OCR
RECOGNISING ACHIEVEMENT

GCE

Science

Advanced GCE **A2 7885**

Advanced Subsidiary GCE **AS 3885**

Report on the Units

June 2007

3885/7885/MS/R/07

Oxford Cambridge and RSA Examinations

Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 870 6622
Facsimile: 0870 870 6621
E-mail: publications@ocr.org.uk

CONTENTS

Advanced GCE Science (7885)

Advanced Subsidiary GCE Science (3885)

REPORTS ON THE UNITS

PE Report for 2841

General

Candidate's marks covered a wide range, as is normal. However, there were a small but significant number of candidates who scored a total mark falling well short of the grade E threshold. These candidates would have made more valuable use of their time on a course making different demands.

Comments on individual questions

1 (a) Even candidates who achieved high overall scores often gave vague answers. Many gave examples of trophic levels, and a few made the important mention of energy or biomass, but only a small number of candidates did both.

(c) There was some variation between Centres here. Candidates of modest overall score were often able to achieve high marks on these recall questions.

2 (a) Most candidates were able to name at least one essential element, though there was some desperate guessing from weaker candidates, and even stronger candidates sometimes had sometimes failed to read the question and named compounds or ions rather than elements.

(b) Disappointingly few candidates seemed familiar with the concepts of steady state and negative feedback.

(c) Given the difficulties that candidates experienced in part (b), credit was given for valid and thoughtful explanations and for matched predictions. Candidates who had the confidence to present coherent answers to parts (i) and (ii) together scored well.

3 Parts (a) to (c) were generally well answered. Part (d)(i) proved an excellent discriminator, with many good answers. In part (ii), many were able to make the more obvious point linking root extent with access to water, but very few noted the significance of the term 'proportion' in the question and thereby gave a valid second point, such as a point regarding water loss from leaves.

4 (a) Most candidates knew the significance of oxygen in aerobic respiration, but a very surprising number equated respiration with breathing rather than with the food as fuel and with energy transfer.

(b) Many candidates could suggest a first method, but most guessed at a second.

(c) (i) This was well done by almost all candidates, with a small number losing marks through careless drawing.

(ii) This discriminated well in general, though it was noticeable that there were some candidates who achieved a low overall mark but were able to reveal ability here.

(iii) Very few candidates were able to give a fully reasoned answer which included, for example, an observation that an assumption is involved.

5 With the exception of part (b), this question yielded the best responses from candidates in general. Relatively few studied Fig.5.1 carefully enough show their understanding. Knowledge of nuclear structure, the electromagnetic spectrum, and the identity of alpha radiation were all good. An impressively large range of candidates were able to correctly associate low penetrating and high ionising abilities rather then merely state the two points separately.

Examiners Report: 2842: June 2007

General:
The number of entries for this unit showed a significant increase on previous June sessions although the general performance of candidates was similar to previous sessions. Overall the paper was of similar demand to those in recent sessions but the examiners were somewhat tighter in terms of the precision of language required in candidates' answers. These factors contributed to low grade thresholds being applied to the paper, particularly at the E grade boundary. Even so there were few candidates scoring single figure marks, although a significant number were achieving less than 20/60

Comments on individual questions:

Question 1: This did not prove an easy start for some candidates. Imprecise use of language was an issue here – a surprising number of candidates were not able to explain the concept of a molecule as being made up of several atoms bonded together. The term *translational* was not well known with many candidates suggesting it referred to the ability of molecules to transfer energy by collision. A high proportion of students could not identify rotation and vibration as two other ways in which molecules could possess kinetic energy.

The calculation was significantly more difficult than in previous papers requiring candidates to consider the effect of both pressure and volume. Although most candidates realised that the volume of the gas sample would remain the same after the reaction in (c), most gave as the reason that the equation was balanced rather than focussing on the total number of molecules being equal on the two sides. Explaining that NO was a radical also proved difficult with many candidates suggesting the key factor was simply that N had an incomplete shell or had a "free" electron (neither of which gained credit)

Question 2: Part (a) was designed to be an accessible start to the question but some candidates were unable to pick up more than a single mark, doing little more than restate the features shown on the map rather than, for example, explaining the role of water (in cooling) or clarifying the different transport needs of the *raw materials* (imported by sea) and the *products* (probably transported by rail). In parts (b) and (c) the examiners looked for precision in candidates' answers – answers such as "*it causes acid rain"* were not sufficient as it was important for candidates to show they were aware that the sulphur was converted into sulphur oxides which then was responsible for the acid deposition. There were many vague and incorrect comments, such as "sulphur is toxic" or "sulphur is dangerous"

