

Examiners' Report November 2007

IGCSE

IGCSE Biology (4325)

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November 2007

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BIOLOGY 4325, CHIEF EXAMINER'S REPORT

General Comments

Candidates were able to access all the questions to demonstrate their knowledge and understanding of the specification. The course also encourages candidates to carry out practical activities with the appropriate collection, analysis and evaluation of data. This area seems less well assured and candidates are encouraged to practice quantitative manipulation of data so they can access questions of this type with greater success.

Paper 1F

Question 1

The multiple choice questions proved to be helpful to candidates at the start of the examination. Most were able to gain many of the marks. Difficulty was often noted when choosing which organism was the fungus, the correct levels of organisation and the correct sex chromosomes of a man and a woman.

Question 2

Candidates are encouraged to use the term nitrate rather than nitrogen when naming ions that could be found in chemical fertiliser. Most were able to name faeces, or some interesting word derivative, as an example of an animal waste. Part (b) (ii), posed most difficulty with many not able to suggest the advantages that organic fertiliser has when compared to inorganic fertiliser.

Question 3

Part (a) of this question was answered well by most candidates. The most frequent error was naming B as transpiration. Almost all candidates correctly named a fossil fuel in (b) (i), but very few gained full marks in (ii), seemingly unaware of the effect of greenhouse gases on our environment. As often noted, many confuse the global warming narrative with acid rain pollution. Candidates need help to distinguish between these methods of air pollution.

Question 4

Part (a) was answered well, though some candidates reversed the order of the renal blood vessels, and some are confused about whether to name tube C as the ureter or the urethra. Most answered (b) correctly. Most were able to correctly indicate the volume of urine in the bladder in (c) (i) and (ii), but only the more able candidates offered an explanation. Candidates are encouraged to note that the term "explain" means that the examiners are looking for the underlying biology for a given observation.

Question 5

Candidates struggled to put these terms in the correct sequence despite being assisted with the names of the terms. Clearly this concept causes difficulty and candidates need help in understanding the link between stimuli and appropriate responses. Part (b) was answered well, though some candidates answered nerves for hormones. Part (c) exposed a lack of knowledge about hormones which was

disappointing to note. In contrast, part (d) was answered well with most candidates appreciating that shoots grow towards light.

Question 6

Many candidates understand that pesticides kill insects that eat crops but very few were able to recall an example of biological control, or to give the advantages that biological control has when compared to the use of pesticides. Very few candidates were able to recall that crops can be genetically modified to be resistant to pests, or to herbicides.

Question 7

This question was easily understood by most candidates. The most difficulty was in recalling that respiration is the process of getting energy from food.

Question 8

Only the more able candidates were able to correctly assign the letters to the processes listed in the table, and part (b) was a struggle for most. They were unable to recall the example of diffusion (alveoli to blood); the example of osmosis (water to blood); or the example of active transport (soil to cytoplasm). The more able candidates realised that graph C represented the effect of temperature on diffusion and that graph B represented the effect of temperature on active transport.

Question 9

Part (a) was answered well. In part (b), many candidates ignored the rubric and used names of the organisms. As ever, candidates are encouraged to read questions carefully before attempting their answers. In part (c), candidates were able to recall bacteria and fungi as decomposers, but they struggled to describe their role in the carbon cycle. Candidates would benefit from practising mini prose questions such as this.

Question 10

Most were able to recall the lens as the part of the eye labelled, though some thought it was the pupil. Part (b) (i) seemed to pose some difficulty with many simply rephrasing the question. The fact that less light would enter to stimulate the retina was not appreciated by most candidates. Candidates also struggled to cope with the demands of the genetics in part (ii). Many used the symbols for sex chromosomes and many were unable to select the correct parental genotypes or gametes, despite being given the letters to use. Many seem unaware of the meaning of the word 'phenotype'.

Question 11

The naming of the parts of the cell caused little difficulty but the function of the parts was less well known. In part (b), only the more able candidates appreciated that the bacterium would be digested by enzymes. A pleasing number of candidates calculated the correct answer for part (c), though candidates need to be aware that often a mark is available for a chosen number seen in the working. As such, they should be encouraged to show their working.

