OCR
RECOGNISING ACHIEVEMENT

GCE

Science

Advanced Subsidiary GCE **AS H178**

OCR Report to Centres

June 2012

Oxford Cambridge and RSA Examinations

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

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.

OCR will not enter into any discussion or correspondence in connection with this report.

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Advanced Subsidiary GCE Science (H178)

OCR REPORT TO CENTRES

Overview

General comments

Although fewer candidates were entered this session, there were still a large number of candidates scoring well on the three components. Obviously centres had the experience of past papers and mark schemes and confidence in applying criteria in G643. It was noticeable that fewer candidates re-sat G641 in the June series. These high scoring candidates were confident in their answers, applying their knowledge to new situations. They could handle calculations and write extended answers well. Unfortunately, however, there were a lot of candidates who were not well prepared and lacked basic definitions of terms, many of which they should have been familiar with, *e.g*. biodiversity or isotope. They also were unable to use the equations on page 2 correctly and left many questions unanswered.

This specification should provide an opportunity for candidates post-GCSE to experience aspects of higher level science with an environmental twist or should provide a vehicle for candidates studying non-scientific AS and A2 qualifications to still maintain some experience of science.

News round-up for GCE Science

A level reform

Over the last year, the future of A levels has received extensive interest. Ofqual is currently running a consultation to seek views from higher education, employers, learned societies, colleges, schools and others.

There is a link to all the relevant consultations, debates and reports at http://social.ocr.org.uk/groups/science/conversations/level-questionnaire-and-level-reform (also see http://social.ocr.org.uk/groups/science/conversations/level-timelines). We would strongly encourage teachers to contribute to the consultation (11 September deadline).

Additionally, if you have suggestions of content you would like to see in future Science qualifications please e-mail your comments to GCEScienceTasks@ocr.org.uk, we would be very happy to hear from you.

Keep up-to-date with developments in the sciences

The OCR community, **www.social.ocr.org.uk/groups/science**, is a useful reference point to help keep teachers up-to-date with the sciences. I would strongly recommend visiting the site and registering.

G641 Remote Sensing and the Natural Environment

General comments

The candidates found the paper straightforward and there was a good spread of marks.

Comments on individual questions

Question 1

(a) The term *biodiversity* was well known.

(b) At best, candidates realised that creatures were adapting to the different conditions on the islands, but few mentioned the importance of the inability of the different populations to interbreed, nor the timescale involved.

(c)(i) Well answered, with some imaginative ideas.

(c)(ii) Invariably correct.

Question 2

(a) Weaker candidates appeared not to have heard of the receptors in the eye. Those that had, had a solid understanding of their different functions.

(b) The source of UV light was well known.

(c)(i) Most candidates could name respiration.

(c)(ii) Candidates could generally score a couple of marks naming the reactants and products. The sites of the reactions proved more difficult.

(c)(iii) The ultimate use of the energy was not well understood. Some could name '*active transport*' but after that, they fell back on low level answers such as '*growth'* and *'repair'.*

Question 3

(a)(i) Very poorly answered, with vague responses which showed little thought, such as '*the Earth*'.

(a)(ii) Most candidates scored this mark.

(b) This question was answered poorly. Many candidates believe that the colour or frequency of light reaching the satellite determines the shade of grey in the final image. Many made no reference to numbers at all.

(c)(i) Many candidates recognised that the radiation would be absorbed/scattered *etc*., but they were vague as to the cause *e.g*. '*clouds', 'gases'.*

(c)(ii) The equation was usually competently rearranged and the answer correct. The units proved more difficult.

(d)(i) A lot of guessing went on here, but a significant proportion of candidates scored the mark.

(d)(ii) Many recognised that NIR images will show deforestation, but fewer mentioned that it depended upon the reflective properties of the healthy vegetation.

Question 4

(a)(i) The definition of *biomass* was not well known.

(a)(ii) Many candidates struggled with this question.

(b),**(c)** Most candidates could identify carbon dioxide as the useful gas emitted by power stations, but fewer were able to suggest anything sensible that would further encourage algal growth.

(d) Candidates appeared to enjoy this question and came up with some well-reasoned answers.

(e) The term *autotrophs* was not well known.

Question 5

(a)(i) Most candidates could name a decomposing organism of some sort.

(a)(ii) Bearing in mind that for the first two marks, the candidates simply have to describe the graph, this question was quite poorly answered. It could be a general rule that if they are provided with figures, it is probably safer to quote some data. Few made the link between respiring decomposers and the temperature of the compost heap.

(b) The Haber process was poorly understood, although the conditions were marginally better known than the participating gases. Even fewer candidates could suggest a chemical produced ultimately as a result of the process. The commonest answer was *nitrogen* or *fertiliser.*

G642 Science and Human Activity

General comments

The general standard of candidates' work was comparable to previous series. There continues to be a significant minority of very poor papers (scoring less than 20%) in which there are many blank responses and equally a good number of pupils who have been well prepared for the exam. Centres that prepare their candidates well clearly make use of past questions and mark schemes which are provided on the OCR website. Weaker candidates avoid questions that require more extended answers (see specific question comments below) and despite common usage of 'triangles' for simple equations, weaker candidates still appear to struggle to re-arrange simple equations. Many diagrams were very poorly presented and lacked labels. It is worth emphasising here that a well-labelled diagram can secure many marks.

Comments on individual questions

Question 1

(a) Weaker candidates did not appreciate the negative temperature scale or were sloppy in reading off the *x*-axis.

(b) Candidates should note the different type of answer needed for an 'explain' question as opposed to a 'describe' question.

(i) An explanation using the kinetic theory was required here. Some candidates missed this.

(ii) A description of the Hadley cell was required (although it did not have to be named).

(iii) This question was generally well answered.