Most candidates simply answered (c) by describing that catalysts speed reactions up, and few candidates were able to go on and describe the lowering of activation energy and hence the reduction in energy costs

Question 3: Candidates have often scored quite well on kinetics questions but this proved rather more challenging. It was disappointing in (b) to find some very confused descriptions of ionic solids. Many answers described the formation of ions rather than the way in which they were arranged. The non-zero start of the graph created difficulties for some candidates in part (c) with most calculations simply reading a volume and time directly from the graph rather than attempting to find a figure for the gradient. However it was pleasing to see other candidates correctly using a tangent method to estimate the initial rate

Later parts of the question were rather more reliably done by candidates,

Question 4: The calculation in 4 (a) was a straightforward substitution so most candidates – but by no means all – obtained two marks here. For many though these were the only two marks obtained on the question. Some students seemed to be attempting the exam without a calculator and, predictably, carried the multiplication and squaring incorrectly.

Answers in (a) (ii) often suggested that lower current would make electrocution unlikely (it is hoped that no-one attempts to test the prediction) and part (b) really discriminated well between candidates who understood the principles of electricity supply and those that did not. Marks of 0 or 1 were, sadly, very common here with the usual difficulty of explaining the meaning of voltage (often described as the “strength” of the electricity) but, more surprisingly, many candidates were unable to make sense of the term frequency (often describing it as the “speed” of the supply)

However there were some excellent, well-structured answers seen showing a thorough understanding of the topic

In order to gain the Quality of Written Communication marks, it was necessary to be using some technical terms correctly; some candidates scored zero here because they simply repeated the information in the stem of the question without using any extra scientific vocabulary.

Question 5: This was probably the most straightforward question on the paper and frequently produced the highest marks. Parts (a) and (b) have been asked so often before on papers that it is very disappointing to see some candidates scoring well short of full marks. Single word answers (such as “warmth” or “protection”) will not really suffice when describing a function and candidates should be aware that “growth” and repair” do not count as two separate points for the roles of proteins. Candidates really should be able to recall some specific tissue or organelle in which protein is particularly important. The word-fill exercise often produced full marks, but some otherwise high-scoring candidates were not able to untangle the data in (d) (ii). Despite food and diet being an explicit theme in this part of the specification, very few candidates were able to suggest the problems caused by unbalanced diets (as opposed to simply restricting the energy available)

2843/01 Principal Examiner's Report

Candidates found the paper easier than last year's and consequently there were few with very low scores. There was no evidence that they suffered from lack of time, although many did leave the very last question blank; this was, however, the most demanding question on the paper. A significant minority made no attempt to answer any of the questions that required interpretation of the text by drawing a sketch. Perhaps they need practice at this, it is a useful skill.

Comments on individual questions

Q1.

This proved to be the highest scoring question. It was the most straightforward, with most of the answers being able to be taken straight from the text.

(a) (b) were invariably correctly answered, although some candidates simply stated that the floods occurred in the winter (or even worse, in the spring).

(c) This was often answered too vaguely. The stem of the question tells them it is about Venice and its problems with flooding, then they were asked why residents are leaving the city. It was not adequate to answer 'because of the flooding'. We were looking for an idea of how the floods inconvenience the residents

(d) The majority of candidates could correctly describe an aquifer, although a few seemed to believe that it was the presence of water in the aquifer that caused the rocks to compress and sink.

(e) Although this question was straightforward, few candidates scored full marks, quoting only one piece of evidence. Many simply reiterated the answer to (d)(ii).

Q2.

The candidates scored less well on this question, since it required interpretation of the information, and careful reading of the questions. (a) Only very few failed to identify the 1966 flood as the event lead to the idea of MOSE, but many incorrectly quoted 8 years as the answer to (ii). Many also found part (iv) difficult. They either failed to realise that they had to divide by 100, or if they did so, did it incorrectly. In general, calculations were poorly done. It was obvious that a number of candidates did not have access to a calculator.

In part (c), the candidates were asked to draw a sketch to show how the barriers will come into operation once the flood warning is given. Some were very poor, consisting of little more than a couple of lines with minimal labelling. A common misconception was that the inlet to the lagoon was a small pipe. Very many of the barriers would not have worked, bobbing about on the surface of the water like buoys.

