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GCSE

Biology B J643

Gateway Science Suite

General Certificate of Secondary Education

Report on the Units

January 2008

J643/MS/R/08J

Oxford Cambridge and RSA Examinations

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General Comments

The paper gave an opportunity for the majority of candidates to access marks. Module B questions produced the most successful responses. The grade level of the question was broadly reflected in the candidates' ability to answer, though there were some notable exceptions, (see below). The calculations in Questions 4, 9 and 14 caused difficulty, perhaps highlighting the problems that Foundation candidates often demonstrate in fairly straightforward numeracy skills.

It is self-evident that candidates feel more comfortable selecting words from a given list, though such questions also demonstrate that many have a 'vague' idea of what something means, but lack the clarity of definition or understanding to distinguish between concepts, structures or functions that are quite closely related. This was very clear in Questions 1, 6b & c, 7a & c, 8, 10 and 11. For example, in question 10a, it is still remarkable that so many candidates fail to remember that animal cells are bounded by a 'membrane' rather than a 'wall'.

Candidates should be continually reminded to read **all** that is written. Information at the beginning will often lead them in the right direction and help to avoid unnecessary mistakes; eg Question 7 – the text about British crayfish leads candidates towards the notion that they are at risk, rather than answers to 7ci that suggested these crayfish were a danger to other animals. In 12bii few wrote in terms of 'ideas about concentration', though they were invited to.

Individual question remarks will indicate concepts and ideas that were poorly expressed or understood.

Candidates did not show any problems with time management and usually the majority of questions had been attempted.

Comments on Individual Questions

Q1 Rather poorly done, considering it was a G/F level question and very few candidates indeed achieved the full 3 marks. While many had the correct 3 words, they were unable to distinguish the differences in the statements to allocate the answers correctly and the correct words were distributed somewhat randomly it appears. Clear definitions that highlight the differences and links between the items in the list would be valuable in teaching this topic.

Q2 (a) Most achieved a mark here and did so usually for a valid reference to the immune system, though it was often a lower level response indicating the immune system was 'stronger' in Lynne. Higher level answers, where it was absolutely clear that Lynne might already have the necessary antibodies, were far fewer.

(b) Generally well answered, with the idea of something infectious being 'passed on' or 'caught' from someone else.

(c) (i) & (ii) Generally well answered – most achieved both marks in choosing 'flu' as the viral infection and 'cystic fibrosis' as the inherited disorder.

Q3 (a) Only the very weak failed to answer correctly that the ear was the other sense organ to be used in detecting the presence of an oncoming car.

(b) (i) Generally well answered. The most common responses to explaining what a reflex is, were 'automatic', 'done without thinking'. There was the usual number of candidates, who wrongly attributed the conscious activity of the brain in bringing about the reflex action.

(ii) Generally well answered. The majority understood the effect of alcohol on the CNS and its speed of response, usually clearly stating that the system would react slower.

(c) Generally well answered. Some form of 'restricted field of view' was the most usual correct response, though a good minority also understood the idea of 'depth of field/distance judgement' being impaired. A significant minority were still thinking in terms of the effect of alcohol on the senses and spoke about blurred or fuzzy vision, which was not acceptable. Some candidates thought that somehow people blind in one eye could not see so far or as clearly as fully sighted people.

Q4 (a) (i) Generally well answered. There was a lot of information to take in before the first question was presented, but it was straightforward and most understood that Chris was in the 'overweight' segment.
(ii) Generally well answered. The large range of possible correct answers meant that only those unable to interpret a graph failed to score with a value for how much mass Sam needed to increase by to make it into the 'normal' category.

(b) While many achieved the correct value for this calculation, the insistence of giving the correct unit, meant that many lost this mark. It was given in the formula above the answer line, so it could be argued that they should have simply copied it down, or perhaps most did not understand that it was required. Candidates should be constantly reminded that any numerical figure requires a unit. If this is **not** provided on the answer line then it must be assumed by candidates that failure to give a unit is likely to lose a mark.

(c) Generally well answered. Most scored the mark by simply indicating that carbohydrate was needed 'for energy'. A number of candidates linked the function of carbohydrates with the removal of fat!

Q5 (a) Many scored 2 for mentioning the need of '<u>more</u> oxygen', though this was clearly fortuitous for a number of candidates. Far fewer linked this, for the 3rd mark, with the requirement of more oxygen for increased muscle activity or greater (aerobic) respiration. For no credit, many simply referred to breathing and heart rate increasing because 'the blood needs to get round the body faster', with no explanation as to why this was necessary. One mark was awarded if the candidate simply mentioned the need for 'oxygen' or 'glucose'. 2 marks were also available for 'more glucose', but very few referred to glucose at all.

