OCR
RECOGNISING ACHIEVEMENT

GCSE

Additional Science A

Twenty First Century Science Suite

General Certificate of Secondary Education **J631**

OCR Report to Centres

January 2012

2783562561 **J631/R/12J**

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.

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

CONTENTS

General Certificate of Secondary Education

Additional Science A (Twenty first Century) (J631)

OCR REPORT TO CENTRES

Overview

The majority of candidates performed well. They, and the staff who helped them to prepare, should be congratulated. There were examples of lucid, well thought out answers that were a real pleasure to read. However, candidates who are operating at Grade C or below but are entered for the Higher Tier would have had a much more enjoyable examination experience had they taken the Foundation Tier.

The improvement in candidates' performance in the free response questions continues. This improved quality of response now allows examiners to give more specific critiques, which Centres should find useful. Unsurprisingly, Foundation Tier candidates had most problems in structuring their answers to these questions, and sometimes contradicted themselves in consequence.

As always, candidates should take especial care in reading the question. In the pressure of the examination it is very easy to make mistakes of interpretation, which can then severely limit the number of marks available to the candidate.

Several Examiners mentioned noticeable omissions, suggesting that some areas of the specification had been covered only briefly or even not at all. As the examination has no choice of questions, a candidate's inability to respond to a question can only limit that candidate's success.

Centres also need to emphasise to the candidates that their papers are marked electronically, after first being scanned. Therefore it is very important that candidates use legible writing and restrict their responses to the boxes, spaces and lines that are provided. On the occasions when candidates have to write outside of these spaces, they need to make it clear to the examiner that they have done so. In addition, if candidates change their minds, any alterations must be made clearly and unambiguously. Examiners sometime struggle to decipher a 'B' that has been written over in an attempt to make it into a 'D'. Candidates would be better to cross out and rewrite their new answer to ensure that they are awarded the appropriate number of marks.

A215/01 Twenty First Century Additional Science A (B4, C4, P4) Foundation Tier

General Comments

The candidates seemed to be entered for the correct tier and made good use of the time available with no evidence of shortage of time. Candidates engaged with the examination in a positive manner and they generally tried their best to match the requirements of the questions. Many candidates scored well in the objective type responses compared to the free response questions. They seemed to have checked the number of marks available and made a sensible number of points to address the marks, however they should also be vigilant in checking what the question is about (for example questions 3, 7 and 8 see below).

Some candidates performed inconsistently, scoring heavily on many questions while letting themselves down by getting almost no marks on others.

In general candidates seemed to have a good grasp of forces but a weaker understanding of energy, and especially energy transfers.

Comments on Individual Questions

1 Q.1 proved an easy start with most candidates showing their ability by scoring at sections requiring the connecting of ideas and also the selecting of the correct explanation of an effect.

2 Most of the candidates correctly predicted the effect of changing temperature on the experiment for Q.2(a), but then struggled with part (b) many looking for more froth and forgetting that at higher temperatures enzymes stop working (denature). Most candidates were able to explain correctly why hydrogen peroxide was needed for part (c) with Lesley and Ayesha common distracters.

3 Part (a) was an overlap question with the higher tier, so many foundation tier candidates struggled and referred to reasons for the movement of oxygen and water, eg homeostasis/respiration, rather than the process that moves them. Of those who scored, many were able to refer to water or oxygen movement, with the more able correctly referring to both. The next sections about water loss were not overlap questions and were well done, the main issue in part (c) being the drawing of more than 1 line despite the clear instruction in the question.

4 Many candidates struggled with this question, and did not seem to realise that the study of spectra has helped scientists to discover new elements. However, very few candidates made no response, with most attempting to produce an answer that could be assessed.

5 Q.5(ai) This question on the physical properties of the halogens seemed to differentiate between those could recall and score well, compared to those who seemed unable to link the properties at all. Few candidates recalled that the halogens can bleach dyes for part(aii) while the majority recalled that they can kill bacteria in water for (aiii). Part (b) was well done; candidates seem to have grasped the ideas of formulae well, with few common errors.

