upward growth in a plant stem. Candidates who wrote a correct symbol equation for photosynthesis in part (c) did not lose credit but were more likely to make an error than those writing the word equation. Some responses to (c) (ii) described how the leaf is adapted to photosynthesis rather than how it is adapted to gas exchange so did not gain full credit.

Question 12

This question brought together the effects of exercise and smoking on heart rate. It also tested the candidates' ability to analyse data.

In part (a) most gained at least one mark, and some gained two marks for describing how the heart rate increases up to a rate of 124 at 50 minutes then levels off. Almost all were able to identify the hormone in part (b) as adrenaline but not always spell it correctly. In part (c) most candidates could explain that smoking would lead to an increase in heart rate, but only the more able could say that that this was due to the effect of the nicotine in the cigarette smoke. In part (d) most were able to name a system affected by smoking. Some responses, however, identified the cardiovascular system as another system.

Question 13

This longer response question tested the candidates' knowledge and understanding of the digestion of carbohydrate.

The best responses described the rice being chewed in the mouth, with the starch being acted upon by salivary amylase and maltose being formed. This maltose is then further digested in the duodenum by maltase, released from the pancreas, and broken down to glucose. Some responses discussed enzyme action in the stomach or described digestion to glucose in the mouth. Most candidates gained around 3 marks.

Question 14

This question brought together the cardiovascular system and the action of insulin on glucose. It required the candidates to fill in the gaps in a passage describing how insulin travels from the site of injection to the liver. Most gained around 3 or 4 marks. The most common errors were the misidentification of the hepatic artery as the hepatic portal vein and confusion between the aorta and the vena cava. Sometimes glycogen was spelled in such a way that it was unclear to examiners.

Question 15

This question tested knowledge and understanding of selective breeding and micropropagation.

In part (a) most candidates were able to show in the table the correct order of the steps involved in selective breeding. In part (b) most were able to describe the advantages of micropropagation as producing large numbers of genetically identical plants in a short period of time.

Question 16

This final question tested the growth of crops and the candidates' ability to perform a percentage increase calculation.

In part (a) some responses correctly named the ion that helps make chlorophyll. In part (b) few candidates were able to calculate the percentage increase, although some gained one mark for a part calculation. In part (c) only the very best responses described how an additional supply of nitrates could enable more amino acids to be produced and hence more protein for growth. Most gained just one mark for indicating that fertilizers would contain a (named) mineral.

4325 Biology Paper 2H

General

The examiners were once again impressed by the knowledge and understanding shown by the candidates in this summer's examinations. They were particularly impressed by the ability of the candidates to apply their biological knowledge to novel situations, to make comparisons and suggest explanations of data. It was felt that the papers allow students to demonstrate their understanding of as well as knowledge of biological principles.

Questions 1-8 also appear on the foundation paper 1F.

Question 1

Almost all candidates were able to gain full credit on this item.

Question 2

Many candidates gained one mark for explaining how building the road would improve access, few gained the second mark for suggesting how the road could enable development of farming, mining or other land use. Most candidates were able to gain credit for explaining two effects of deforestation. Suitable examples included loss of habitat leading to loss of species due to migration or extinction and less photosynthesis leading to increased carbon dioxide levels.

Question 3

Most were able to identify the anther as the part of the flower that produces pollen and label it on the diagram. A few responses pointed to the filament. Pollination was accurately described by many candidates as the transfer of pollen from the anther to the stigma. Almost all responses were able to identify light or gravity as the stimulus for upward growth in a plant stem. Candidates who wrote a correct symbol equation for photosynthesis in part (c) did not lose credit but were more likely to make an error than those writing the word equation. Some responses to (c)(ii) described how the leaf is adapted to photosynthesis rather than how it is adapted to gas exchange so did not gain full credit.