Question 12

This difficult biology was understood by many of the candidates, no doubt helped by the format.

Question 13

Candidates struggle to express themselves in continuous prose and, once again, it is suggested that they get as much practise at this style of question as is possible throughout the course. Those who impressed were aware of the multitude of abiotic and biotic factors that can be controlled in glasshouses to improve crop yield.

Paper 2H

Question 1

Candidates answered this question well, with most able to match up processes in the body and their descriptions well. The most common mistake was to refer to nutrition instead of respiration as the process that released energy.

Question 2

Most candidates were able to match up the methods by which different substances move into and out of cells with their descriptions well described. Part (b) caused problems for some candidates. Some did not realise that it was places that were required and referred to concentrations instead. Some thought that oxygen moved from the blood instead of from the alveoli into the blood. Despite osmosis being mentioned many candidates did not refer to the movement of water in the kidney. Most candidates knew that water moved from the soil, but made reference to parts of the plant such as the roots or leaves instead of the cytoplasm inside the cell. In part (c) very few were able to match up the letters with the correct graphs, with a wide variety of wrong answers given.

Question 3

The majority of candidates were able to identify the primary consumer and give the original energy for the food chains, although some referred to the producer as the original energy source. In part(b) many gained at least one mark, but some just referred to the fact that they contained different organisms. A significant number of candidates gained fungi and bacteria in (c), but others referred to a variety of other organisms. Part (c) (ii) discriminated well. Knowledge of the role of decomposers was mixed, with some candidates not giving precise answers, e.g. referring to carbon instead of carbon dioxide being released.

Question 4

Most candidates knew lens, but some gave pupil or even iris instead. In part (b) some candidates just repeated the information in the question and others did not express themselves clearly enough to gain two marks - most candidates gained one mark for stating that light would not be able to pass through easily. The majority of candidates gained full marks for the genetic cross, although some did not make it clear in the last stage which genotypes their phenotype description referred to. If candidates made a mistake at the beginning of the question, for example in genotypes of the parents, then they were credited thereafter if their working from then on was correct.

Question 5

Part (a) discriminated well, with the full range of answers being seen. A surprisingly large number of candidates did not realise that A was the nucleus. Others gave descriptions that were vague. In part (b) most candidates gained one mark for saying that the bacterium was killed, but only the more able candidates referred to the part that enzymes played. The calculation in part (c) was well done, with the majority gaining full marks here.

Question 6

Most candidates gained full marks. The most common mistake was to have steps 3 and 4 the wrong way round.

Question 7

This question allowed candidates to demonstrate their knowledge of how conditions related to photosynthesis could be controlled in a glasshouse leading to increased crop conditions. It was answered well, with most candidates scoring four or five marks. The most common conditions mentioned were temperature and carbon dioxide concentration. Few referred to light of long wavelength being reflected. Some candidates failed to state the obvious and say that the crop yield would be increased. Instead they just referred to the fact that it would be altered, which was stated in the question itself.

Question 8

Most candidates showed a good knowledge of the relationship between large molecules and smaller ones. The most common mistake in part (a) was to refer to sugars such as sucrose instead of simple sugars or glucose. In part (b) most candidates described how the rate of reaction of the protease varied with temperature, although some did not refer to the detail in the graph and therefore lost one mark.

Question 9

Most candidates could correctly identify the large intestine, but some thought that bile was either made in the gall bladder or in the pancreas. In part (c) many candidates gained two marks for the idea of emulsification and the idea of neutralisation of acid. Some gave rather vague answers relating to liver function rather than that of bile. Part (d) was answered well, with the most common answers referring to increased surface area and presence of capillaries.

