RECOGNISING ACHIEVEMENT

GCE

Science

Advanced GCE **A2 7885**

Advanced Subsidiary GCE **AS 3885**

Report on the Units

June 2008

3885/7885/MS/R/08

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

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

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

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Advanced Subsidiary GCE Science (3885)

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2841 Science and the Natural Environment

General

The total entry for the June 2008 2841 unit exam was 202. The paper proved to be slightly more demanding than the previous year's June paper which was reflected in the lower grade boundary thresholds at Grades A (41/60) and E (23/60). As with previous years there continues to be a significant minority of poorly presented scripts and answers that required extended writing were frequently attempted, crossed out, and then re- attempted in the margins with very little space for a full exposition. Students are strongly advised to draught written answers in "rough" before committing them to the exam paper; if time is short then the rough answer can still be submitted.

Questions in detail:

1a)	This proved to be a straight forward introduction to the paper with many students getting all 3 marks.
b) i) and ii)	A surprising number had little clear idea of the role of mitochondria (confusion with the chloroplast's role was common) and even fewer were able to recall the role of the rough endoplasmic reticulum.
c)	All three features, cell wall, (large) vacuole and chloroplast were needed for 2 marks
d) (i)	The key idea here was to understand that the membrane is fragile (thin accepted) and thus difficulty of preparing it for observation was the main issue
(ii)	This question was frequently poorly answered. A description of the lipid bi layer (fluid mosaic) allowing diffusion of small molecules through the membrane was required as thus allowing molecules to move with the concentration gradient. Credit was given for a mention of (protein) pores but not in conjunction with any active processes (active transport etc) as this was not asked for.
e) (i)	Sunlight and Glucose (Food accepted). Too many students thought that oxygen was a source of energy and many students stated the processes i.e. photosynthesis/ respiration.
(ii)	Too many answers were too general; Respiration scored 0 unless the resultant dissipation of energy due to heat loss was mentioned. Chemical energy; again on its own was insufficient unless transportation of particular chemicals out of the cell, eg excretion was exemplified, movement energy eg muscle contraction.
2a)	Poor diagrams not showing a full wavelength clearly were penalised. Weaker pupils referred to the frequency rather than actual length of the wave.
b)	The idea of different sensors or filters was required here. Too many students talked about how different types of matter interacted with different parts of the EM spectrum and missed the point of the question.
c) (i)	False colour composite; Generally well recalled.
(ii) (iii) (iv)	white/ deep red/ purple. Some indication of (iv) being a composite of the blue and the red
d)	Detail was lacking in answers. "Used in farming" for example was not credited. Some indication of monitoring deforestation or changes in sedimentary deposition in rivers was required.
3 a) (i)	Poorer answers described the properties of alpha radiation rather than what the radiation actually is; helium nuclei (2p + 2n) emitted from the nucleus of a radioactive isotope.
(ii)	Too many vague answers, the time (1) taken for the mass of a radioactive isotope (1) to drop to half of its initial mass (1)
b) (i)	The low penetrating power of the alpha particles was required. Weaker students talked about short half lives.
(ii)	The key point here is that the radiation is ionising.

(c)	A= 208 Z= 84
d) (i)	Students needed to show on the graph how half life (2.8 years +/- 0.2 years) was obtained.
(ii)	A steeper decline (1) showing a half life of approx 0.4 years (see question stem)
(iii)	40% +/- 5%
e) (i)	Mention of the association of radioactive isotopes with cancers/ cell damage required
(ii)	The key point was to recognise that the concentration of the isotope was low (see stem)
4a)	This proved to be a demanding question. The key idea here was to recognise that all ecosystems need to recycle nutrients. Thus an ecosystem with only one plant (which would have an energy source) would still need a decomposer to recycle matter.
b) (i)	Nutrient depletion would cause plant species to die.
(ii)	Deforestation/logging etc. This was the most accessible mark on the paper.
(iii)	Students found it very difficult to put the idea of negative feedback into words. An example within the context of the rainforest was expected. A decrease in nutrients would result in more plant species dying, thus the dead matter would be available to decomposers who would break down the dead matter to make more nutrients available and thus providing more nutrients for plants to grow.
(iv)	The idea of any change on a system accelerating or reinforcing the change to a greater extent was required here.
c)	The final extended writing question proved to be a very demanding and thus discriminating question. Most students realised that a changing rainforest would lead to a greater diversity of habitats and thus natural selection/ competition of resources would drive evolution. However, too many students suggested that the rate of mutation was faster in a changing ecosystem. The better students realised that rates of mutation would be the same but the chance of a mutation conferring an advantage in an ecosystem in which there was a greater variety of habitats was greater in an unstable environment. Alternatively a drop in population due to changing ecosystems/ changing food supplies would mean that a chance beneficial mutation would have a statistically greater change of passing on its advantage on.

