RECOGNISING ACHIEVEMENT

GCSE

Biology B

Gateway Science Suite

General Certificate of Secondary Education **J263**

OCR Report to Centres

January 2012

J263/R/12J

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This report on the examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the examination.

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Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

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OCR REPORT TO CENTRES

Overview

General Comments

This has been the first set of examination papers for the new specification and as such has been a new experience for Centres, candidates, and examiners alike. Apart from the changes in content from those of the legacy specification, these papers differ from their predecessors B631/01 and B631/02 in that they are out of 75 marks (as opposed to 60) and there are fewer short-answer questions and more extended-answer questions, including three six-mark answers per paper (that are marked by level of response mark schemes). In general, candidates seemed to have been well prepared for this new style of examination and worries that they might not write at sufficient length for the six-mark questions to access all the marks have generally not materialised. However candidates preparing for future sessions need to be aware that these questions do require clearly expressed answers of both depth and breadth to gain full marks.

B731/01 Modules B1, B2, B3 (Foundation Tier)

General Comments

In general the paper was balanced and accessible to all candidates. Few candidates failed to complete the paper, but the number of no response answers scattered through the paper seemed higher than usual.

Answers were appropriate to the questions and there was little evidence of guessing taking place. Questions which tested the quality of written communication were largely well developed by candidates, particularly when the demand of the question was at low level. Very few of these questions were left unanswered. No artistic embellishments were observed indicating that the candidates were 'on task' throughout the session.

This was the first examination in the new specification and overall candidates performed with some apprehension on this paper, particularly in questions which were testing the candidates' ability to apply their knowledge and understanding. Marks ranging from low teens to low fifties were seen but in future it will be encouraging to see higher marks obtained by the more able candidates as they become more familiar with the new specification and examinations.

Weaker candidates were able to recall knowledge of the term 'evolution' and also the jobs of different parts of the blood and understand at least one way the body helps keep warm. More able candidates were able to describe and explain, using ideas of lock and key and active sites, the effect of temperature on an enzyme controlled reaction. Encouragingly, many candidates could calculate a BMI in Q3(ci) but it was very rare to see a correct response to calculating a percentage in Q10(ci).

Candidates need to be more aware of making comparisons to avoid losing marks. Candidates should also be more alert to applying their knowledge to given situations in questions. They often failed to gain credit in questions such as 1(c) and 3(ciii) because they answered in a generalised way rather than applying knowledge specifically to the context of the question.

Comments on Individual Questions

Module B1

1 **(a)** Many scored marks here for frostbite and slowing or stopping enzymes working. Candidates made common errors in referring to hyperthermia rather than hypothermia and some did not gain credit as they referred to enzymes 'denaturing' in the cold.

(b) Many candidates thought that **vasodilation** rather than **vasoconstriction** in the skin would help keep Simon warm.

(c) Most candidates were able to describe one effect of alcohol on the body but few were able to apply this effect of alcohol on the body specifically to the ability to have a snowball fight so did not gain the second mark.

2 **(a)** **(i)** Generally this was well answered with fungus causing athlete's foot being a common response. Occasionally candidates did not match the correct pathogen to disease so only got the pathogen mark.

(ii) Most candidates gained credit usually for either making it safe or to identify any potential side-effects.

(b) There was a good response to this level of response question with a significant number of candidates' responses at level 3. Understanding of defence mechanisms used to prevent infection, including white blood cells involved in phagocytosis and antibody production, was widely demonstrated and some more able candidates referred to antibody – antigen responses.

3 **(a)** Many candidates referred correctly to the need for 'more' energy but some did not give a comparative response and just referred to providing energy or slow energy release.

(b) Generally this was well answered.

(c) **(i)** This calculation was done well by many candidates. The most common error, however, was using 1.8 x 2 rather than 1.8 squared in their calculation.

(ii) Many candidates didn't give the range from the box (ie >25 and <30). Also many candidates did not appreciate the difference between 'overweight' and 'obese'.

(iii) Few candidates got the idea of being fit enough to play rugby at that level so did not gain credit. Most gained a mark for the idea of having more muscle than fat / relatively muscle weighs more than fat.

