OCR
RECOGNISING ACHIEVEMENT

GCSE

Biology A
Twenty First Century Science

General Certificate of Secondary Education **J633**

Report on the Units

January 2009

J633/MS/R/09J

Oxford Cambridge and RSA Examinations

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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 syllabus 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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REPORTS ON THE UNITS

Chief Examiner's Summary

Candidates performed very well on all of the Biology papers showing both good knowledge and good understanding of the specifications. Although there was a deliberate effort to reduce the mean mark by making this session's paper more demanding than January 2008, the mean score was still high when compared to the other two separate sciences. The style of the papers will be changing from Jan 2010 (see information below). It is anticipated that this will help align the means with all three sciences. Centres should be aware that this change is taking place and prepare their students accordingly.

The Principal Examiners' reports which follow indicate

- gaps in factual knowledge,
- common errors which reveal misconceptions, both in *Ideas about Science* and in *Science Explanations*, and
- places where the candidates did not follow the instructions in the questions.

Important changes to papers A221 and A222 from January 2010

Up to, and including, June 2009, the current model for the objective style question papers will continue to be used. In these papers, all questions currently require objective responses: candidates select from a defined set of alternative responses or provide a short answer which is expected to be clear and unambiguous.

From, and including, January 2010 a new style of question will be introduced to these papers. While the majority of questions will continue to be objective, following the current format, a number of questions on both Foundation and Higher tiers will be open-ended, requiring candidates to provide longer written answers without selecting from a set of alternatives. Each of these responses will be worth from 1 to 4 marks, providing candidates with opportunities to organise information, develop arguments, analyse and evaluate.

The papers affected all carry 42 marks. These open-ended questions will in total carry 12-14 marks of those available, with the remaining 28-30 marks continuing to be assessed with objective style questions.

New specimen assessment materials for these papers have been developed and are awaiting approval by QCA. As soon as they have been approved, centres will be informed with a further 'Notice to Centres' and the papers will be made available on the OCR website (www.ocr.org.uk). At the same time, revised specifications will be published to reflect these changes. No other significant changes have been made to the specifications, but a small number of minor corrections and clarifications will be included and highlighted at the time of publication.

A221/01 Twenty First Century Science Biology A (Modules B1, B2, B3) Foundation

General Comments

The paper was completed by all candidates in the allocated time. Most candidates performed well and were able to demonstrate what they knew and understood. There was a good range of marks on the paper and candidate scores ranged from very low to almost full marks in a minority of cases. Candidates would be well advised to take care to make sure their responses match what has been asked for in the questions, for example ticking the correct number of boxes in those questions which ask for this response.

Comments on individual questions

Q1 was generally well answered, although a surprising number of Candidates did get part (a) wrong, with cell membrane being the most popular incorrect response. In part (b) most chose at least one of the two correct responses. For part (c) there was no clear pattern as to which of the correct responses was chosen by the candidates scoring only one of the marks.

Q2 was very well done by nearly all candidates.

Q3 showed a greater range of successful responses. Part (a) was well done, with most candidates scoring both marks. In part (b) there were many who scored only 1 or 0 marks, although there was no clear difference between which correct option was chosen by those scoring only 1 mark. This perhaps suggests that Candidates needed to spend a little longer thinking through the conditions required for microbial growth. Again with part (c) there were many who scored 1 of the 2 marks, and the combinations of responses chosen at times seemed to indicate that Candidates were not very familiar with the causes of symptoms of infectious diseases.

Q4 was not well answered. Many Candidates penalised themselves on part (a) by drawing lines from all of the symptoms to the disorders, and liking all of the causes with the disorders. It may be helpful if the Candidates realise that where they offer both the correct response and an incorrect one they cannot score the mark. Part (b)i was much less well answered than (b)ii, suggesting that some Candidates would benefit from more detailed understanding of the difference between dominant and recessive conditions as exemplified in the specification document.

Q5(a) differentiated between the more able candidates and the others, with part (a) being a little better answered than part (b), which required some thoughtful interpretation of the diagrams.

Q6 generated some marks for nearly all of the Candidates, with part (a)ii being the least well answered, suggesting that while many could distinguish between correlation and cause many were having difficulty thinking quite what was meant by correlation.

Q7(a)a was generally well done, but part (b) proved more difficult. A substantial number of Candidates lost marks by drawing two lines from one or more of the changes listed. Again it might be helpful to future Candidates to be aware that while drawing all possible lines on this type of question will contain the correct answers, it is not going to score marks in the examination. Only a small number of Candidates had the question exactly wrong showing that they had correctly grouped the changes but had then wrongly linked their groups to the wrong causes.