If **(b)(i)** was scored then **(b)(ii)** was generally also scored.

(c) A good discriminator question. Many scored three marks but failed to get the correct unit of N m^{-2} (Pa).

Question 2

(a)(i) Any mention of seasonal variation was credited here.

(a)(ii) Surprisingly poor responses were seen. Many mentioned that CO_2 was lighter than air.

(b)(i) The idea of proxy evidence was required. A significant minority talked erroneously about carbon dating.

(b)(ii) A straightforward definition but some candidates are still referring to molecules in their answer.

(b)(iii) A surprisingly large number of candidates were unable to complete this low demand question.

(b)(iv) This question was generally well answered if **(b)(iii)** was answered correctly.

Question 3

(a)(i) Most candidates scored the mark.

(a)(ii) Many candidates understood idea of oxidation number and could apply it.

(b)(i) A simple definition that a significant minority of candidates could not answer.

(b)(ii) Generally well answered.

(b)(iii) An easy question if part **(ii)** was understood and yet there were many poor answers.

(c) This was a good discriminator. Candidates who realised that the answer required a titrimetric analysis generally scored well.

Question 4

(a)(i) This was the best answered question on the paper.

(a)(ii) Many candidates did not seem to have encountered the term '*restriction enzyme*'.

(a)(iii) This proved to be one of the more challenging questions on the paper and many candidates failed to attempt an answer.

(b) Poorer answers lacked specific detail and tended to wander.

Question 5

(a)(i) Well answered.

(a)(ii) Weaker candidates failed to rearrange the density = mass/volume relationship correctly.

(b)(i) Many candidates failed to label their additions to **Fig. 5.1** (or to label their own diagram if they drew one.

(b)(ii) A clearly labelled diagram and a mention of electronegativity would have scored full marks. Unfortunately, too many diagrams were very poor and not labelled.

(c)(i) Well answered.

(c)(ii) Poorly answered by many candidates.

Question 6

(a) A straightforward definition answered well by most well-prepared candidates.

(b)(i) Well answered.

(b)(ii) If the nature of the α-particle was known then this was an easy mark to access.

(c) This should have been a straightforward question but weaker candidates struggled to present their work systematically and again there were too many poor diagrams.

Question 7

(a)(i)–(iii) Many were put off by the already 'high' voltage. However, if part **(i)** was secured then part **(ii**) followed easily.

(a)(iv) Few candidates managed to complete this multi-step calculation.

(b)(i) Generally well answered.

(b)(ii) If the definition of reduction was known in this context, then the mark proved easy to gain.

(b)(iii) The more able candidates realised that the answer related to the equation in part **(ii)**.

Question 8

Many candidates struggled to manipulate numbers with very large or very small powers and were too quick to write down the number on the calculator rather than appreciate the expected values for quantities such as frequency.

(a)(i) Many candidates thought that the greater range for the UV-C given was significant here and not the energy.

(a)(ii) A straightforward calculation but many candidates struggled with powers.

(a)(iii) Well answered if part **(ii)** was well answered although some sloppiness with units was observed by examiners.

(b) Generally well answered.

G643 Practical Skills in Science

General comments

There were fewer candidates from fewer centres this year. Most candidates produced good Case Studies and Practical Skills reports. Annotation of the reports is always helpful in confirming marks. Teachers are reminded that they should carry out the practical tasks in advance of the candidates and supply trial results which are used to confirm the accuracy of candidates' results.

Practical Tasks are designed to give candidates opportunities to carry out activities where they can demonstrate practical skills. The Tasks should not require too much equipment and they do have flaws in their design which should give candidates opportunities for evaluation. The evidence provided suggests the Tasks worked well and were achievable within the time available. In Practical Tasks this year there was some consideration given to risks and hazards associated with the Task. The answers here were often poor and over-marked. Candidates concentrated on the risks and hazards of materials but ignored the risks and hazards associated with the Task itself.

Candidates, according to the information provided by the teachers, generally followed the instructions well and collected some results. Sometimes the tables were not as good as they could have been. Tables should be clearly headed and appropriate units given. Candidates were generally quite good at drawing graphs but the processing associated with the Task was often not clear or incorrect. As has been stated for many years, before an accurate gradient can be calculated, a tangent to a curve must be drawn and a large triangle used. Evaluation, which was such a weakness last year, was better this session, with candidates taught to realise that they must consider the quality of the data and the method. Often obvious imperfections in the method, such as maintaining a constant temperature, were overlooked and more trial things given. Stating that there would be better results if we have better equipment is not acceptable.

Case Studies allow candidates to research and write a report on a topic related to the specification content. For Quality A, too many candidates restrict themselves to websites such as Wikipedia or textbooks. All sources should be fully referenced. The stimulus material names scientists whose work should be studied. Before awarding 4 or 5 marks, the candidate needs to use material from the original scientists' work or work of their contemporaries. In Quality B, we should see a good understanding of the topic which includes an input from the candidate and not just pasted in material from websites. Where material has been pasted in or copied this should be clearly shown in some way. For marks above 3, the candidate needs to cover ethical issues and/or the skilful techniques used by the scientists. A trend must be given from the research before even 1 mark is awarded in Quality C. At this level, the trend can be obtained by information given from OCR. Some processing of data is required for 3 marks. For 5 marks, the candidate must process data, preferably from the original scientists, to reveal additional information. At this level they must comment on the reliability and validity of **data** and not just sources.

This component does give opportunities to assess skills which cannot be assessed in written papers. Teachers are to be thanked for their efforts in setting up the Practical Tasks and marking the work against the appropriate mark scheme.

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

OCR Customer Contact Centre

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

www.ocr.org.uk

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Head office
Telephone: 01223 552552
Facsimile: 01223 552553