Q3.

Parts (a) and (b) which simply required lifting information from the text were usually correctly answered, although in (b)(iii), candidates rarely gave a second reason for the suitability of the deeper aquifer, even though they were clearly asked to. Part (c) was not often answered using the text, more often coming up with something vague like 'because it's the same'.

Q4.

This was probably the question where the candidates lost most marks.

(a) The diagrams asked for were very simple, but many candidates failed to even attempt this question, or did them in a very perfunctory way with little explanation. A distressing number of students abbreviated carbon dioxide as CO^2 (rather than CO_2).

(b) Many students failed to realise that they were being asked to comment on the environmental damage caused by the MOSE project, and continued to talk about that proposed by the Padua team. It also required them to go back a little in the article.

(c) Few candidates could quote specific reasons why a combination of the plans would be the best way to save Venice. This was not an easy question since it required careful reading of the text without any obvious signals to flag up the answer.

Coursework components - 2843/2 and 2846/2

Approximately 560 candidates were entered for AS Science; and 127 candidates for A2 Science. This represented 33 AS Centres (2843/2) and 18 A2 Centres (2846/2). Again it is pleasing to report that very few Centres had to be scaled but it is of some concern that the same Centres are scaled year on year. This is a very stable cohort producing work of a very similar standard year on year.

Centres were generally very prompt in sending coursework for moderation. The administration of Centres was generally good with most Centres correctly using Coursework form GCW048 and counting the best mark in each of Skill Areas P, I, A and E. This year there was the additional requirement to send CSS160 (Certificate of Authentication). Some centres were still sending one CSS160 for two specifications.

Quality of the work submitted for moderation

There was some excellent work submitted for moderation this year where candidates clearly demonstrated high levels of performance in all Skill areas. Some of the work, however, was little better than that produced at GCSE and it was hard to see progression from GCSE to AS and A2.

Choosing appropriate tasks

- The tasks chosen were generally the ones that were acceptable in previous years. to do some scientific research at an appropriate level to inform their planning;
- enable the candidates to collect ample data with suitable precision and accuracy;
- usually allow candidates to plot one or more line graphs (bar charts and similar are not appropriate at this level);
- enable candidates to do some detailed processing (calculating the average values for three readings is *not* detailed processing);
- allow opportunities for candidates to evaluate their experiments.

Some Centres applied the criteria with generosity. It should be remembered that these criteria are hierarchical. For example, to award 1 mark in any Skill Area, 1a and 1b *must* be scored. Some Centres awarded 2 marks, for example, when only 1a and 1b had been scored. Also, in some Centres, if a candidate had achieved 1a, 1b, 3a and had made some progress in 5a, candidates were awarded 4 marks. This should only be 2, as 3b had not been achieved.

Skill Area P - Planning

Too often the planning by different candidates within a Centre was very similar with all candidates using the same apparatus and often solutions of the same concentrations. Evidence of real planning was sometimes hard to find.

P.1a The candidate must give a question to be studied, plan a fair test and, if relevant, make a prediction.

P.1b The candidate must choose appropriate equipment from a range of equipment.

P.3a The candidate must introduce some scientific knowledge and understanding. For example, in a rate of reaction experiment, they may list factors which affect the rate of reaction and then identify which factor is to be varied and which are to be kept constant.

P.3b The candidate must choose a suitable number and range of observations/measurements to be made.

P.5a At this level the candidate must use a secondary source to inform the plan. It is not enough to list a book. A reference, e.g. a page number or web address, must be given so that it can be checked. The science used should be at AS or A2 level. Often the reports seen lacked science altogether or included science at below Grade C GCSE level. Some reports contained completely wrong science. They should not be given credit for wrong science. A reference to safety, e.g. ‘wear a lab. coat’ or ‘use eye protection’, is not enough to award P.5a where clearly P.3a and P.3b were not merited. Perhaps for P5a candidates might use Hazcards for information.

P.7a To be awarded this, the candidate must use and evaluate information from a variety of sources. Again, these must be identified and references given. Very few candidates realised this and some teachers gave P.7a when P.5a was clearly the maximum.

P.7b The candidate must now justify the strategy used, i.e. that it will provide precision and reliability.

Eight marks are available only for exceptional performance in P.7a and P.7b or both.