(b) (i) Poorly answered. Candidates showed little understanding of the concept or process of evaporation and often simply re-worded the question. From experience candidates know that sweat 'makes you feel cold', without understanding the mechanism. As a level 'C' concept it requires careful explanation.
(ii) Moderately well answered, with just a list of words to choose from. However, 'hypothermia' was a frequent wrong answer because of its obvious link with temperature and 'insulation' cropped up a number of times, confused with the idea of keeping temperature from dropping.

Q6 (a) Generally well answered. As structural answers for the characteristic of a plant were acceptable, eg root, stem, leaves; most candidates scored a mark. A significant number used the higher level ideas – 'make their own food' or 'photosynthesis'.

(b) Poorly answered on the whole. Very few were aware of the 'binomial' system of naming living things, so it wasn't surprising that 'classification' was a much more common wrong answer.

(c) Generally well answered. From the given list, 'respiration' was a common wrong alternative to 'photosynthesis' in response to what plants use water for. Less frequently, 'insulated' was wrongly given instead of 'adapted' as to why cacti need less water.

Q7 (a) (i) Generally well answered. 'Food' was the most usual answer for a resource that the crayfish were competing over. 'Habitat' was quite an understandable common error, but was not allowed as the question specifically asked for a 'resource'. Other acceptable responses included, 'shelter', 'nesting sites' and 'territory'. Some candidates thought there might be competition for 'mates', not understanding the species divide.
(ii) Generally well answered. Commonest errors were to invert the answers, 'habitat' and 'community' for this 2 part question or write 'population' for 'community'.

(b) (i) Generally well answered. Very few failed to score here, recognising the function of the crayfish claw as a feeding adaptation. There was a variety of ways of describing 'claws'! 'Pincers' or anything that clearly identified the claws was acceptable.
(ii) From the given list, the great majority of candidates chose 'predator' as the name for an animal hunter.

(c) (i) Moderately well answered. Wrong answers included the notion of 'being hunted' or 'being a danger to other animals'. In 'General comments' it has been pointed out that some candidates had not appreciated the overall discussion of British crayfish being under threat. No mark was given if the response was simply, 'numbers are dropping'. The word (facing) '<u>extinction</u>' was not required, but 'likely to die out' or 'dropping too low/hardly any left' was needed as a clear idea.
(ii) Moderately well answered. Usually scored with 'osprey' if they achieved a mark in c.i above; otherwise 'fox' was a common response and less often 'rat', probably as examples of animals that are perceived as 'dangerous'!

Q8 Particularly in this sort of question on the environment, candidates often think they know about it, yet fail to have a grasp of <u>specific</u> details. Here answers were general and appeared to be generating the usual clutch of wrong responses.

(a) (i) Modestly well answered. From the given list, 'sulphur dioxide' was the pollutant required as a product of some fossil fuels being burned. 'CFCs' was a very common error, with 'sewage' less so.
(ii) Surprisingly not well done. Many simply re-phrased the question as to why the burning of fossils fuels was increasing and said, 'more fossil fuels were being burned'. Most common correct answers were, 'population increasing' and 'more cars', though a wide choice of anything causing increased energy consumption was acceptable.

(b) Of the 3 parts to this question, where missing words needed to be inserted into sentences, the last, 'global warming' was done well. ('Greenhouse effect' was an acceptable alternative) Part 1 was poor, with 'ozone layer' the commonest error for what surrounds the Earth. 'Air, atmosphere, gases' were all accepted answers. In Part 2, candidates often suggested wrongly that carbon dioxide 'caused' some of this radiation, instead of blocking, trapping or reflecting it.

Q9 (a) Very few candidates failed to score a mark for identifying an **artificial** pond as a 'manmade' ecosystem.

(b) Most recognised a 'net' as being the correct piece of apparatus for sampling from the pond, though quite a number chose a 'pooter'!

(c) Estimating the number of flatworms in the pond, from those counted in a given sample, was poorly done. The mathematics of proportion seemed beyond most, with a few scoring 1 mark for '400' – stage one of the calculation. Candidates' working often showed little logic or coherence, with a variety of obscure numbers on offer. Scaling up from $0.5m^3$ to 200 m^3 was rare and it could be that some were unsure what the unit of volume meant.

Q10 (a) Most labelled the 'cell membrane' as 'cell wall'. The majority scored with 'nucleus'.

(b) Moderately well done. Candidates were asked for the job of 3 cells, with one example given: for 'sperm cell', the commonest error was 'swimming to egg' or copying the answer from the example in the line above; the 'white blood cell' function was often correctly identified – most often wrong with 'healing cuts'; the RBC was too often associated with 'carrying blood or food round the body'.

(c) This question on cell division and specialisation as mechanisms for growth of a fertilised egg cell was very poorly done. This was probably the least understood question on the paper and only a handful achieved one mark for cell division/multiplication and probably less than 10 – 20 candidates mentioned any form of cell differentiation/specialisation, other than talking about a baby developing major body parts. The commonest error was discussion of the development of the foetus over 9 months.