Question 4

This gave candidates a table of results showing how heart rate varies with exercise. In part (a) most gained two marks for describing how the heart rate increases up to a rate of 124 at 50 minutes then levels off. Almost all were able to identify the hormone in part (b) as adrenaline but not always spell it correctly. In part (c) the more able candidates could explain that smoking would lead to an increase in heart rate and that this was due to the effect of the nicotine in the cigarette smoke. In (d) most were able to name a system affected by smoking. Some responses, however, identified the cardiovascular system as another system.

Question 5

This was a question in which the candidates were able to write in free prose to show their knowledge of starch digestion. The best responses described the rice being chewed in the mouth, with the starch being acted upon by salivary amylase and maltose being formed. This maltose is then further digested in the duodenum by maltase, released from the pancreas, and broken down to glucose. Some responses discussed enzyme action in the stomach or described digestion to glucose in the mouth.

Question 6

This required candidates to fill in the gaps in a passage describing how insulin travels from the site of injection to the liver. Most gained credit with the most common errors being misidentification of the hepatic artery as the hepatic portal vein. Sometimes glycogen was spelled in such a way that it was unclear to examiners.

Question 7

This provided a table showing the steps involved in selective breeding that the candidates were to put in order. Most were able to do this correctly. In part (b) most were able to describe the advantages of micropropagation as producing large numbers of genetically identical plants in a short period of time.

Question 8

This gave candidates a table of different crop yields grown on soil and using liquid fertiliser. In (a) most responses correctly named the ion that helps make chlorophyll. In (b) the majority were able to calculate the percentage increase, however, as always, some candidates were unable to do this simple calculation. In part (c) the better responses described how an additional supply of nitrates could enable more amino acids to be produced and hence more protein for growth.

Question 9

A diagram was given showing three neurones. Most candidates were able to identify the parts X and Y. They could usually name B as the sensory neurone that carries impulses from the receptor to the CNS and A as the relay neurone that is only found in the CNS. More errors were made on the relay than on the sensory. Almost all candidates could plot an accurate graph and use it to interpolate the transmission speed of a neurone of 5µm and describe the relationship between diameter and speed of impulse.

Question 10

This described the genetic control of dwarfism in mice. In part (a)(i) and (ii) most candidates could identify the parent mice as Dd and show the genotypes of their offspring and give the phenotypic ratio. In part (iii) the best responses described how two homozygous DD mice could not produce a dwarf mouse as they lacked the d allele and that the homozygous dd mice are sterile. Some candidates appeared to be uncertain of the relationship between the terms gene and allele and seem to use them as interchangeable. In part (b) only the most able candidates could describe that a dwarf mouse would have a large surface area to volume ratio and therefore lose more heat so require more oxygen per g for respiration. Some candidates appear to believe that small organisms have a larger surface area. Part (c) was more accessible and almost all could identify the site of production, target organ and effect of adrenaline and oestrogen

Question 11

Part (a) required candidates to recall the word equation for anaerobic respiration in yeast. Again although most gained full credit some put lactic acid as a product while those who wrote a symbol equation were more likely to lose credit for a wrong formula. Part (b) enabled candidates to gain credit for describing how yeast could be genetically modified. Most gained full credit as they were able to describe the correct steps used. The better responses gained full marks in (ii) for explaining that the modified yeast would contain the amylase enzyme and would therefore be able to digest more of the starch.

Question 12

A table gave some biological processes and the candidates needed to describe these. Most did well gaining full credit for decomposition and transpiration. Some did not gain full credit for describing vasodilation as dilation or described how blood vessels moved nearer the skin surface. Some were unable to describe nitrification confusing it with nitrogen fixation or even denitrification.

Question 13

In part (a) most were able to explain why fish need lipids and vitamin D. Some suggested that the vitamin D would prevent rickets in the fish surely a relief to the fish farmer. In part (b) most candidates were able to explain energy loss in terms of heat loss, egestion and excretion. Part (c) enabled most candidates to demonstrate their knowledge of the eutrophication and its causes and consequences. Some less able candidates wrote about fish and fishermen being poisoned.