6 Most candidates scored well on Q.6(b), an overlap question. There was a lot of evidence of effective teaching of this topic, with many candidates showing additional knowledge by "pairing" electrons appropriately. A common mistake was to have 6 in the inner shell and 8 in the outer. The structure of the atoms for 6(a) and ions for 6(c) was a struggle for weaker candidates.

7 Part (a) was well done, the majority of candidates seemed able to interpret the graphs successfully. In part (b) some answers referred to forces rather than energy and so scored no marks. The question asked for answers to include reference to Gravitational Potential Energy (GPE), Kinetic Energy (KE) and total energy. Those candidates who did this were often rewarded although some responses were not always consistent, eg KE up, GPE up and so total energy down. However there were some good responses which recognised that GPE changes to KE as the parachutist falls. Part (c) about forces was successfully answered by most candidates.

8 In Q8.(a) many candidates correctly identified the size of the force, many responses about the direction were correct although some where ambiguous, and only a few scored the third mark for the idea that it is a reaction force. Many candidates expressed ideas about steady speeds having balanced forces even though the rocket is accelerating. In Q.8(b), the substitution into an equation was well done by many. Q.8(c) was done well by the more able who were able to interpret a graph to match a given steady speed on a distance time graph.

9 Many candidates struggled with question 9(a). A common confusion was that a crumple zone provides a counter force to the force from the wall. Q.9(b) caused problems for many weaker candidates who were distracted by the initial speed of the car, and some who struggled with dividing by 0.1 second. Q.9(c) proved very accessible, with no sign of the candidates having given up, and their commitment resulted in many marks being gained. Friction instead of force on a seatbelt was one of the few common errors.

A215/02 Twenty First Century Additional Science A (B4, C4, P4) Higher Tier

All candidates appeared to have time to complete the paper and were able to demonstrate their knowledge and understanding of the subject. However, Examiners were concerned that in at least one case [9c] candidates appeared to answer the question that they wished was there rather than the one that was actually on the paper.

1 This question was common with the foundation tier paper. Many candidates gained credit for mentioning diffusion, and the more able went on to either describe diffusion as being flow from high to low concentration, or to link osmosis to the movement of water. The most able wrote a clear and full answer differentiating the two. Some candidates were distracted by ideas of active transport. In part [b] most candidates realised that the link between blood plasma concentration and urine concentration is an example of homeostasis, and only a few suggested that the urine would be more dilute rather than more concentrated.

2 Most candidates clearly understood the nature of a negative feedback mechanism and antagonistic effectors, and in part [c] they were also able to gain at least one mark for realising that the hypothalamus is the organ which processes information and that this stage comes before vasodilation.

3 Many candidates identified both the correct statements about the graph of enzyme activity and temperature, and most got at least one of the statements correct. Incorrect choices tended to be for “the enzyme only works at the optimum temperature” and “at high temperatures the collisions between enzyme and substrate stop”.

4 Most candidates were familiar with the basics of ADH production and scored well on part [a] of this question. Probably the most common mistake was to suggest that ADH is released by the hypothalamus instead of the pituitary. The effects of ADH and of Ecstasy on both ADH and urine volume were well known.

5 This question targeted the more able of the candidates, who gave confident, high scoring responses displaying full and clear understanding of the science. Others often successfully linked the discovery of elements in the Sun to spectroscopy, and sometimes went on to discuss the presence of lines in a spectrum. The idea that the pattern of lines is unique for each element was much less well known. Answers which were too weak to be given credit at this level still showed clear appreciation of the basic ideas – such as discussion of and “look at the flame colour”. However, such candidates were not transferring their scientific understanding to the problem of identifying elements in a remote object such as the Sun. A few candidates suggested that telescopes are so powerful that you can actually see individual atoms of different elements on the Sun’s surface and so tell what they are.