Skill Area I - Implementing

In Skill Area I, much of the evidence remains in the Centre, and the Moderator can only act on the annotation provided. Although annotation can assist the Moderator throughout in confirming the decisions of the Centre, it is essential here.

I.1a Evidence provided by the Centre.

I.1b The candidate makes some observations or measurements. However, if they are not adequate for the activity, I.1b cannot be given. At this level, they do not have to be recorded in a formal table.

I.3a Evidence provided by the Centre. The candidate is confident in practised techniques, e.g. weighing, titrating, using a colorimeter.

1.3b The observations and/or measurements are recorded in a table devised by the candidate. Correct units are given in the table headings. All readings are given to the same number of significant figures.

1.5a Evidence provided by the Centre. A higher level of competence is seen. For example, a candidate can dilute a given solution accurately to produce five different solutions of different concentrations.

1.5b The candidate must now show precision in the observations and measurements taken. In many cases candidates had three very different results (e.g. 17s, 34s and 51s and they took an average. This does not suggest precision in the results collected.

1.7a Evidence provided by the Centre. The candidate must be fully proficient in all techniques and with all equipment.

1.7b Here the candidate must ensure that the degree of precision is the maximum permitted by the equipment. For example, a thermometer should be used to measure temperature to the nearest 0.5 ^{o}C and a burette consistently to 0.05 cm^{3}.

Skill Area A - Analysing Evidence and Drawing Conclusions

A.1a The candidate carries out some simple processing of evidence, e.g. averaging results. The average should have the same number of significant figures as the readings in the table.

A.1b The candidate can report a simple trend or pattern, e.g. increasing the concentration of hydrogen peroxide increases the rate of reaction.

A.3a Here the candidate draws an appropriate line graph with a line of best fit when appropriate. If this is not possible, the candidate carries out some numerical calculations at a higher level than for A.1a. Candidates draw graphs with graph paper or with computer programs. However if computer packages are used to draw graphs they should be half a page in size and with correct scales and lines of best fit.

A.3b The candidate links the conclusion with associated scientific knowledge and understanding. As a guide, it should be linked back to the science given in P.3a.

A. 5a It is again where many candidates fall down. For rate of reaction experiments, for example, they tried to calculate the initial rate by working out a gradient. For this a tangent must be drawn to the curve at 0 and a large triangle drawn. Too often candidates did not draw a tangent but tried to calculate the gradient of the curve or they drew a very small triangle. This interpretation is common to all OCR GCE Science specifications.

A. 5b The link made now is with science at a higher level.

A. 7a For a rate of reaction experiment, the candidate now might use evidence from A.5a to devise a rate equation and write:

$$\text{Rate of reaction} = k[A]^{x}[B]^{y}$$

A.7b Now the link is with science at the highest level.
A mark of 8 is available.

Skill Area E - Evaluating Evidence and Procedures

Evaluation is the most difficult Skill Area for candidates. It is perhaps easier here to separate the two strands.

The 'a' strand is about improvements in the investigation. Often an experiment that works very well gives fewer opportunities for evaluation than one that is more open-ended. A candidate who suggests studying a different variable is not meeting the requirements of this strand. Too often candidates are given credit for suggesting the investigation of another variable.

E.1a The candidate makes a relevant comment on the suitability of the experimental procedure.

E.3a The candidate recognises the limitations in the experimental procedure. For example, in a rate of reaction experiment, some gas is lost before the cork attached to the gas syringe can be put into the flask.

E.5a The candidate indicates an improvement. In the above example, perhaps the solid reagent could be put into a small test tube separate from the acid. The reaction is started by shaking the flask.

E. 7a The candidate justifies the improvements in terms of increasing the reliability. In the example given, will the acid enter the small tube sufficiently quickly or will the rate be limited?

The 'b' strand is about the *quality* of the evidence collected and this strand is overlooked by many candidates, a candidate failing to score E.1b cannot be awarded even 1 mark despite reaching 7 marks in the ‘a’ strand.

E.1b The candidate recognises anomalous results. In practice, many candidates either highlighted them in the results table or circled them on graphs. If there are no anomalous results, candidates should state this. Where there are anomalous results, and the candidate ignores their existence, E1.b cannot be given.

E.3b The candidate comments on the accuracy of observations suggesting reasons for anomalous results. For example, when measuring photosynthesis of a plant, the temperature of the water may change. This could account for any anomalous results.