4 **(a)** Many candidates were able to gain credit for describing Plant A as growing towards the light, but some did not and this was usually because they just referred to it bending towards the light rather than growing.

(b) This was a well answered question.

Module B2

5 **(a)** **(i)** Most scored this mark, usually from referring to hunting or habitat destruction.

(ii) The most common error was "for transport". Also, many candidates misunderstood the question and apparently thought that it was about ways of benefiting the elephants rather than the people, and gave answers about setting up Game Reserves and captive breeding etc.

(b) **(i)** Generally it was a well answered question.

(ii) Most candidates could link the theory to Darwin.

(c) Unfortunately, many candidates referred to holes in the ozone layer and there seems to be a ubiquitous misunderstanding of carbon dioxide damaging the ozone layer.

(d) Many candidates referred to the mammoth tusks being weak/brittle after having been preserved in the ice.

6 **(a)** **(i)** Many candidates could answer this but the most common error was choosing 3.

(ii) Few candidates referred to photosynthesis and some lost the mark by not referring to the energy flowing through the food chain by the organisms actually eating/feeding.

(iii) The most common omission was not recognising that the parasite actually lives in/on/off the host. Many candidates also failed to indicate that the parasite actually causes harm to the host.

(iv) Many candidates obtained both marks here.

(b) **(i)** Generally this was correctly calculated.

(ii) Candidates in the main identified that the buffalo did not benefit from the oxpeckers.

(iii) Quite a lot of candidates looked at the 3rd column of the table and interpreted it as the oxpeckers actually healing the buffalo (ie '55 wounds healed on buffalo with oxpeckers').

7 Many candidates only gave level 1 responses as they did not identify specifically features of insects or arthropods. They generalised the looking at number of legs and body parts, wings etc.

Module B

8 Many got the 30 chromosomes mark, but a significant number of candidates didn't refer to actual fertilisation, and those that did attempt it simply referred to the sperm meeting the egg, rather than joining/fusing/penetrating etc.

9 **(a)** **(i)** When answered, protein was the most common response, although a number incorrectly did put amino acids.

(ii) When answered, mitosis was the most common response.

(iii) The responses here were generally very weak and very few candidates were able to link the reason for DNA replication to maintaining the same amount of DNA in each new cell after division.

(b) **(i)** Level 2 responses were seen as many could describe the trend in the graph and also could link this to enzyme lock and key hypothesis. Few candidates, however, were able to link the active site being changed and denatured by high temperatures.

(ii) There were very few correct responses and most candidates incorrectly referred to 'cloning'.

10 **(a)** Occasionally candidates gained a mark by writing the word equation but few knew that respiration involved the reaction of glucose, with or without oxygen and even fewer could apply the knowledge of energy released from respiration being needed to make the muscles contract.

(b) Many candidates only scored 1 mark here as they did not make a comparative response by identifying that more oxygen, more glucose, more energy was needed to the muscles.

(c) **(i)** Very few candidates could calculate this percentage. Some used the correct method but lost a mark by incorrectly putting 93.

(ii) Candidates did not score here because they generalised their responses by saying that he got fitter the more he trained without referring to which type of training was more successful. Very few specifically referred to the table of fitness level.

11 **(a)** Very well answered, very few got less than 2 marks here.

(b) Generally candidates did get this mark but quite a lot of candidates seemed confused between the idea of a 'fair test' and the idea that repeating the experiment leads to greater 'reliability'.

B731/02 Modules B1, B2, B3 (Higher Tier)

General Comments

Although candidates in general did make a good attempt at the paper, attempting most if not all of the questions, and also usually writing at an appropriate length, it is also true that they found it harder than did candidates for the previous B631/02. Although the paper did produce a normal distribution of marks, this did not extend to the top of the available mark range. The quality of candidates' spelling, punctuation and grammar was generally good overall. There were only a few cases where it was very difficult to interpret a candidate's writing. When doing calculations, candidates should be made aware of the importance of correct rounding of answers.

Comments on Individual Questions

1 (a) Most candidates gained at least one mark, with a minority gaining two, usually for explaining the consequences of body temperature falling being hypothermia or even death. Good answers also referred to the consequences for enzyme activity or other chemical reactions. While generally candidates do not lose marks for incorrect spelling and words are read phonetically if necessary, in this case, while 'hypothermia' gained one mark, 'hyperthermia' did not.