6 The colours and states of bromine and chlorine were often known, though candidates usually did better on the states than the colours. Many thought that chlorine is yellow. Far fewer stated that iodine is a grey or black solid, though the frequent references to purple did show a familiarity with iodine in other states. The most able candidates correctly identified all the colours and states of the halogens.

The most able candidates realise that the formula of sodium bromide is NaBr, and went on to balance the equation for the reaction of sodium with bromine, while other candidates suggested that the sodium bromide would have a formula of $NaBr_2$.

The melting point of sodium bromide was successfully predicted by most, though some candidates subtracted one number from the other to give an answer of 140°.

Able candidates clearly understood the way in which a sodium atom forms an ion, with sodium gaining an electron as the most common mistake.

7 About half the candidates knew that the number of protons in an atom governs which element that atom belongs to, and even more candidates could complete the electron shell diagram. Able candidates went on to choose the correct formula for sodium sulfide, with NaS_2 being the most common error, and also chose the correct description of the chloride ion in part [d].

8 Able candidates were aware that crumple zones protect car occupants by increasing the time over which forces act, though this gave weaker candidates some difficulty, as did the speed calculation. The role of force and work on stretching the seat belt was generally very well understood.

9 Most candidates could read off the times from the graph of the parachute drop, and knew that air resistance reduces the momentum of the parachutist. However, part c] caused considerable problems. Examiners were concerned that a majority of candidates might have only skim-read the introduction and then assumed what the question was going to ask rather than read the specific details of the question itself. Many candidates ignored the statement that the parachutist is falling at steady speed and instead described an object as it accelerates to a constant velocity. Other candidates limited their answer to a description of the forces and made no reference to energy changes. These answers often showed an excellent scientific understanding, but one that was not related to the question itself.

10 Almost all the candidates attempted to calculate the increase in momentum of the rocket, and about half got the correct answer. The question deliberately gave extraneous numerical information to allow candidates to demonstrate their ability to choose only that which was appropriate. The most common mistake was to multiply force and speed instead of force and time.

Explaining the changes in momentum as a rocket accelerates caused, as in previous years, considerable problems. Many candidates were able to gain credit for a low level statement about forces. There was almost no mention of momentum being conserved, and even less of the gas having momentum.

In part [c] most candidates suggested that the distance-time graph for an accelerating rocket would be a straight line.

A216/01 Twenty First Century Additional Science A (B5, C5, P5) Foundation Tier

General Comments

The paper was well attempted with few questions not attempted. The candidates seem to have made good use of their time. There was no evidence of candidates running out of time.

Candidates found it difficult to write longer, free response answers. They often contradicted themselves when writing more than one sentence.

The handwriting of some candidates was difficult to read.

Comments on Individual Questions

1a The answer is 29.7%. Some candidates thought that sugars are different carbohydrates so added the 3.9 to 29.7 getting the wrong answer.

1b Most candidates realised that carbon, hydrogen and oxygen were the elements needed but many wrote them in the wrong boxes. Carbon was usually correct. Although candidates were asked to write the names of the element, the symbols C, H and O were allowed on this occasion.

2a Only half the candidates knew the difference between an element and a compound.

2b Candidates were able to pick out the correct diagram and identify sulfur dioxide.

2c The flow diagram showing how sulfur dioxide moves in and out of the air was understood by about two thirds of the candidates.

2d This question proved to be very difficult for foundation candidates and over two thirds scored no marks here. The ideas needed to score were that the silicon dioxide has a high melting point because it has strong covalent bonds and a giant structure.

3a The aluminium is extracted by electrolysis because it is too reactive. A common wrong answer was it is less polluting.

3bi Despite being given the three names used in the equation many candidates could not put them in the correct sequence. Some candidates used other elements and compounds in their answer.

3bii Although most candidates knew the aluminium and oxygen were made at the electrodes, only half of candidates knew which one was made at which electrode.

3biii Candidates did not know that reduction is the name of the process when a metal oxide loses its oxygen.