Question 14

This required candidates to calculate BMI values for three humans and interpret these. Almost all could do this correctly. Most were also able to recognise that an athlete with large muscle mass would have a higher BMI. In (c)(i) they were asked to draw conclusions from a graph of risk of heart disease against BMI. Most could do this correctly. However in part (c)(ii) few candidates gained full credit. Only the most able candidates were able to indicate that build up of cholesterol in the coronary arteries would reduce the amount of glucose and oxygen reaching heart muscle. This would lead to a move towards anaerobic respiration leading to build up of lactic acid which is toxic for the cells.

Question 15

Part (a) asked candidates to compare ultrafiltration and selective reabsorption. Almost all candidates scored well on this item and the most able gained full credit for comparing, for example, the location, the pressure used, the direction as into or out of the blood, the influence of hormones, the role of ATP. The table in part (b)(i) again proved straightforward for most candidates. Part (b)(ii) required candidates to write about the consequences of pituitary damage on osmoregulation. The most able candidates gained full credit but some other candidate seem uncertain about how the change in permeability of the collecting duct wall relates to water movement and the consequences for urine and blood concentrations. In part (c)(i) most candidates were able to explain that using a vein is preferable because for example of reduced pressure, easier to find nearer skin surface and thinner walled. In (c)(ii) most could describe diffusion from a high concentration to a lower concentration and in (iii) name two waste products.

4325 Biology Paper 03

General

The paper was felt to be of a similar standard to those set previously. The candidates' performance was felt to be similar to that of the previous series. The paper discriminated well, with a very wide range of marks seen. The full range of marks was seen for each part of each question.

Question 1

This was a gentle start to the paper - a simple recall question about food tests. Most candidates scored full marks, although a few did not realise that a Bunsen burner was needed for testing for glucose. Some candidates lost marks because they gave more than two answers for each test.

Question 2

This question tested the candidates' knowledge and understanding of enzymes. It was set in the context of digestion.

Part (a) was answered well, although some candidates got mixed up with the speed of reaction and the time taken for the reaction. It did not matter whether candidates talked about speed or time taken, as long as they got what happened with temperature the right way round. The majority of candidates picked up the maximum two marks here, usually by saying it speeded up and then slowed down, as the temperature rose. Others correctly referred to the optimum point. In part (b) the full range of marks was seen. The majority of candidates gained 2 marks, usually by making reference to an optimum point and denaturation of the enzyme. The most able candidates talked in terms of increasing energy and movement of molecules with increasing temperature.

Question 3

This question was based on the germination of pea plants. It tested the candidates' skills of observation, graph plotting and understanding of genetic crosses.

In part (a) (i) almost every candidate gained the full two marks for the counting of the seeds. In (a) (ii) most candidates scored the full five marks for the graph. The most common mistake was in forgetting to label the axes properly. Part (b) discriminated well, yielding the full range of marks. The majority of candidates gained 2 marks, for identifying the parents as heterogeneous and for identifying smooth as dominant/wrinkled as recessive. Two marks could be gained by a correct Punnett square diagram.

Question 4

In this question, candidates were required to show their knowledge and understanding of planning, carrying out, analyzing and evaluating an experiment. It was based on osmosis in potatoes placed in different concentrations of sodium chloride solution.

In part (a) (ii) most candidates gained one mark for saying they would use a ruler. Only the more able indicated how all the cylinders could be cut to the same length (of 10 cm). Almost all candidates gained at least one mark in part (a) (i), for identifying a suitable factor, e.g. temperature. Only the more able candidates gained the second mark for saying how the factor might be controlled. e.g. by using a water bath. In part (b) (i) about half the candidates gained full marks for measuring the length of the cylinders. They gained one mark out of the two if one or two had been measured correctly and two marks if all three had been measured correctly. Most candidates gained the mark in (b) (ii) for calculating the change in length for all three cylinders (they could gain the mark even although they had not measured them

correctly in the previous part). Most candidates gained at least two marks for explaining the change in length in the potato cylinders. The most common mistake was to talk about the concentrations of the solutions the wrong way round. The majority of candidates gained the two marks for explaining what would happen to the length of the potato cylinders when placed into distilled water. A few candidates lost a mark because they did not make reference to length. Many candidates appeared confused about reliability and accuracy, with many answering initially in the wrong place for parts (d) (i) and (ii). A significant number of candidates realized their mistake and corrected this, using arrows to indicate their answers were in the wrong place.