Q11 (a) This question on vegetative reproduction in strawberries was generally well done. 'Identical' was sometimes used wrongly instead of 'asexual' and in the second part, 'similar' was quite often used instead of the correct 'identical', as the genetic make-up of the plantlets.

(b) Very few failed to score at least 1 mark where they had to give the correct sequence of events in taking a plant cutting. Most achieved the 2 marks available for the correct order and could score one mark for a partially correct answer, with one event out of turn.

(c) Modestly well answered. Many simply spoke of the plant hormone applied to the cutting as promoting growth or something about ensuring the 'same plant' developed. Some reference to root development or cell differentiation was required.

Q12 (a) Labelling the 'alveolus' in the diagram was reasonably well achieved, with every imaginable spelling of 'alveoli' on offer! 'Lung' or 'bronchiole' were common errors for this label.

(b) (i) Most identified 'oxygen' as the correct gas entering the blood from the lungs. The usual minority opted for 'carbon dioxide'.

(ii) Few had any reasonable ideas as to the mechanism by which oxygen entered the blood. Despite the clue about 'concentration', very few understood what to say here. The most common correct attempt involved a reference to 'diffusion', which scored one of the two marks. The other mark was for some correct reference to the concentration gradient, 'going from high to low concentration' etc. There were a lot of answers about the mechanics of breathing.

Q13 A minority of candidates scored much in this question. They knew little about mutations and the final calculation produced very few correct answers.

(a) Few candidates had a clear idea of the meaning of the word 'mutation' Some candidates understood it was something to do with genetics, but did not couple it with the idea of 'alteration/change'. Both ideas were required for the mark, viz. 'change in the gene/DNA/chromosomes'. Many thought it was simply a feature of bacteria, as this was the context of the question.

(b) Two factors causing mutations were beyond most candidates. Those who had some idea usually scored with 'radiation' or a specific example of radiation. A tiny minority mentioned 'chemicals' as a cause. Those in the right area often simply said, 'smoking', which was not accepted on its own. 'Chemicals in smoke' would have been acceptable.

(c) Little mathematical understanding was shown here, though this may have been a result of simply not reading and following the question step by step. Rather than doubling the number of bacteria for each succeeding half hour period of the 3 hours, the most common error was 40 x 3 = 120; simply multiplying the number of bacteria in 1 hour times 3.

B631/02 Higher Tier

General Comments

This Higher Tier paper was of an appropriate level for the ability range of the candidates. There were challenging questions for appropriate candidates at the A and C boundaries which discriminated candidates' responses well.

Most candidates attempted all the paper and there was no evidence of candidates not reaching the end in the time allowed. Most candidates appeared to have been adequately prepared for the examination and the item coverage across the three modules being tested (B1, B2 and B3) was very thorough.

A few candidates failed to achieve more than twenty marks and these candidates would have benefited by being entered for the Foundation Tier. The quality of candidates' spelling, punctuation and grammar was generally good and there were very few cases where it was really difficult to interpret a candidate's writing.

Comments on Individual Questions

Q1 (a) (ii) Most candidates correctly calculated that the increase in mass was between 7 kg and 27 kg. The most common incorrect answer was 6 kg. No answers used grams.

(b) Although many candidates correctly calculated the answer to be 37.5 they failed to included the correct unit. A few candidates put the decimal point in the wrong place during the calculation.

(c) There were a variety of acceptable responses as to a factor that may influence what Sam eats. Most candidates answered this question correctly with the answer 'vegetarian'. A number correctly wrote 'religion' or 'availability'.

Q2 (a) This question discriminated well between candidates. Most candidates explained that the lens became thinner but often incorrectly explained this was because the ciliary muscle and suspensory ligaments contracted. Good answers had clearly described and ordered responses.

(b) Most candidates knew that having one eye 'reduces the field of vision' or that 'it affects the judging of distance'. Candidates often gave a correct response and a detailed explanation to this question. A few thought that having one eye made that eye stronger to compensate for the one that was missing or that they had poor vision.

Q3 (a) (i) Most candidates knew that 'evaporation of sweat' causes Ayshea to lose heat but a number of candidates failed to explain the process clearly. Many of these answers included vague statements about sweat cooling her down.
(ii) Most candidates knew that 'homeostasis' is the word that describes keeping the body temperature the same. The most common incorrect answer was insulation.

(b) Most candidates answered at some length with most candidates gaining the mark for the idea of paying back an oxygen debt. Those candidates gaining two marks gave very good descriptions about the need to remove lactic acid and a few even mentioned that it had to be moved from the muscles to the liver.

Q4 (a) Many candidates gained three marks and used neat Punnett squares in the space available. Many different ways of expressing the correct answer on the answer line were seen including 0.25, 25%, 1/4 and 1:3. There were a number of completely blank responses to this question.