4a Positioning the voltmeter in the correct position was correctly done by about a fifth of candidates. Most knew it was a circle with a V in it, although some drew a square or a rectangle. The majority put the voltmeter in series rather than in parallel. A line through the symbol was not allowed.

4bi 45 ohms was the correct answer. A common wrong answer was 44.4.

4bii The answer of current increases, charges free to move increases and resistance decreases was worked out by a sixth of the candidates. A further fifth worked some of the answers to score one mark. The option “stays the same” was regularly chosen.

5a The idea of electrons being transferred was known by many candidates.

5b Candidates knew that the silk cloth gained a positive charge.

5c Bess gave the correct explanation, again known by over two thirds of the candidates.

6a Iron is used in the core of a transformer. Over half the candidates did not know this, with the majority writing copper.

6b The candidates found this question very difficult. Only a few scored all three marks. Candidates did not realise that the core is magnetised so only scored the marks for current flowing in the two circuits. A lot of candidates thought that the current flows through the core.

7a Candidates knew the functions of these four electrical components.

7b Most candidates could calculate the PD of 9 V across the resistor.

8a About half of the candidates knew where DNA is found and where proteins are made. Only one candidate in six scored no marks.

8b The features of DNA were well known with few candidates not scoring.

9 This question did not ask about how to grow the cutting, it asked about how the cutting turned into a new plant with the emphasis on unspecialised cells. Some candidates confused unspecialised cells in a plant with stem cells. Others wrote about the original plant not the cutting. Few candidates mentioned meristems, and those that did rarely got the right context.

10a and 10b Candidates usually scored both marks or neither on this question. The correct answers are 19 and 38 chromosomes.

10c Few candidates knew the relationship between specialisation and active genes. Charlie and Di gave the correct explanations.

11 There was a lot of confusion between mitosis and meiosis. There were two problems:

- candidates did not express themselves very well
- candidates did not clearly understand the differences between the two processes.

A216/02 Twenty First Century Additional Science A (B5, C5, P5) Higher Tier

General Comments

As always, a substantial minority of candidates were entered for this paper who were operating at grade C or below. Although most of them will earn a grade, they would have enjoyed a much more satisfactory examination experience had they been entered for the Foundation Tier paper instead. Although most candidates attempted all of the questions, it cannot have encouraged them to have to answer so many questions which were clearly beyond their understanding. The performance of many candidates on the transformer question suggests that this difficult topic may have been avoided or tackled superficially by many centres. When faced with an examination where there is no choice of question, it must be in the interest of a Centre to ensure that all aspects of the specification are taught at the appropriate level.

It was good to find that the vast majority of candidate were willing to have a go at the free response questions. Too many candidates are still repeating information provided in the question; marks are only awarded for fresh information. The longer questions require an account of a sequence of events, not a set of facts in random order. Too many candidates seem to rush straight in to their answers without any planning, making their answers difficult to understand. More practice at this style of question during their learning would be beneficial for many candidates.

Comments on Individual Questions

1 It was good to find that the majority of candidates earned full marks for the question about covalent bonding; some weaker candidates confused it with ionic bonding. However, very few candidates realised that the flow diagram only showed some of the changes, so most lost the mark for part (b) – candidates should have read the stem of the question more carefully. The free response question about the melting point of silicon dioxide was poorly answered by the majority of candidates, usually because they failed to describe the structure or nature of the bonds in enough detail.

2 Too many candidates were unaware of the term reduction, with oxidation a popular incorrect alternative. However, candidates were more successful at calculating the mass of iron obtained from an ore. Balancing the symbol equation proved, as expected, to be difficult for the majority of candidates, but a substantial minority managed to do it completely correctly. Although most candidates could correctly identify one metal (copper) whose ore could be reduced with carbon, only a minority correctly identified the other (zinc).