(b) Only a small minority of candidates could clearly explain how vasoconstriction reduces heat loss. What was required was the idea of less blood flowing close to the skin surface but many found it difficult to describe this unambiguously. There are still many candidates who think that blood vessels move away from the skin. Some candidates wrote about sweating or hairs.

(c) About half the candidates gained marks with about a quarter gaining two marks. One mark was for the fact that insulin reduces blood sugar levels and the second mark was for part of the mechanism, eg converting it to glycogen. Some candidates lost marks through vague answers that did not add anything to what they had already been told in the question, eg stating that 'insulin controls blood sugar' but without saying how. A few thought that glucose is broken down to make glycogen.

2 (a) This was marked using a level of response mark scheme. Explaining that deflex was a depressant gained level 1 (1-2 marks), explaining that it interfered with synapses gained level 2 (3-4 marks) but giving a mechanism for its action, such as binding with the neurotransmitter receptors, gained level 3 (5-6 marks). Which of the two marks at a level was awarded was determined by the quality of the candidate's communication, eg the clarity of explanation or use of correct terminology. Two thirds of candidates gained marks ranging from 1 to 6, with 4 being the most commonly awarded mark. A common error was to refer to impulses crossing synapses.

(b) Most candidates gained at least one mark, usually for explaining that coffee contains caffeine which is a stimulant. Many also went on to explain that this would have the opposite effect to deflex.

3 (a) Around a quarter of candidates knew that, apart from fatty acids, fats are also made up from glycerol. Many other answers were also seen, eg glucose, glycogen and amino acids.

(b) Almost half the candidates could explain that first class proteins provide all the essential amino acids. This is a big improvement on previous years. It was not enough to simply state that they are of animal origin or that they come from meat. Some candidates answered only in terms of proteins, eg 'they contain the proteins we can not make'.

(c) **(i)** The majority of candidates correctly calculated the BMI as 26.2. The most common error was to divide 85 by 1.8. Candidates should be aware that full marks were not awarded for incorrect rounding, so 26, 26.2 and 26.23 all gained two marks, but 26.0 for example was only given one mark.

(ii) The majority of candidates correctly explained, referring to data from the table, why Rafik was overweight.

(iii) Not very many candidates gained both marks but around half gained one. Candidates were asked about fitness and health but often did not make it clear in their answers which one of these they were addressing at which point in their answer. Many knew the definitions of health as being disease-free and of fitness as the ability to carry out physical activity, but they did not necessarily link these to the example of the rugby players which they needed to do to gain full marks.

4 **(a)** Almost all candidates gained at least one mark, and around half gained two, for choosing the correct statements about tropisms.

(b) This question discriminated particularly well with broadly equal numbers of candidates gaining each of the marks from zero to three. Most knew that the hormone was auxin and that seedling 2 was lacking in the hormone. Fewer explained that auxin is made in the tip. While a minority correctly explained that auxin collected on the shaded side of seedling 1, only a very few explained that it causes growth through increased cell elongation.

5 **(a)** **(i)** Around a third of candidates explained that preventing the extinction of elephants could bring benefits through increased tourism.

(ii) A majority of candidates suggested that using mammoth ivory could lead to a reduction in the poaching of elephants.

(b) Many candidates were confused about the mechanism of global warming and only a minority gained any marks. Perhaps the most common error was to think that carbon dioxide causes holes in the ozone layer, so allowing in more heat from the sun. Others thought that it was the entry of UV radiation that is responsible.

(c) **(i)** About half the candidates gained one mark, usually for the idea that Lamarck's theory had no genetic basis or that acquired characteristics can not be passed on. However very few gained two marks by expanding on this.

(ii) This was another question that discriminated well with all marks between zero and three regularly seen; more gained three marks than any other mark. Compared with similar questions in the past, fewer candidates gave generic answers (which would not have gained full marks) and most made their answer specific to mammoths.