(b) Most candidates correctly chose 'red-green colour blindness' with 'anaemia' usually the ringed answer for incorrect responses.

Q5 (a) This question proved to be more difficult than expected. The most common correct answer was that 'cilia are damaged'. Many candidates failed to refer to cilia in their answers and instead wrote about 'cells being burnt'.

(b) Most candidates appreciated that nicotine was being replaced and that it was satisfying a craving.

(c) Most candidates gained two marks for clear descriptions explaining the difference between being fit and being healthy. Those candidates only gaining one mark usually did so for explaining being healthy as being 'free from disease'. A surprising number gave vague answers to being fit including being 'physically active' without any qualification such as strong, fast or good.

Q6 (a) Most candidates were able to give a characteristic that places cacti in the plant kingdom. The most common answers were 'the ability to make their own food' or 'contain chloroplasts'. A number also listed the parts of a plant including roots and explained that plants cannot move.

(b) Although most candidates knew that the system was 'binomial' a surprising number thought the answer was 'bimodal' or 'classification'.

(c) Almost every candidate gained at least a mark for this question, many gaining two marks. The most common correct answer was the 'spreading roots to allow more water uptake'. A number of candidates failed to gain the second mark as they did not give an adaptation but gave only a reason.

(d) Many candidates gave the answer as 'evolution' or 'survival of the fittest'. Fewer gave the correct answer of 'natural selection'.

Q7 (a) Most candidates knew that different species 'cannot mate and produce fertile offspring'. Perhaps the most common incorrect answer was 'one breeds faster than the other'.

(b) (i) Most candidates answered at some length but usually only gained one mark as both the explanations given usually described protecting the British crayfish from extinction. The other possible answers were usually about reducing damage to food chains.

(b) (ii) Many candidates went into great detail about the difficulty in controlling where whales go, knowing where they are, the space needed and the difficulty in moving them. Fewer candidates gained a second mark, but where they did this was usually for difficulties in getting international agreements between countries or that whales provide useful products.

Q8 (a) Most candidates gained at least two marks for 'traps' and 'global warming'. Fewer candidates gained the third marking point for 'atmosphere' with the most common answer being 'ozone'.

(b) A minority of candidates correctly explained why increasing the photosynthesis rate may stop the temperature becoming too high. A number of candidates repeated the information given in the question without explaining what this meant. Many candidates also failed to use ideas about limiting factors in their answers.

Q9 (a) (i) Most candidates correctly calculated the total number of flatworms, many without showing clear calculation steps. A variety of answers were seen including '400', '80' and '50'.
(ii) Most candidates explained the reason well with the idea that 'there may be more in other areas of the pond' as the usual answer.

(b) Most candidates knew what an 'indicator species' was and so gained one mark. Many answers included named examples of an indicator species, for example the bloodworm. Approximately half of these candidates then went on to explain that a presence or absence indicates the level of pollution. A few candidates only described the causes of the pollution.

Q10 (a) Many candidates knew that muscle cells need large numbers of mitochondria for 'respiration'. Fewer candidates knew that respiration provides muscles cells with energy or that this energy is required for movement.

(b) Most candidates correctly chose two answers from 'cell wall', 'vacuole' and 'chloroplast'. A few candidates wrote down the names of structures also found in animal cells, for example 'cell membrane' and 'cytoplasm'. Some candidates gave the names of different types of plant cell, for example 'palisade cells'.

(c) (i) Although most candidates knew that a stem cell was an 'undifferentiated cell', or 'a cell before it specialises' or 'a cell that can become any other cell' a surprising number thought it was a cell found in the stem of a plant.

(c) (ii) Most candidates suggested that some people object because 'the embryo dies'. A number also explained that 'the process is unethical'.

Q11 (a) Although candidates knew the plant hormone would cause the stem to grow few explained that this 'encouraged root growth' or 'cell differentiation'.

(b) Very few candidates gained all three marks. A number of candidates left this question blank and those that attempted it often confused tissue culture with taking cuttings. Most candidates gaining marks for this question usually described the conditions needed rather than the precautions taken.

(c) Most candidates gaining a mark for this question explained that the 'chromosomes replicate' but a number confused the process with meiosis. Many candidates explained what was happening to the cell rather than the chromosomes.

Q12 (a) This was well answered with the majority of candidates naming the part as 'alveoli'.

(b) Most candidates gained two marks for a clear description of 'diffusion as the movement of oxygen from a high concentration in the lungs to a lower concentration in the blood'.

(c) Very few candidates correctly explained why being thin helps the cells carry out their function. Most explained 'it is easier or 'it is quicker'.

Q13 (a) Generally well answered by most candidates with the most common answers being '10 000' and '9 500'.

(b) Most candidates gained at least one mark for this question and this was usually for 'UV rays' or 'X rays'. Some candidates failed to mention 'chemicals' and instead wrote about 'resistance to antibiotics' or explained what a mutation was.