3 Few candidates earned full marks, with the majority losing a mark by assuming that oxygen formed positive ions.

4 It was good to find that all three parts of this physics question were well answered by strong candidates. The calculation of 4bi proved to be a problem for candidates who did not have a calculator; their method of division seemed to lead to an incorrect answer of 44 instead of 45. Weak candidates did not appear to use the graph at all, simply using the light intensity value given instead of the current to calculate the resistance. The sentence completion exercise for the LDR allowed strong candidates to earn both marks, but too many candidates earned none; they appeared to have no grasp of the causal link between numbers of free electrons and resistance.

5 Electrostatics is usually a difficult topic at this level. It was good to find that the vast majority of candidates could earn at least one mark by selecting one true statement about the charging process described, usually that the rod and cloth had opposite charges. Too many candidates lost the second mark by assuming that electrons had a positive charge. Only a substantial minority of candidates could identify the correct reason why the balloon repelled the rod.

6 This question was poorly answered by nearly all candidates. Few candidates recognised the circuit as a transformer and identified the iron core as a conductor or insulator rather than as a magnetic material. Most candidates assumed that the current in the first coil managed to pass through the insulation and flow to the second coil through the iron core. Only a minority knew that the current magnetised the core.

7 Few candidates failed to calculate the power of the lamp correctly. Weak candidates struggled to explain the effect of a resistor on the current in a circuit, but many strong candidates had no difficulty. However, the final question proved to be difficult for even the strongest candidates, with few realising the two-step nature of the required calculation. Too many candidates took one of the two voltage values stated instead of their difference when calculating the resistance.

8 Most candidates scored well on this first biology question of the paper, suggesting a good understanding of the process of egg fertilisation.

9 A substantial minority of candidates showed a good understanding of haemoglobin and earned both marks for this question. Few candidates failed to earn any marks at all.

10 It was good to find that most candidates had plenty to say in their free response answers to this question about the use of stem cells for repairing organs. Many lost marks by not being specific enough, often failing to mention the key words of “cell” or “tissue”.

11 Too many candidates earned no marks at all for their free response answer to this question about the process of using genes to make proteins. They often knew the terms to use (eg base pair, amino acid, protein, ribosome, cytoplasm, mRNA, DNA) but could not describe the sequence of events clearly enough to earn the marks. The idea that the amino acids had to be grouped in threes to make a protein was very popular.

12 The majority of candidates were able to earn both marks for this question on the effect of auxins on plant growth.

A217/01 Twenty First Century Additional Science A (B6, C6, P6) Foundation Tier

General Comments

There were no indications that candidates lacked time to complete the paper. A number of candidates may not have been fully prepared for the questions involving calculations and extended writing since these were the areas where there were no responses offered. This was not limited to weaker candidates.

Where extended answers were attempted, the responses were often unstructured but demonstrated an appropriate level of science to score at least some of the marks on offer. It should be noted that the stem of the extended response questions offers guidance to the candidates to help them structure their response. This remains an area for development for future candidates.

Candidates appeared to perform slightly better in the Biology based questions than in Chemistry and Physics sections of the paper. Specific areas for development are outlined in the comments below.

Comments on Individual Questions

Q1a The majority of candidates realised that 'energy' was carried by the sound wave. Most incorrect responses chose the word photon.

Q1b This question differentiated well. A large number of candidates struggled to understand the meaning of the units and so could not unpick the definitions of frequency, speed and distance. Most candidates could identify the correct value for distance to score 1 mark.

Q1c Candidates could generally interpret the shape of the graph to offer diffraction as an explanation.

Q1d Very few candidates could identify that there is a change in speed when refraction takes place.

Q2a Candidates struggled to identify that 'Infrared light' is used to carry information along optical fibres.

Q2b Candidates scored well when they attempted to describe the digital wave. Unfortunately candidates were less successful with their descriptions of noise. This was often confused with descriptions of sound in the television rather than a description of interference of the digital signal. A limited number of candidates could identify that the noise can be removed from the digital signal to enhance the picture quality. This is an area for future development.

Q3a Candidates struggled to identify speed as another property shared by photons. Amplitude was often given as an incorrect response.

Q3b Only more able candidates could identify the link between intensity and the energy arriving per second.