6 This was another question marked using a level of response mark scheme. There were three ideas on the mark scheme: that members of the same species can produce fertile offspring, that organisms can share characteristics for ecological reasons as opposed to be closely related, and evolutionary relationships can be investigate through comparing DNA or multiple characteristics. Level 1 was given for explaining one of these ideas, level 2 for explaining two, and level 3 for explaining three. Only very few candidates gave all three ideas, with most giving one or two. The most common mark was 2.

7 **(a)** **(i)** A minority of candidates explained that the different shape of the pyramids of numbers and biomass for the described food chain is due to a large number of small ticks feeding on a much smaller number of large buffalos.

(ii) Although most candidates gained one mark, only around a quarter gained both marks for explaining the term 'parasite'. It was well known that parasites benefit from the relationship, but many candidates explained only that the host does not benefit, not that it actually is harmed. Candidates should be advised to avoid definitions that could equally well apply to predators, eg 'feed off other organisms'.

(b) Around half the candidates made use of the data to work out that the net change in each case was +6 and then went on to conclude that the oxpeckers gave no benefit to the buffalos, gaining one mark. Very few commented on how weaknesses in the data itself made it difficult to reach a firm conclusion.

(c) **(i)** Around a quarter of candidates correctly calculated the percentage as 52.9%.

(ii) To gain full marks candidates had to comment on differences in the actual numbers of wounds, the difference in the percentage healed, and explain that it was likely that the oxpeckers were causing the wounds or keeping them open. Most candidates gained one or two marks with very few gaining all three.

(d) About half the candidates explained that the two species do not occupy the same niche, usually with the answer either that they live in different places, or that they eat different food.

8 **(a)** Most candidates correctly worked out the haploid number as 30.

(b) Over half the candidates gained at least one mark, with progressively fewer gaining two or three marks. Many candidates knew this was an example of selective breeding, and the better answers then went on to describe the problems of inbreeding in terms of a reduced gene pool, with a few explaining the accumulation of harmful recessive characteristics.

(c) **(i)** Most candidates did not gain the mark because they focused on the practical difficulties of cloning animals, with some trying to describe the process of cloning by nuclear transfer. Only a minority correctly explained that it's easier to clone plants than animals because few animal cells retain the ability to differentiate in later life.

(ii) Most candidates gained one or two marks for explaining the benefits of using teams of scientists to investigate problems. Acceptable answers included the ideas of combining different knowledge and skills, that work can be more easily checked, and that it's quicker.

9 The majority of candidates identified the cell as bacterial and most of these could give a valid reason, either the absence of a (true) nucleus or the presence of a flagellum.

10 **(a)** **(i)** Over two thirds of candidates correctly answered 'mitosis'. The most common incorrect answer predictably perhaps was 'meiosis'.

(ii) Many candidates made statements that were correct in themselves but not many satisfactorily explained that DNA replication before cell division ensures that there will be the same DNA in both daughter cells after division as in the parent cell.

(b) To gain full marks in this level of response question it was necessary to fully answer the question, ie to both compare the shapes of the two graphs and to explain them. A level 3 answer (5-6 marks) required an explanation of denaturing in terms of a change in shape of the active site, or an explanation of the graphs in terms of collision rates, in addition to a comparison of the graphs. A level 2 answer (3-4 marks) required just a correct reference to denaturing, as well as a comparison between the graphs. A comparison of the graphs with no explanation limited the answer to level 1 (1-2 marks). Although most candidates gained some marks, very few went beyond four marks, and more gained two marks than any other mark.

11 **(a)** Some candidates ignored the instruction to write a symbol equation for aerobic respiration, and gave a word equation instead, which gained no credit even if correct. Relatively few candidates lost marks through the incorrect use of superscripts or case. When symbol equations were attempted incorrectly, marks were usually lost through incorrect numbers in formulae (usually for glucose) or balancing. About a third of candidates gave a fully correct answer.

(b) The majority of candidates correctly chose the second option,

(c) **(i)** Candidates found this question difficult. More left this blank than any other question, although most did attempt it. Only a small number of candidates were able to correctly work out the percentage as 93.6%.

(ii) Although most candidates gained at least one mark, only a minority of these went on to gain two or three marks. Candidates usually recognised that Carl was respiring anaerobically but did not go on to explain the consequences in terms of lactic acid production.

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

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Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

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