(c) (i) This question was well answered by candidates who understood the structure of DNA. Many correct responses included examples of base sequence changes, for example 'a change from ATG to ATT'.
(ii) Many candidates that answered question 13(c)(i) correctly also gained this mark for explaining that 'different proteins' or 'no proteins' are produced. A few candidates repeated their answers from the previous question.

B632/01 Foundation Tier

General Comments

Although this examination has been set for the first time candidates appeared to be well-prepared having sufficient time to complete the paper and appearing not to have obvious problems with the rubric. The grammar and punctuation of the more-able candidates were appropriate to this level of examination. There were some notable examples of candidates who had major difficulties, both grammatically and in clarity of communication. In the majority of cases handwriting was easy to read.

Candidates found difficulty in understanding the graphical data and this could be one area in which emphasis could be laid in the preparation for future examinations.

Once major concern was the number of questions left unanswered, especially those involving two or more marks.

There was significant evidence that candidates did not carefully read required information necessary for the answering of particular questions.

Interestingly, there often appeared to be no correlation between candidate ability and particular questions answered correctly

Comments on Individual Questions

Q1 Part (a) was designed to elicit the knowledge of candidates on organelles; part (b) on the importance of one particular organelle, the chloroplast and part (c) involved another cellular structure, the cell wall.

(a) A significant number of candidates achieved this marking point but many candidates suggested other names from the list. There were no trends in wrong answers.

(b) Rarely were two marks awarded for this part; the more-able candidates appeared to understand the importance of the chloroplast in relation to photosynthesis and all marking points were equally frequently given. However, a significant number of candidates appeared to believe that the chloroplast was necessary to store water and/or oxygen. Many of the candidates, even the less able, understood that they were associated with growth, but the answers were too vague for a mark to be awarded.

(c) Few candidates correctly identified the function of the cell wall although reference to ‘shape’ and ‘support’ were equally frequently given by those candidates that did. Less often observed was a reference to ‘cell bursting’. Most answers were centred on references to ‘protection’ and ‘cell structure’.

Teaching tip
Candidates should create their own glossary of terms for the course in general. They should be encouraged to be less vague in their approach to answering questions and, in this particular case, to components of the chloroplast.

Q2 This question initially required the candidate to interpret information provided mostly in diagrammatic form on plant water loss. Subsequently, recall of appropriate ways of obviating leaf yellowing was required.

(a) Many candidates correctly identified flask A but few of these could correctly qualify this answer and so rarely were two marks and very rarely were three marks awarded. The most frequent answer involved the use of the water or the presence of large roots. Less frequently was the suggestion that ‘C’ did not contain a plant.

This part exemplified a common feature of the answers by most candidates in this paper which is the lack of understanding of data interpretation and underlying theoretical concepts.

(b) A significant number of candidates achieved this mark predominantly for reference to the more general term 'nutrients' although much less frequently for the alternative more specific marking points. 'Soil' and 'plant food' was given by many candidates.

Teaching tip

Candidates should be encouraged to be more specific in their terminology in this area. For example, 'mineral' or 'nitrate' being more specific than 'nutrients' and this can lead the candidates on to a better understanding of not only inorganic sources but also of photosynthesis.

Q3 This question centred on food webs, their components and anthropomorphic influences. Candidates were required to draw conclusions from various pieces of data.

(a) (i) Many of the candidates deduced correctly the answer, 'caterpillars' although a few answers included reference to 'dandelions' and 'thrush' and rarely 'bacteria'. Even though this is a simple food web it is very rewarding to observe how many of the candidates were able to correctly identify the correct organism.
(ii) Many candidates identified the importance of pest removal as an influence in cabbage growth. Reference to 'thrushes' was the only common trend in incorrect responses although this was also one of the many questions where no suggestion was given.

(b) (i) This part was not answered as well as Q.(a)(i) although many candidates did correctly give the term. Reference to 'thrush' or 'caterpillar' was suggested by a number of candidates.

(b) (ii) Many candidates achieved this marking point predominantly for reference to 'light', 'space', and 'water'. There were a number of 'vague response' but few answers reflected a lack of understanding rather more a vagueness in explanation.

Q4 This question required some knowledge of the biogeochemical cycles. The first part was not very well answered by any of the candidates. Many of the candidates correctly answered the second part although this could have been due to the association of the answer with the time of year. Most candidates achieved one mark for part (c) predominantly for 'respiration' with few answers being awarded both marking points.

(a) Very few candidates suggested 'bacteria' and none included a reference to 'fungi'. Most answers referred to detritivore/named detritivore or a vague reference to photosynthesis. The conclusion from assessing all the answers is that this part of the syllabus appears to have caused problems to virtually all the candidates.

(b) Most candidates were able to suggest an increase in temperature eg 'warmer', 'hotter'. There were a minority of references to 'sun (light)'.