E.5b Candidates may notice from their results that when they take three readings there are differences between them.

E.7b The candidate assesses the significance of the uncertainties. In the above example, perhaps looking at 19 and 25 (ignoring 43) and averaging the value as 22, they could look at the graph and decide whether this point would now be closer to the graph.

Some Centres have reported missing regular training that exists in larger GCSE Science subjects. Centres are always able to seek advice through a Subject Officer at OCR.

PE REPORT

GCE SCIENCE 3885/7885

UNIT 2844

1 (a) Generally well answered.

(b) Proved very difficult for most candidates. Of the marks available, a majority got the mark for ‘DNA unzipping’ and the production of a new strand accompanied by an original (i.e. they could define the term semi-conservative).

(c) (i) Many candidates were aware of the existence of triplets of something but remained unaware of what these triplets encoded for.

(ii) Many candidates defined the term universal in a non-biological context which was not creditworthy.

(d) The whole of this part of the question was a good discriminator since A grade candidates tended to answer it fully and accurately, whilst less able candidates usually gained only two marks of the eight available.

2 (a) Candidates are consistently confused about the direction of energy transfer in bond breaking and formation. This gives an obvious emphasis to teaching of this conceptually difficult topic.

(b) Many diagrams were seen that showed an exothermic reaction. Some did however show activation energy which lead some to lose the mark for enthalpy change.

(c) Fig. 2.2 was difficult to interpret and many candidates lost the mark for the higher range since the mark for this was non-inclusive 9i.e. the value of 700 is a minimum value).

3 (a) Generally well answered.

(b) The answer ‘Photorespiration’ was seen often and was creditworthy.

(c) The question required both descriptions and explanations. Descriptions were often seen but unaccompanied by coherent explanations. A good discriminator.

(d) Both adaptations needed an explanation and this should have been clear from the marks available. The majority of candidates gained two marks for a widely dispersed/deep root system and the need for water.

4 (a) Generally well answered.

(b) This seems to be a little understood part of the specification.

(c) Experimental techniques seem to be little understood. This is probably because most centres do not have the facilities to carry out specialised spectroscopy techniques. This problem also lost candidates marks in the essay question (6(b)).

(d) Better candidates should have been aware of the appropriate formula for this.

(e) Many candidates drew curved arrows for the transitions which was creditworthy since they were required to draw two arrows form a single point.

5 (a) (i) In describing osmosis it must be clear whether candidates are talking about the concentration of solute or solvent. A small minority lost marks because of this lack of clarity.

(ii) The reverse argument (i.e. reduce pressure on side B) was seen and deemed creditworthy, in a small number of cases.

(b) Generally well answered when attempted at all.

(c) Of those candidates who did answer this correctly, good use was made of the available information (Fig. 5.1).

(d) Simple distillation was described by many candidates and gained, at most one mark, since the question is really about energy conservation.

6 (a) The production of complex carbohydrates is little understood by candidates.

(b) This question was really about experimental design, a topic covered extensively at GCSE, but perhaps not emphasised enough at A level.

As noted above, candidates seemed unfamiliar with the experimental techniques used in this question. Candidates should also be aware that QWC marks could be gained if they could construct a legible coherent answer which did not contain incorrect science. A substantial number of otherwise well-informed, eloquent candidates simply did not answer this question, perhaps because of poor time-management.

(c) This part question was only well-answered by the very best candidates. The question was a good discriminator for the more able and better-prepared candidates.

June 2007 Paper 2845: Principal Examiners Report

General

The number of entries was similar to previous sessions. Overall candidates found that the questions on this paper – particularly the longer essays – were rather more accessible than in some previous papers. Conversely, the examiners were looking for a greater precision, structure and relevance in many of the questions and the overall effect was for the marks to be broadly in line with previous years. There were fewer really poor papers seen and the small number of candidates scoring above 70 are to be congratulated on displaying a very wide range of knowledge, understanding and skills in this demanding component.