Q3c A limited number of candidates could identify that 'frequency' is the property changed to alter the energy of photons. 'Amplitude' was a common incorrect response.

Q3d Where candidates attempted the diagram, they could generally draw a continuous line from the beam to the mirror and show some reflection at the mirror surface. Unfortunately the angle of reflection offered was often significantly different to the angle of incidence.

Q3e A large number of candidates could correctly identify the pattern as 'interference'.

Q4a This was extremely well answered. A significant number of candidates gained at least 2 marks here, if not all 3 for correctly identifying the sequence of the stages in a reflex.

Q4b Almost all candidates scored at least one of the two marks available here. A vast number of candidates also gained both marks for identifying that the simple reflex 'gives fast responses' and is 'involuntary'.

Q5 A number of candidates offered no response to this question. Where responses were given a job or function of the cerebral cortex was generally identified. A number of candidates could also identify the use of MRI scans as a method of mapping brain activity. There were many responses that were confused or gave unrealistic ideas about how the functions of the cerebral cortex could be mapped. Incorrect responses also discussed reflex reactions, vague ideas of 'brain scans' and the use of 'x-rays'.

Q6a This was the first calculation on the paper. Candidates struggled to calculate the percentage of woodlice in chamber D. Responses often reflected the numbers in the table, suggesting a poor understanding of percentages. 12 was a common incorrect response.

Q6b Most candidates could identify 'dark' as the condition which strongly attracted the woodlouse. A small number of candidates also circled the word 'moist' as well as the correct response. This showed a lack of understanding of what the question expected in terms of the number of responses to be given. The wording 'Which condition appears to most .....' in the question should be identified as needing only one response by candidates.

Q6c Candidates generally identified at least one type of behaviour that helps the woodlouse survive.

Q7a and b Most candidates could identify 'Maria' and 'Rick' as the correct responses.

Q8a Few candidates scored more than one mark on this question. The ability to interpret information given in the stem of the question and apply the candidate's own knowledge is a skill that needs developing in the future. Responses often restated that there was a difference in mass between the starting chemicals and the mass of ibuprofen produced without offering whether this difference was higher or lower.

Q8bi This was a good differentiator. Where an incorrect response was given, 10% was often chosen.

Q8bii Many candidates chose not to offer a response to this question. Where an answer was given, the calculations were confused and candidates struggled to express their calculations clearly.

Q9a Candidates answered this question very poorly. Often too many ticks were given in response to the question. Two ticks were required to gain one mark. Where the correct number of ticks were given, 'lead nitrate' was often wrongly identified in many responses.

Q9b Again this was poorly answered and the correct volume of $10cm^3$ was rarely seen.

Q9c Most candidates could identify the need for 'filtration' as the first stage of the process. The subsequent washing and methods of drying were less common responses, even for the most able candidates.

Q10a Most candidates could pick out the formula of hydrochloric acid from the list.

Q10b Few candidates could identify both the salt and water as products of an acid and alkali reaction. No specific pattern in incorrect responses could be identified.

Q10c It was disappointing that the number of candidates that could identify the pH of an alkali as 14 was limited.

Q10d More candidates could identify the OH^- ion as the ion produced when an alkali dissolved in water.

A217/02 Twenty First Century Additional Science A (B6, C6, P6) Higher Tier

General Comments

It was pleasing to see some very able Candidates present really good answers. There was a slight tendency for Candidates to score more marks in the Physics and Biology sections than in the Chemistry section of the paper.

Overall many Candidates seemed to struggle with the skills required to give clear extended answers in questions such as 1b, 6a, 7c and 8a. Some of the responses might have benefited from a little more thought before candidates began to write on the paper.

In general there was a pleasing pattern of candidates following the instructions given within the questions, with the possible exception of Q6b. Centres are to be congratulated in preparing the candidates for the varied demands of the questions in this paper.

There were no signs that any appreciable number of candidates ran out of time. However some questions eg 5ei and 8 were not attempted at all.