(c) 'Respiration' was suggested by most candidates for one mark although the second mark was only achieved by a minority of these candidates. 'Photosynthesis' and 'diffusion' were frequently given in conjunction with 'respiration'. There were a minority of scripts with three circles rather than the two which were requested.

Teaching tip

Word lists for each topic taught will help candidates to remember specialist terms as well as their correct spellings. Laminated individual words backed with self-adhesive Velcro could be stuck onto fixed or mobile notice boards – easy to remove at the end of a topic and replaced with the next set. Or candidates could be given assignments to write that include specific word lists. These can be of varying difficulty depending on the number of words in the list and should aid understanding as well as improve the quality of extended writing.
Candidates must also be made to understand that giving more, in this case, circles, than required can lead to the loss of marks.

Q5 This question involved various calculations on energy flow through a food web. Candidates find difficulty in numerical calculations in general and these in particular. However, very few correct answers were observed for any of the parts of this question.

(a) (i) This part was more frequently answered correctly than the other parts but still only by a minority of candidates. There were no trends in wrong answers with many different values given.

(a) (ii) About half of the candidates identified 'respiration' as the correct response. Many candidates did not give an answer and there were many references to the substrate eg 'faeces', 'urine' or 'soil'. This was one the questions where it was difficult to sometimes understand why candidates had given responses which bore no connection with the question.

(b) Few candidates appeared to be able to calculate the '2%'; many different answers were suggested such as '300', '25' and '4' but overall there were no trends in wrong answers.

(c) All values in the list were equally observed except for the correct value which was rarely given.

Teaching tip

These calculations are fundamental to this topic and more time should be spent in giving candidates experience in calculating relevant energy changes.

Q6 This was a very accessible question that tended to score fairly well. It was designed to be accessible to all candidates as reflected in the generally high marks achieved. Only part 'c' caused some difficulty to a minority of candidates. Generally, candidates were well prepared and many gained maximum marks.

(a) Very few candidates did not suggest 'amoeba' and there were no trends in the very few incorrect responses.

(b) 'Shark'; was correctly identified by most candidates; a very few 'worms' were suggested.

(c) Most candidates were able to correctly answer this part although a minority of answers included 'shark' and 'worm'.

Q7 This question refers to information which is currently in high profile in the media and the answers from most candidates reflected some knowledge although a paucity of understanding of the topic.

(a) (i) Most answers included some correct reference to the use of the donor card although this was one of the questions which highlighted the problems of communication that some candidates have. Vague references to donation contributed to the few candidates not being awarded a mark. However, a few candidates were under the mistaken belief that the 'donation' involved any personal item of the donor such as financial donations.

(a) (ii) This part was answered correctly by most candidates. Interestingly, because of the wording of the stem of the question even those candidates who referred to financial donations in Q7(a) were able to correctly identify two organs for this part. A very small minority of candidates were unable to suggest two organs which could be donated. There were very few suggestions that included artificial organs and few that indicated blood donation.

(b) Candidates appeared to have difficulties interpreting the graphical data. Many answers included some correct reference to the transplant increasing which was the easiest of the three conclusions to make. Possibly by default many candidates indicated that the number of donors was not increasing. No candidate included a reference to the gap between number of donors and transplants required increasing. The modal value was one and rarely was two marks awarded.

(c) This part was answered correctly by a large number of candidates. However, many of the candidates appeared to misunderstand the question answering in terms of more people needing an operation. A minority of candidates referred to the use of artificial organs and reference to blood donation. But more worryingly there were a number of references to the donation of dead organs.

Teaching tip

Unfortunately, graphical interpretation at this level is always difficult and suggestions that more examples would be of benefit is perhaps unhelpful. However, it is apparent that candidates are confusing blood donation with organ transplant and this should be emphasised as appropriate.

Q8 This is a fairly simple identification of parts of the female reproductive system. Most candidates scored quite highly in all parts.

(a) (i) Most candidates correctly identified both parts and of those candidates only achieving one mark ovary was predominantly given although rarely substituted by uterus. Yet again, there were scripts in which no response had been given.

(a) (ii) Rarely was 'ovary' not given with only 'uterus' being observed, albeit rarely, as an incorrect response.

(b) Most candidates achieved one mark for this part, either for the first or third cause, with two marks being infrequently awarded. Most candidates either associated the top two rectangles on each side or the bottom two rectangles on each side.

Q9 Anatomical structures often cause candidates problems and this question is no exception. Few candidates really did justice to this question especially the first part where rarely 'ulna' was suggested.

(a) (i) Omitting from discussion the very infrequent reference to 'ulna' the most prevalent response was 'tendons' with no other trends except for answers that bore little reference to the answer as for example 'tissue' and 'bone'.

(a) (ii) All types of fractures were equally suggested so it is difficult to gather whether any of the candidates really new which type is correct.