Question 10

This question gave candidates an opportunity to demonstrate their knowledge of the kidney. It was apparent that many knew this well, with a significant number scoring full marks in part (a) (i). Most knew the Bowman's capsule, but some thought that the collecting duct was called a nephron. Part (a) (ii) discriminated well, with the full range of marks being seen. Most gained one mark for knowing that only small molecules would pass through, but not many gained the second mark for the idea of pressure being involved. The majority of candidate gained the correct answer relating the concentrations in (b) (i), although a significant number subtracted the numbers instead of dividing them. Many appeared not to understand what the question was asking in (b) (ii) and made no reference to water at all. Part (c) discriminated well. Some candidates did not know the role of ADH and some just said what role ADH played in the kidney without referring to the question at all and therefore talked about what would happen with an antidiuretic instead of a diuretic.

Question 11

In part (a) many candidates knew that progesterone would remain high if the woman was pregnant, but a significant number of candidates did not answer this part of the question. The majority of candidates gained full marks in part (b), showing a good understanding of the terms zygote, embryo and amniotic. Almost all gained the mark for sexual reproduction in part (c).

Question 12

Many candidates gained the mark for knowing respiration in part (a). Aerobic respiration was also allowed. A pleasing number of candidates were able to recall the balanced chemical equation for respiration in part (b). Some candidates wrote word equations instead and gained a compensatory mark. Other candidates had oxygen and water the wrong way round and gained no credit. A variety of answers was allowed in part (d) and many candidates gained full marks. The most common answers referred to vasoconstriction, but many candidates referred to lack of sweating or hair standing on end.

Question 13

The roles of the various bacteria in the nitrogen cycle proved to be a good discriminating question and the full range of marks were seen. In part (b) not many candidates knew that fungi fed by external digestion or could describe it well and very few gained full marks. In part (c) the majority of candidates did not answer the question asked, with full descriptions of eutrophication being given, instead of just describing up to the point of increased algal growth. A significant number just repeated the question and said that algal growth would be affected instead of saying how - that it would increase.

Question 14

Most candidates gained two marks in part (a) by saying that clones are genetically identical, although it was clear that some did not understand the question as they just referred to the fact that they were clones. Many failed to answer the question in part (b), particularly regarding the advantage and just talked about many plants being formed instead of referring to the fact that they would all have the good characteristics. Many did gain the mark for the disadvantage by correctly referring to the possibility that they would be more susceptible to disease. In part (c) most candidates showed they knew that transgenic was transferring genes from one species to another, although only the very best candidates gave good uses for this technique.

Question 15

Candidates were given the opportunity to demonstrate their knowledge of the heart here and most did this well, with the majority gaining the mark in part (a) for correctly identifying the left atrium. Most also gained the two marks for giving correct reasons why they knew the ventricle was contracting. The most common answers referred to the semilunar valve being open and the atrioventricular valve being shut, although some referred incorrectly to the tricuspid valve, getting this mixed up with the bicuspid valve instead. Most referred correctly to the pulmonary vein entering the left atrium, although some said pulmonary artery or aorta instead. Part (b) produced mixed answers. Most candidates gained the mark for 0.2s in (i) and many got between 0.2 and 0.4s in (ii), although a significant number said 0.3 - 0.4s instead. Part (iii) discriminated well with the full range of marks awarded. Many referred to 0.3s and the highest pressure, but made no reference to blood being forced into the aorta and therefore lost the third mark.

Question 16

Many candidates showed a good knowledge of cystic fibrosis and gained at least two marks in part (a). The most common marks gained referred to less oxygen and exercise being more difficult. Part (b) was answered fairly well by most candidates, with the names and functions of restriction endonuclease and ligase well known. Few candidates referred to inhalation or aerosol or to sticky ends.

Paper 3

This paper produced a good range of marks and showed that many candidates were familiar with experimental work in biology.

Question 1

Provided an opportunity for all levels of candidates to get marks for recognising familiar apparatus. In part (a) most were able to correctly identify the beaker, tripod and Bunsen burner. A small number of candidates were unable to identify the tripod and vague answers such as stand did not earn credit. Most candidates were able to give two appropriate safety precautions for heating the milk. Suitable answers included wearing safety glasses, adjusting the Bunsen flame, keeping hair tied back and setting the apparatus away from the edge of the bench, but many other sensible suggestions were credited. In part (b) almost all could correctly name thermometer Q as showing the temperature at which the bacteria are added. Most candidates were able to suggest a fridge as a way of cooling the yoghurt, although other answers were credited use of a freezer earned no credit.