Despite the length and complexity of some of the questions most candidates appeared to be able to finish the paper in the time available – indeed for many candidates the final question proved to be by far the best answered. In a small number of cases, however candidates did seem to have rushed the longer essay questions

Comments on particular questions

Question 1: Most candidates seemed comfortable with this data analysis question, with a familiar context. The term "characteristic" seemed to confuse a small number of candidates who selected a single and discussed the factors affecting its productivity. The slightly more unusual percentage calculation caused problems for some who, not believing that a percentage value of above 100 was possible, inverted the ratio to obtain a figure of 20%

Candidates lost marks on the scatterplot by not including a meaningful label for the horizontal axis, omitting units or producing a non-linear scale. All candidates described the relationship between the two variables but few were able to relate this pattern to ideas about the energy required to break bonds between water molecules or other valid points. Some candidates gave only one example of a biome in (d) (i) despite the question clearly asking for biomes in the plural

Question 2: Candidates now seem familiar with a question asking them to use data which includes very large or very small numbers, but some of the steps in this calculation proved quite taxing.

Most candidates gave a convincing explanation for the decrease in volume; the best answers often included a suitable calculation of the two volumes. Almost no-one was correctly able to convert km^2 into m^2 as the first step in the calculation in (b) (i); most answers assumed that the conversion factor would be 10^3.More worryingly some candidates attempted to square or cube the area in km to produce an area in m. However, providing some calculation had been attempted, credit was given for an answer expressed in standard form – most candidates scored this mark. (b) (ii) provided a challenge for many. There was little evidence that candidates had tried to make sense of the process (a rough diagram might have helped in the interpretation) and as many answers divided the answer to (i) by 0.918 as (correctly) multiplied by 0.918. Most were able to use the 91% figure in (iii) however (although some, strangely calculated the volume of the 9% of the ice that lies **above** the water.

The difficulty with visualising the situation continued in (iv); only a relatively small fraction could see that the trick was to find the difference between the volumes in (ii) and (iii). However credit could still be gained in (v) by dividing the answer for (iv) by 3.6×10^{14}. Many candidates appeared to have given up by this stage. Some clear answers were seen for part (c) however.

Question 3: This question required rather less background knowledge than some similar questions in past years; candidates who understood the information clearly were often able to score close to full marks. Common errors, which lost marks for candidates included:

- Not making it clear that some kind of chemical reaction is required to convert DMS and SO_2 into sulphuric acid
- Believing that it was the water in the sea which absorbed the sunlight, not the phytoplankton
- Implying that **all** sunlight is reflected by clouds and haze

Despite the warning in the questions, some candidates could not resist spending much of their answer discussing acid deposition or the greenhouse effect.

The second part of the question, about negative feedback, proved a useful discriminator. Several excellent answers were seen, but many candidates were not able to construct a clear discussion. A common error was to describe a negative feedback loop in which increased dimethyl sulphide emission would eventually cause a reduction in phytoplankton growth

Question 4: Almost all candidates chose to discuss photosynthesis as one of their examples and some excellent and detailed answers were seen, discussing the biochemical details of the light-dependent stage, for example. The second example of a process involving solar radiation proved more difficult for candidates, with many choosing the water cycle or the greenhouse effect with a reasonable degree of success. A number of candidates chose the ocean circulation which *can* be linked in with the absorption of energy close to the equator or the evaporation of water to increase salinity but unfortunately many answers focussed on more general issues for example sub-tropical gyres or sinking due to ice formation. A small number of candidates could not think of a second process – and in some cases not even a first process.

Question 5: These types of questions, where some stimulus material is used to prompt candidates to discuss the relevant scientific principles, have become quite familiar to candidates now. There are still some candidates who ignore the suggested structure at the beginning of the question and simply rephrase the passage. There are only a small number of marks for commenting on the details of the passage and no credit is given for simply restating information already present in the passage. The best answers showed, however, that some centres have trained their candidates well to spend time planning out which aspects of the science they have learnt will be most relevant to the question and to the passage. Some extremely good answers were seen with an excellent balance between the three areas of science and with all the science discussed linking clearly to the passage. Some candidates found that there was insufficient room provided and continued onto separate paper or condensed their writing so that is was almost illegible. The examiners will attempt to ensure that sufficient space is provided in future papers to avoid this problem.

There is no doubt that producing coherent, scientifically accurate answers to questions like these which draw upon such a range of concepts is a really high level skill; candidates who successfully do this are to be congratulated. It should be noted however that even the very best candidates were not able to score full marks on this question – 21 out of 28 was the highest mark seen; a mark of 14 or 15 would still be a praiseworthy performance. As in previous years some answers only obtained a handful of marks

Question 6: This proved to be the best-answered question on the whole paper, possibly because the topic area under discussion was partly based on ideas encountered towards the end of the course. Several candidates achieved full marks and marks of 11 or above were very common. Most of the marks were obtained for detailed descriptions of ionic bonding and of the layered structure of the earth and a description of volcanic activity at plate boundaries. There were some particularly detailed and accurate descriptions of this latter process. Weaker answers, inevitably simply quoted details from the passage verbatim.