(b) (i) Most candidates were under the impression that the elbow joint is a ball and socket joint. There were few references to 'hinge' but many candidates did not attempt an answer.

(b) (ii) Tendon was not very often given with ligament much more frequently observed. There were a number of scripts which contained at least two ringed structures.

Teaching tip

Possibly the use of wall charts of the skeleton which are widely available would reinforce the information on anatomical structures.

Q10 This question involved reference to skin structure and function. Candidates appeared to have little understanding of relevant features of the skin to correctly answer part (a) or the appropriate physiological response to part (b).

(a) The majority of candidates ticked either the top or bottom box but seldom the middle box. This question is quite difficult as it depends on recall of not only the correct skin profile but also the nature of the sweat gland. However, the diagram, if studied in depth, has all the information for arriving at the correct solution when correlated with candidate recall.

(b) A significant number of the candidates included a correct reference to sweat although few of these answers were awarded a second mark for evaporation. 'Water' and 'liquid' were often given although in the absence of the term 'sweat'. Most candidates who referred to any of these three terms indicated a connection with cooling but very few understood the importance of evaporation in removing heat from the skin surface.

Q11 This question was designed to investigate the candidates' knowledge of cell appendages, the flagellum and cell wall.

(a) The majority of candidates correctly identified both cellular structures although there were some references to 'membrane' instead of 'cell wall' and 'nucleus' for 'flagellum'.

(b) Most candidates found this a difficult question to answer and those that did suggest a valid answer, 'yogurt' and 'insulin' were the only suggestions. There were references to 'food' and 'wine' and, in a number of scripts, the question had not been attempted.

(c) Rarely were these two questions answered correctly with 'spiral' being suggested slightly more frequently than 'spherical'. Most answers had no connection with the question as for example references to 'flagellum' and 'epidermis'.

Teaching tip

Constructing cells and their appendages can be achieved by using plasticine and ball bearings which is sometimes useful at this level. However, Google has some wonderful 3D diagrams of cellular structures if accessible from a Centre.

Q12 This question examined the knowledge of candidates on particular disease-causing organisms.

(a) Most candidates achieved a mark for the fungal connection; both other marking points were equally, but less frequently, observed. Many candidates were awarded two marks and a few candidates a third mark. There were a minority of diagrams with more than one line joining two boxes together.

(b) (i) A further example of some lack of experience in reading graphical data connected to a textural prequel. Very few candidates suggested the correct value. 9 and 15 days were predominantly given.

(b) (ii) There was little evidence that any candidate understood or recalled the effects of bacterial-stimulated pyrexia. Rarely was 'toxin' given and no other valid alternative was observed.

(c) Many candidates correctly referred to 'antibiotics' with fewer to 'antibodies' and rarely to 'disinfectants'.

Q13 This question involves some information concerning a biogas digester.

(a) There were relatively few references to the anaerobic gas, 'methane', most candidates were under the impression that the aerobic gas, carbon dioxide, was the main gas in the mixture. Of the many invalid responses, 'acid', 'petrol' and 'no response' were the most common.

(b) There were many valid examples of the use of biogas predominantly as heating, cooker fuel or vehicle fuel. There were also a number of no responses.

(c) This part was answered well by the majority of candidates with a modal mark of one. Fewer answers were worthy of a second mark. Correct reference to 'water', 'minerals' and 'oxygen' were mostly suggested. There were also a minority of references to 'carbon dioxide' and 'waste' as invalid answers.

Q14 This question was designed to elicit information on the topical subject of diabetes. One candidate in the entire cohort achieved a mark for the first part.

(a) It is somewhat difficult to understand the reasons for the lack of knowledge or understanding of this topic. The applied nature of the question may have influenced the answers given as for example for part (a) 'collect urine sample and send to doctors'. However, no reference to any of the many approaches to glucose quantification was given by any candidate. Other answers included reference to DNA testing, the use of universal indicator and of pH paper and noting the colour of urine.

(b) A minority of correct references to genetic engineering with no other correct alternative being observed. Apart from some vague references to DNA change there were no indications that the remaining candidates could recall the correct nomenclature. There was a significant number of 'no response' observed.

(c) The responses appeared to indicate that few of the candidates knew that sucrase is an enzyme. A very small minority achieved one marking point for some reference to a sweeter final product and even less for reference to sucrose hydrolyses to a sweeter product. The majority of answers indicated that either sucrase is added because it is sweet or that sweeteners are added.

B632/02 Higher Tier

General Comments

The paper was judged an appropriate level of difficulty. Candidates completed the paper and there was no evidence of lack of time.

A wide range of marks was seen.

Most candidates appeared to have been adequately prepared for the examination, which is of great credit to centres given the early examination date.

A small number of candidates would have benefited by being entered for the foundation tier.