Question 2

Provided candidates with the opportunity to demonstrate their measurement skills and the majority of candidates were able to accurately measure the distances covered by the beetles. Most were also able to suggest how a lower temperature could be produced and why the student should not collect data above 35°C as this could harm or even kill the beetle. The last part of this question required students to plot a graph of the results. Many earned good credit for accurate graphs using an appropriate scale, with axes labelled with units and points accurately plotted and joined with neat lines labelled with 'age of beetle'.

Question 3

Illustrated a simple method of determining the energy content of a small food sample. Part (a) required them to name a suitable apparatus for accurately measuring 20 cm³ of water. Responses such as measuring cylinder pipette and burette earned credit others such as jug or beaker were not credited. Again most candidates were able to calculate the energy value using the formula given and then use this to determine the energy content of a 1g biscuit. Centres should remind candidates to show the stages of their calculations as this often enables examiners to award credit for correct working even if the final answer is incorrect. In part (b) most could calculate the mean value and the more able candidates were able to suggest that energy may be lost to the atmosphere, to the glass tube or to the needle. Part (c) discriminated well between candidates. Only the most able could correctly explain that as the beaker has a lower surface area to volume ratio it will lose heat more slowly, so the temperature and therefore energy value will be higher.

Question 4

Enabled candidates to demonstrate their abilities in observation, data handling, analysis and interpretation of results. In part (a) they were required to determine the number of measuring cylinders used in the design and many failed to get this correct. Most were able to correctly identify an anomalous result and the better responses also suggested a cause for this result. They were then required to match a diagram of a result with a reading from the table. A significant number of candidates failed to earn full credit for this task. In part (b) candidates had to explain the effect of temperature on the rising of the dough. Some described the effect of temperature but did not explain it. Centres need to enable candidates to distinguish between description and explanation. The most able candidates were able to describe the

increase in kinetic energy of the enzyme and substrate molecules then describe denaturing of the enzyme structure as the optimum temperature is exceeded. The better responses also linked this to the release of carbon dioxide gas causing the dough to rise. Finally candidates had to examine the data and give the effect of vitamin C on the rising of the dough. Most stated that it increases the rising and the best responses qualified this by explaining that this effect only occurred at temperatures between 25 and 55°C.

Question 5

Provided candidates with the opportunity to demonstrate understanding of some important terms used in experimental design. Some candidates could confidently match the terms to their descriptions. It is expected that candidates should be familiar with reliability, accuracy and precision as they are all used in the specification yet many appeared to be guessing. Candidates did better in suggesting why the counting of bubbles may produce inaccurate results.

Question 6

Described how quadrats could be used to compare the population of plants on two sides of a hill. The most able candidates were able to suggest improvements to the plan such as more replication and by sampling the two areas at random. Centres in which candidates had carried out or discussed such an investigation, given in the specification, had a significant advantage in answering this item. The final part of this question required a CORMS style experimental design and the well prepared candidates scored well.

COURSEWORK (PAPER 4), PRINCIPAL MODERATOR'S REPORT

Centres who entered candidates for the coursework option have received a report directly from the Principal Moderator.

For general comments about coursework please refer to the Moderator's Report for June 2007.

BIOLOGY 4325, GRADE BOUNDARIES

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

	A*	A	B	C	D	E	F	G
Foundation Tier				56	44	33	22	11
Higher Tier	84	72	60	49	38	32		

Option 2: with Coursework (Paper 04)

	A*	A	B	C	D	E	F	G
Foundation Tier				N/A	N/A	N/A	N/A	N/A
Higher Tier	85	74	63	52	40	34		

No candidates at foundation tier entered coursework so there are no grade boundaries for this category.

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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