Q8(a) was well done by most Candidates, but many failed to score both marks on part (b). There were some careless responses which had the correct pair of words associated with e.g. hormones suggesting that some link was being made with the correct response, but which did not score because the words were inserted into the sentence in the wrong order.

Q9 was well done, with many scoring both marks for part (a). Part (b) was less well answered, with as many as a third of Candidates either choosing the wrong response or choosing more than one response.

A221/02 Twenty First Century Science Biology A (Modules B1, B2, B3) Higher Tier

General Comments

Candidates performed extremely well on this paper and were well prepared for the examination. There was no evidence that any of the candidates ran out of time.

Candidates should be aware that this is mainly a multiple choice style of question paper and that for any questions that they cannot answer, they should at least try to eliminate incorrect responses and then take a guess at the correct answer.

On the higher tier paper only some of the multiple choice style questions state how many responses are required. If two or more responses are asked for, candidates will lose marks if they only give one response. Candidates should also be aware that a three response answer does not always merit three marks.

The paper is now marked by electronic marking after first being scanned and then passed electronically to examiners. It is now more important than ever that candidates use legible writing and restrict their responses to the boxes, spaces and lines that have been provided rather than writing in margins and other areas that may not be visible to examiners in the electronic copy.

Q1 Part (a) proved an easy start to the examination with most candidates scoring both marks. Common errors included transposing the male and female answers or only writing down one chromosome.

Part (b) was generally well answered but often words such as ‘male’ were used instead. This was not credited. A response commonly given was SRY which was credited.

Part (c) was also well answered but many candidates thought that it also caused the ovaries to develop and ticked the first or third boxes.

Q2 Part (a) was well answered with most candidates scoring both marks. Some candidates failed to read the question carefully and drew lines linking all four boxes on each side. This resulted in no marks being awarded. Candidates are well advised to carefully read each question.

Part (b)i was also well answered. Most candidates realised that because Huntington’s is a dominant condition Hh is not a carrier and correctly gave the answer of D. Candidates who wrote down the genotype of Cc were also credited provided that it was clear that both upper and lower case letters had been written.
Most candidates also correctly identified B and E as the correct answers. Once again writing down the correct genotypes was credited.

Q3 This question was very well answered with the vast majority of candidates scoring all four marks. This shows a significant improvement in answers from questions of a similar type from previous papers.

Q4 This was a harder question but was well answered. In part (a) candidates were not told how many of the responses were correct and candidates who gave three responses were limited to only scoring one mark. In part (b) candidates were told how many responses were correct. However this did not stop a significant number of candidates giving either one, or three

responses. This was another example of how marks can be lost by not reading the question carefully.

Part (c) proved to be a hard question. The question was subtly worded indicating that there was only one correct response for a 'value' and one correct response for what is 'technically feasible'. Far too many candidates completed each of the boxes with either a V or a T. In order to be fair to candidates the question was marked so that those candidates who only wrote down one of one letter and three of the other letter, were credited provided the single letter was in the correct box.

Q5 In part (a) most candidates scored both marks. However a significant number of candidates only scored one of the marks and often thought that a placebo was a mixture of different drugs.

Part (b) was well answered with most candidates scoring the mark.

Part (c) was quite difficult as the number of responses required was not indicated in the question. Most candidates were guided by the mark allocation of two marks, and gave two responses often scoring both marks.

Part (d) was well answered with most candidates scoring the mark of obtaining more reliable data.

Q6 This question was well answered and in part (a) Wendy and Stella were usually correctly identified.

Part (b) was very well done with nearly all candidates identifying the correlation between a factor and an outcome. Also in part (c) most candidates understood that John visiting Mary in hospital and catching a cold, was not convincing evidence for a correlation. Candidates are to be applauded for their skill in answering this question.

Q7 Part (a) proved difficult to mark. This was because in the stem leading into the question, candidates were told that the harlequin ladybird was spreading across Britain. This could be construed as data and therefore the first box could be a correct answer. The original intention of the question was to use the data from the three pictures. Because of this it was decided to ignore the first box when marking the question. As the candidates had not been told how many responses were correct, candidates who also ticked the first box as well as the other two intended correct responses were no longer penalised and scored full marks.
Part (b) was intended to be a hard question and to discriminate between more able candidates. It proved to be successful in this, and only the more able candidates scored all three marks.
Part (c) proved to be more accessible and most candidates performed well on this section scoring at least one of the two marks.

Q8 Most candidates performed well in part (a) giving the correct responses of B and A.
Part (b) was also well answered with most candidates correctly realising that if conditions had been different, so would natural selection.