Comments on Individual Questions

1a was well answered, although a number of responses which mentioned microwaves in part (a) went on to miss the point that an optical fibre cable was being used. Perhaps the candidates did not read the question carefully enough.

1b was fairly well answered on the whole, and it was pleasing to read a number of well structured responses. Some Candidates lost marks by restricting their answer to a comparison of digital and analogue signals, something they might have practised from a previous paper.

2a did not provide a mark for many, as most failed to recall that a wave transfers energy.

2b was a source of two marks to only the most able. It was slightly more common to see a mark scored for the value written in the top box than it was to see the correct value calculated and inserted into the wrong box.

2c was the best answered part of Q2, most spotted diffraction as the correct explanation.

2d offered several ways to score the mark (speed, wavelength, density of medium even as an indirect way of referring to speed) but few candidates showed this understanding of the underlying mechanism of refraction.

3a had a wide range of options to give two properties for the mark, but not many did score the mark. Nearly all who did score gave wavelength and speed, from the main points on the mark scheme.

3b was really well answered. Centres are to be congratulated on giving such a good grounding about intensity.

3ci did not produce a mark for the majority of candidates. There were a number who had three of the words correct, but who lost the mark by failing to spot that this was about interference in the second sentence.

3cii was rather better answered, with more ticking the top box about wavelike nature than scored the previous mark about interference.

4a was well answered, most candidates were able to calculate the percentage correctly.

4b was very well answered. The great majority of candidates were able to say that the dark was the condition most strongly attracting the woodlice.

4c was well answered, with nearly all scoring at least 1 mark, most often for “prevents the Sun from drying them out”.

4d tended to be better answered by the more able candidates ticking both the first and fourth boxes. Nearly all candidates offered two ticks as instructed, so Centres have done a good job in reinforcing the importance of reading the instructions in each question.

4e often scored one mark rather than two. The most common error was to fail to tick “brain” in the first sentence.

5a saw a good number of candidates correctly ticked the third box.

5b was even better answered with many choosing the correct options of “pathways” and “more likely”.

6a was an opportunity for candidates to express how well they understood synaptic transmission. The most able gave clear, well ordered answers which sometimes matched more than the minimum points on the mark scheme to gain three marks. At the other extreme, some answers were confused eg with references to electrical impulses diffusing, or chemicals binding with multiple cells after crossing the synapse.

6b asked Candidates to match blocking the removal of serotonin from the synapse with increased serotonin enhancing mood. A significant number of Candidates gave poor answers by drawing more than the one line they were asked to draw.

7a proved to be beyond many Candidates, most seeming to fail to appreciate that the potassium iodide would have been used up in the reaction.

7b was somewhat better answered, with a significant proportion able to interpret the results of the experiment.

7c showed a number of confused responses, suggesting that Candidates were unclear about needing to purify impurities. Where a mark was scored it was most often on the point that distilled water has no impurities.

8a was another free response opportunity which even the more able Candidates seemed unsure how to make the most of. Responses tended to get bogged down in repeating the question, and did not move quickly enough (if at all) into giving the required detail.

8bi asked Candidates to calculate a percentage yield of 90%. This was very well answered.

8bii asked Candidates to show their working for this calculation. The real point of this was to show an appropriate equation in either words or correctly substituted figures, but there were some strangely wonderful methods given to justify the 90% response.

9a offered three marks for a correctly balanced equation. Many scored one mark by giving the correct formulae for water, carbon dioxide and hydrochloric acid. A major stumbling block for many was an inability to give the correct formula for magnesium carbonate – where that was offered the third mark often followed.

9b tended to be correctly answered only by the more able Candidates. The ideal response would have been OH^- although the word “hydroxide” was also accepted when presented.

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

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

Oxford Cambridge and RSA Examinations
is a Company Limited by Guarantee
Registered in England
Registered Office; 1 Hills Road, Cambridge, CB1 2EU
Registered Company Number: 3484466
OCR is an exempt Charity

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