Comments on Individual Questions

Q1 (a) (i) This question was generally well answered.
(b) Again, this was generally well answered. However candidates should be encouraged to describe saprophytes as organisms that feed on dead matter rather than waste.
(c) Approximately half the candidates identified denitrifying bacteria.
(d) A number of candidates lost marks because they thought nitrogen compounds contained amino acids instead of being used to make them

Q2 (a) (i) This question was generally well answered.
(ii) Most candidates understood respiration releases heat, however incorrect answers included sweating and movement.
(b) Approximately half the candidates carried out the correct calculation
(c) Few candidates identified 30kJ as correct being the only answer less than the 60kJ used for growth. Some candidates made no attempt to answer this question when all they needed to do was put a ring around the answer.

Q3 (a) Although most candidates gained one mark in part (i) large numbers of candidates mixed up pesticides and fertilizers and mentioned eutrophication as well as run off into rivers. Some candidates referred to disruption of the food chain without gaining marks because they did not mention bioaccumulation or harm to other organisms. Part (ii) was generally well answered.
(b) Most candidates knew that magnesium is used to make chlorophyll however some thought it contained chlorophyll. Part (ii) was generally well answered.

Q4 (a) The majority of candidates confused this question with photosynthesis and talked in terms of using water instead of water loss. Of the few that mentioned transpiration only a minority made a comparison and used the word more.
(b) Candidates should be encouraged to use the correct term 'as a control' instead using vague descriptions.
(c) Candidates did not gain the mark because they described the difference in terms of mass instead of evaporation rate.
(d) Most candidates knew the cell was plasmolysed but few knew the space contained air.

Q5 (a) Most candidates realised there were not enough donors. However few identified a second trend such as the number of people needing donors is increasing.
(b) This question was generally well answered.
(c) This question was generally well answered.

Q6 This question was generally well answered with most candidates gaining at least 3 marks.

Q7 (a) Candidates knew about cartilage however a large number of them incorrectly thought adult bone contained no cartilage. Few candidates gained the second mark linked to ossification.
(b) Those candidates that did not answer this correctly tended to think it was ADH.
(c) This question was generally well answered.

Q8 (a) Candidates lost marks because they did not mention sweat by name. Also few were unable to state that heat energy is used to evaporate the sweat.
(b) Only the more able candidates knew that the ascending limb regulated salt levels.
(c) Most candidates knew about the pacemaker in part (i) and correctly answered adrenaline for part (ii)

Q9 (a) Those candidates that lost marks did so because they got the wrong number of zeros. The most common error was 15000000 adults instead of 1.5 million.
(b) Candidates must be encouraged to describe treatments using more than one word. 'Inhalers' is not a description; they need to include the idea of it relaxing the muscles in the airways.

10 (a) Very few candidates were able to identify the bacterial shapes as spherical and spiral.
(b) Only the more able understood the role of bacteria in the nitrogen cycle. Most thought nitobacta produced nitrogen.

11 (a) Few candidates realised that the incubation period is the time between infection and the start of the increases in temperature. In part (ii) only a few candidates understood that the increase in temperature is due to production of toxins.
(c) Most candidates knew the role of Fleming in the discovery of penicillin.

12 (a) Most candidates knew biogas could be used as a fuel. However they should be encouraged not to use terms such as 'run' or 'power' cars.
(b) Candidates that knew biogas was sustainable or renewable gained marks. However a number of candidates incorrectly thought it produced no pollution.
(c) Only the most able candidates answered this in terms of enzyme activity. Those who just said it killed the bacteria gained one mark. The common error was to suggest it would explode.

13 (a) This question was generally answered well. One common error was to place the DNA into the bacteria not the bacterial DNA. Some candidates thought the bacteria were then injected into the humans.
(b) About half the candidates knew the enzyme was restriction enzyme.
(c) Candidates found this question difficult. Most seemed to think sucrase was a sweetener not an enzyme.

14 (a) This question was generally answered well.
(b) Very few candidates knew the correct balanced equation.
(c) Most candidates knew that this was to kill the bacteria. However they should be encouraged not to make ambiguous comments such as 'get rid' or 'remove' the bacteria.

Grade Thresholds

General Certificate of Secondary Education
Biology B (Specification Code J643)
January 2008 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
B631/01	Raw	60	-	-	-	35	28	21	15	9	0
	UMS	69	-	-	-	60	50	40	30	20	0
B631/02	Raw	60	47	38	29	20	12	8	-	-	0
	UMS	100	90	80	70	60	50	40	-	-	0
B632/01	Raw	60	-	-	-	32	26	20	14	8	0
	UMS	69	-	-	-	60	50	40	30	20	0
B632/02	Raw	60	42	34	26	19	11	7	-	-	0
	UMS	100	90	80	70	60	50	40	-	-	0

For a description of how UMS marks are calculated see:
http://www.ocr.org.uk/learners/ums_results.html

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