Q9 In part (a) only more able candidates gave the correct response of CBEAD and scored both marks. The marking for this type of question considers the position of the letters in respect to another letter. So for example, C before B, B before E and E before A scored two marks. If two of the orders are correct one mark is awarded and if only one order is correct, the candidate does not score.

Part (b) required two correct responses and although most candidates scored two marks, many candidates only managed to give one correct response.

A222/01 Twenty First Century Science Biology A (Modules B4, B5, B6) Foundation Tier

General Comments

Candidates performed well on this paper and were well prepared for the examination. There was no evidence that any of the candidates ran out of time.

Candidates should be aware that this is mainly a multiple choice style of question paper and that for any questions that they cannot answer, they should at least try to eliminate incorrect responses and then take a guess at the correct answer.

The paper is now marked by electronic marking after first being scanned and then passed electronically to examiners. It is now more important than ever that candidates use legible writing and restrict their responses to the boxes, spaces and lines that have been provided rather than writing in margins and other areas that may not be visible to examiners in the electronic copy.

Q1 Part (a) proved to be an easy introduction to the paper. Most candidates scored both marks by writing down the letters in the correct order and very few candidates failed to score at least one of the marks.

Part (b) was very well answered and very few candidates failed to score the mark.

Part (c) was also well done but 'heat' proved to be a powerful distracter for the second word. This was possibly because a few candidates failed to read the question carefully and did not notice the phrase "… a lack of"

Q2 In part (a) a significant proportion of candidates did not know that diffusion was a passive process with many thinking that it was active. Most candidates knew that water molecules moved form an area of high concentration to an area of low concentration and were awarded the second mark.

Part (b) required the candidates to tick three correct statements for two marks. Most candidates scored one of the marks by correctly ticking two boxes.

Part c) was not well answered. Most candidates thought that the level would drop or stay the same with few giving the correct response of 'becomes higher'.
This was an overlap question with the higher tier.

Q3 In part (a) most candidates scored at least one mark on this question. 'Breathing' and 'excretion' were popular incorrect distracters for the correct response of 'respiring'.

Part (b) was worth three marks with most candidates scoring two of them. A common error was to think that the amount of oxygen in the blood affected concentration of urine rather than external temperature.

Q4 In part 4(ai) both meiosis and fertilisation proved to be popular distracters for this question with only about half the candidates correctly identifying mitosis as the correct answer.

Part 4(aii) was better answered with most candidates identifying 'increases' as the correct answer.

Part (b)i was not well done. Most candidates gave '…..doubled' as an incorrect answer with only the minority correctly giving the answer of '…..halved'.

Part (b)ii was also not well done by a significant number of candidates. Many thought the correct answer was 'embryo'.

Part (b)iii was well answered with most candidates scoring the mark for giving 28 as the correct answer.

Q5 This was an overlap question with the higher tier. Not surprisingly candidates found this a hard question. The most popular answer for part (a)i was 'nucleus' with relatively few giving the correct answer of 'cytoplasm'.

Most candidates managed to score the mark for part (a)ii and realised that production of haemoglobin would stop.

Part (b) proved to be more difficult with only the most able realising which pair of words to choose.

Q6 Most candidates performed quite well on this question. In part (a) most realised that the cell were already specialised and in part (b) that the cells contain both active and inactive genes. Likewise in part (c) most realised that it was the zygote that divides by mitosis to produce the embryo. Part (d) also proved to be accessible with over half the candidates giving 'continues to grow all their lives' or 'only consist of specialised cells' as an incorrect response.

Q7 Part 7(a)i proved to be quite a difficult question with 'blood vessels' and the 'brain' proving to be very powerful distracters. However, in part (a)ii most correctly identified muscles as being effectors.

Part (b) was not well done. In part (i) few candidates identified the last answer as the correct one. Most responses seemed to be scattered over the three incorrect statements.

In part (ii) axon was often given the letter A, and thus candidates regularly only scored one of the two marks. Most candidates correctly identified the fatty sheath and the nucleus from the diagram.

Q8 Part (a) was not well answered. Even though candidates were specifically told to draw one straight line, many drew two lines and thus forfeited the mark. Few managed to correctly link 'simple' with 'involuntary'. Clearly this is one area of the specification which needs to be covered in more detail.

Part (b) however was well done with most candidates scoring both of the single marks.

Also in part (c) most candidates correctly identified Bob and Pnashe as the two correct responses.

Q9 This was an overlap question with the higher tier and consequently candidates found the question rather hard. Pin pricks and hot surfaces proved to be powerful distracters for part (a) with only the more able candidates correctly identifying the last two statements as correct responses.

Part (b) was an easier finish with most candidates scoring at least one of the two marks.