PE's Report, 2846/01, June 2007

There were few very high scores, but many students who were able to show learning to the mid-range level of the specification and examination. Again, there were a small number of centres, albeit with small entries, whose candidates achieved consistently low scores.

Question 1

(a) This was well done by most candidates, showing the Indian plate moving below the Eurasian, complete with subduction zone and with labelling as a destructive boundary or margin. Weaker candidates tended to place the mountains in the wrong place, or experienced confusion with volcanoes.

(b) A significant number of candidates incorrectly equated the lithosphere with the crust.

(c) Again, many candidates scored well, naming and describing another type of boundary.

(d) (ii) Some candidates provided clear answers, correctly mentioning or clearly showing direction of travel of waves relative to the direction of disturbance of the medium. Many candidates, however, were unable to express the information in a clear manner.

Question 2

(a) and (b) were generally well done but explanations in part (c) involving both ocean currents (cold water, low evaporation) and prevailing winds (from the SE and hence having already passed over the continent) were surprisingly rare.

(d) (i) Many candidates lost marks by incorrectly showing, or failing to label, the bond angle.
(ii) Full explanations, involving the significance and locations of charges, proved to be good indicators of stronger candidates.
(iii) Few candidates mentioned the origin of the nutrients or the role of water in dissolving them

Question 3

(a) Most candidates could sketch an array of particles, with only a few failing to show positive and negative charges. Relatively few gave a clear indication of three-dimensional structure.

(c) A surprisingly large number of candidates could not correctly name the types of structure and bonding. Ability to apply knowledge to construct a coherent explanation, in part (iii), was limited to the better candidates.

Question 4

There seems to have been a difference in performance of candidates from different centres here. Candidates who had performed moderately well on previous questions could score well here, whilst a smaller number of others lost marks here having done well on the first three questions.

(a) Most candidates could give the correct equation and to use it for the calculation. Very many then became confused in converting the times given into a form suitable for the calculation. Some correctly converted to minutes, but only a minority of these then either converted back to hours or amended the unit to km per minute.

(b) (i) Remarkably few candidates could get as far as a standard graph with time along the x-axis, and even fewer showed understanding by drawing the correct curve.

(ii) There was a difference in candidates' competence in using the equation that did not fully correlate with their general performance. This could suggest some candidates had been better prepared than others, on this point.

(c) Relatively few candidates could provide a full equation for predicting the kinetic energy of moving mass, fewer recognised the significance of kinetic energy to the destruction caused, and just a very small number of candidates identified the significance of the square of the velocity.

Advanced GCE Science 3885/7885
June 2007 Assessment Series

Unit Threshold Marks

Unit		Maximum Mark	a	b	c	d	e	u
2841	Raw	60	46	40	34	28	22	0
	UMS	90	72	63	54	45	36	0
2842	Raw	60	40	35	30	25	20	0
	UMS	90	72	63	54	45	36	0
2843 A	Raw	120	83	73	63	54	45	0
	UMS	120	96	84	72	60	48	0
2843 B	Raw	120	83	73	63	54	45	0
	UMS	120	96	84	72	60	48	0
2844	Raw	90	58	50	43	36	29	0
	UMS	90	72	63	54	45	36	0
2845	Raw	90	49	43	37	31	25	0
	UMS	90	72	63	54	45	36	0
2846 A	Raw	120	87	78	70	62	54	0
	UMS	120	83	73	63	54	45	0
2846 B	Raw	120	87	78	70	62	54	0
	UMS	120	83	73	63	54	45	0

Specification Aggregation Results

Overall threshold marks in UMS (i.e. after conversion of raw marks to uniform marks)

	Maximum Mark	A	B	C	D	E	U
3885	300	240	210	180	150	120	0
7885	600	480	420	360	300	240	0

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

	A	B	C	D	E	U	Total Number of Candidates
3885	11.6	24.9	43.1	63.4	82.2	100	546
7885	7.1	20.6	38.9	61.1	88.9	100	128

For a description of how UMS marks are calculated see;
http://www.ocr.org.uk/exam_system/understand_ums.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

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

www.ocr.org.uk

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