Question 5

This question tested the candidates' understanding of planning and carrying out an experiment. It was based on transpiration in leaves.

Most candidates gained full marks in part (a) by indicating some kind of balance. They also scored well in part (b), showing a good understanding of the idea of reliability. Some, however, wrongly said for accuracy. Others lost the mark as they said for reliability and for accuracy. Most candidates gained at least two marks in part (c). The most common answers were wind and light. Some candidates wrongly gave temperature and the size of the leaves. The former was the independent variable in the experiment and the other had already been controlled. Part (d) was fairly well answered, with many candidates gaining one mark, usually for saying that the change in mass would decrease. Others were unsure of this, but gained a mark for saying that transpiration or evaporation would be decreased with a lower temperature. Part (e) was answered well with many candidates gaining two marks or more. Even if candidates did not realise that covering leaves was important, they gained a mark for knowing that the top and bottom surfaces should be investigated separately.

Question 6

This question tested the candidates planning skills. It was based on finding out the effects of temperature on the rate of sweating. It was answered very well, with a significant number of candidates gaining full marks. Most candidates gained at least 3 or 4 marks. It is clear that 'CORMS', from feedback meetings and the previous reports is being used well. A few candidates forget to give examples of fair testing.

4325 Biology Paper 04 (Coursework)

The total number of centres entering candidates for this component of the examination increased again this year. Five home centres entered candidates this year, which is also an increase on last year.

The moderating instrument used was the Sc1 criteria as used by home centres, using exemplars provided by the JCQ (Joint Council for Qualifications) as a guide. Centres entering students for the coursework component of the iGCSE examinations in 2008, therefore had their coursework moderated to the same standards as for all home centres.

The tasks chosen by the centres were generally appropriate for iGCSE students. Osmosis in potato chips was once again the most common practical task seen this year. Catalase was also a popular option in some centres.

Overall a range of Biological investigations were seen and the Osmosis investigations usually gained high marks. The best piece of work was seen for an investigation of lipase on lipids hydrolysis which on moderation was awarded 28 out of 30. One centre did five different investigations. At one centre the students were assessed on the effect of temperature on the reaction of starch with the enzyme amylase where the choice of range of temperatures meant that they only got at the most a couple of instances where the iodine colour changed.

The quality of annotation was variable, with some centres not annotating the students' work at all. Teachers are respectfully reminded that when scripts are marked, teachers should use the printed coursework mark criteria as a guide, putting minimalist annotation such as P6b, P8a, and P8b alongside the point in the script where the student achieves the mark description.

Centres are respectfully reminded that students should work individually, with minimal teacher guidance, on the investigations presented for moderation. For this reason, one would not expect to see virtually identical scripts with identical safety issues, the same preliminary task with the same number and range of readings, the same task with the same results, and the same improvements suggested.

BIOLOGY 4325, GRADE BOUNDARIES

Option 1: with Written Alternative to Coursework (Paper 3)

	A*	A	B	C	D	E	F	G
Foundation Tier				60	48	36	24	12
Higher Tier	77	66	55	44	33	27		

Option 2: with Coursework (Paper 04)

	A*	A	B	C	D	E	F	G
Foundation Tier				64	51	38	26	14
Higher Tier	81	70	59	49	37	31		

Note: Grade boundaries may vary from year to year and from subject to subject, depending on the demand of the question paper.

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