A222/02 Twenty First Century Science Biology A (Modules B4, B5, B6) Higher Tier

General Comments

Many candidates found the majority of items in this paper to be very accessible. There did not appear to any significant errors stemming from the misinterpretation of the instructions or rubric within each item. The candidate scores ranged from 12 to 42 out of a maximum of 42 marks, indicating an appropriate range of performance according to the skills and knowledge of candidates. A number of candidates were able to achieve full marks or very close to this level and showed an excellent performance. As for the previous examination session for A222.02, the candidates appear to have been well-prepared for this paper and very few items were left without a response. Another encouraging feature of candidate responses was noted by the absence of unnecessary comments and calculations around the perimeter of items. Indeed, relatively few attempted to cross out initial responses, indicating that they felt confident in terms of paper content. Finally, there seemed to be little evidence that candidates ran out of time, the items located at the end of the paper were seemingly answered to the same level of success as those towards the start of the paper.

Q1 (a) The majority of candidates recognised the different ways in which we gain our water.

(b) Most appreciated the factors affecting the concentration of blood plasma but some selected amount of oxygen in the blood rather than external temperature.

(c) Again, many candidates were confident in relation to the production and activity of ADH.

(d) Although most realised that Megan and Paul gave the best descriptions, some chose Matt i.e. the body produces a greater volume of more dilute urine in relation to ecstasy use.

Q2 (a) (i) and (ii) The hypothalamus was recognised as the temperature regulation centre, although some chose the pituitary gland. The reaction of the body to increased body temperature did not present too many challenges for many candidates.

(b) (i) There was some slight confusion in relation to the sequence of events leading to dehydration but many were able to identify (ii) the symptoms of heat stroke. Some provided only two of the three responses needed.

Q3 (a) (i) and (ii) The cytoplasm was clearly identified as the site of protein synthesis but not all candidates appreciated that protein synthesis would stop in the absence of a nucleus.

(b) Candidates showed a sound understanding of the numbers of organic bases in DNA.

Q4(a) Many were able to determine the shoot response to auxin diffusion (i) and a number of candidates were confident in relation to the overall activity of auxin in the experiment. This was most encouraging.

(b) It was logical for candidates to make the correct link between light and photosynthesis but some chose photoperiodism.

Q5 (a) The zygote was correctly selected by many candidates but it was interesting to note the number of candidates who selected the egg or sperm cell.

(b) (i) and (ii) Some candidates were puzzled by the activity of genes during tissue development but most realised that hormones were the key factor involved.

Q6 (a) Candidates were confident about the role of the cerebral cortex in respect of memory and speech.

(b) Although many correctly chose the electrical charge and the MRI scanner, some unfortunately chose body temperature or urine sampling.

Q7 (a) Many were able to determine the sequence of events at the synapse (i) and realised that the receptor molecules were located on the membrane of the motor neuron. No clear pattern of alternative responses emerged.

(b) Not all candidates were familiar with the response of the synapses to ecstasy.

Q8 (a) Again, the role of the cerebral cortex was appreciated for memory and the eyes were identified correctly. However, some chose the pituitary gland.

(b) Most coped well with this item and could determine the correct responses from the information provided. Some were distracted by how the policeman sounded.

(c) Although many correctly chose the smell of the sweet factory, some were distracted by the number of right and left hand turns.

(d) The model was self-explanatory in relation to the information rehearsed and lost. The secondary stimulus was slightly more challenging for some candidates.

Grade Thresholds

General Certificate of Secondary Education
Biology A (Specification Code J633)
January 2009 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
A221/01	Raw	42	N/A	N/A	N/A	29	24	19	14	9	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A221/02	Raw	42	39	36	30	24	15	10	N/A	N/A	0
	UMS	50	45	40	35	30	25	20	N/A	N/A	0
A222/01	Raw	42	N/A	N/A	N/A	29	25	21	17	13	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A222/02	Raw	42	38	34	28	23	18	15	N/A	N/A	0
	UMS	50	45	40	35	30	25	20	N/A	N/A	0

Specification Aggregation Results

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

	Maximum Mark	A*	A	B	C	D	E	F	G	U
J633	300	270	240	210	180	150	120	90	60	0

The cumulative percentage of candidates awarded each grade was as follows:

	A*	A	B	C	D	E	F	G	U	Total No. of Cands
J633	9.6	34.6	75.0	96.2	100.0	100.0	100.0	100.0	100.0	52

198 candidates were entered for aggregation this series.

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

Statistics are correct at the time of publication.

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

OCR Customer Contact Centre

14 – 19 Qualifications (General)
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

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OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553