QWC marks were awarded for use of specific terminology (1) and coherence and logical reasoning of argument.(1)

2842

General comments: After a significant rise in numbers over the past two years, entries for this unit fell again this year to just over 400. This is the final session in which this unit will be sat in significant numbers (a small number of this year's candidates may retake this unit during 2009). Overall the standard of entries has remained stable over the seven years lifetime of the paper. Some skills – notably confidence in mathematical calculations – appear to have improved while others – for example the precision of language used by candidates – have remained a cause for concern. In this session the overall level of the paper was felt by the examiners to be slightly easier than in some sessions; however the examiners continued the trend of crediting precise language at the expense of ambiguous and woolly answers.

Question 1: Enzymes are a familiar topic for candidates and most picked up marks on the fairly straightforward knowledge-based sections of this question. Many explanations of the importance of the active site were excellent although some candidates could not get much beyond a reference to lock and key mechanism. The important point that a reaction occurs in the active site was often missed.

Definitions of polysaccharide often simply implied that it was formed by a *small* number of sugar molecules joining together – the examiners required some indication that *many* molecules are involved or that a long chain was produced

Question 2: This question tested the understanding of some important chemical ideas in a possibly unfamiliar context. The explanation of the formation of nitrogen oxides is a very familiar question but full marks were only rarely seen. Some thought that nitrogen oxides were impurities in petrol and a larger number felt that the most likely source of nitrogen (or even oxygen) was the petrol itself [nitrogen-based impurities may be found in crude oil or coal but are not likely to be present in petrol].

A pleasing number of candidates could make the connection in (ii) between the conditions in the lean-burn engine and the requirement for energy in the formation of nitrogen oxides. Few candidates however could deduce that both air and water are involved in the formation of nitric acid and a surprising number of candidates seemed mystified by the term *reduction,* suggesting, for example, that the number of molecules is reduced.

Candidates lost marks in (c) (ii) by careless language, simply writing "heat" and "pressure" rather than trying to explain what would need to be done to the conditions. "*Increase the concentration of the gases*" was a common answer which was not given credit in this particular context (increasing the concentration of pollutant gases not being a very sensible strategy!)

A pleasing number of candidates could explain the proportional relationship in the data and write a rate equation.

Question 3: The unusual context foxed many candidates here and a range of curious field line patterns were seen. A common error was not to continue the field lines through the membrane into the central channel. However almost all candidates realised that stronger fields are represented by more closely-packed field lines.

Part (c) (i) was correctly done by the majority of candidates but (c) (ii) with the need to convert minutes into seconds did not often yield full marks. Some incorrect answers using time in minutes would have scored 2/3 with some sensible working

Numerical answers: (c) (i) 400C (c) (ii) 0.2A

Question 4: Candidates coped well with the unfamiliar full structural formula of a lipid. The best candidates realised that it is the carbon-carbon double bond which makes a lipid unsaturated (all lipids contain [carbon-oxygen] double bonds). The role of lipids in organisms and the health risks of a diet rich in lipids were both well known.

Explaining molecular shape is always a difficult question and the clue about using the electron-shell repulsion theory helped many to do this successfully. However many still implied that atoms repelled each other and many stated that there were four separate electron groups, despite the stated 120^{o} bond angles

Only a minority of candidates could explain the main environmental benefit of catalysts in terms of performing the reaction at lower temperatures although there were some good creative suggestions about the possible environmental impact of catalyst use

Question 5: Almost all candidates seemed to relish this question and certainly full marks were scored on (a) (i) and (ii) without problem.

Although all candidates provided a lengthy answer to the essay, most failed to score more than 3 or 4 out of six. In most cases the excitement of encountering a favourite topic meant that candidates did not think sufficiently carefully about the depth required of an AS-level answer. Something more specific was required than simply “people are driving more cars so the world will get hotter and everyone will die” (to paraphrase the style of answer often seen). The best answers gave some specific examples of how relatively small temperature and climate changes will have major effects in, for example, the desertification of marginal agricultural land or the loss of specific habitats leading to extinction of animals (polar bears were predictably often chosen as the example). Interesting predictions about the economic problems caused by migrants from flooded or famine-stricken areas were also seen. As regards the causes of global warming, few mentioned any other greenhouse gas apart from carbon dioxide.
Predictably (and distressingly) some candidates were unable to prevent themselves from enthusiastically discussing every other pollutant gas they have studied and providing irrelevant detail about ozone depletion, acid rain etc. These answers would lose marks for organisation and selection of material in the QWC marks

2843/01 Interpreting Scientific Information

General Comments:

Candidates seemed to find this paper quite accessible and there was a wide range of marks, but with few very poor scripts. It was rare to find a section that was not attempted. The question requiring the candidates to interpret information in a diagramatic form was done better than in previous years, with some very imaginative drawings. As ever, it was the calculations that proved the most problematic.

This paper was marked on line this year, and candidates were warned to write in black ink only. On some papers there was the suggestion of faint lines (perhaps pencil) which it was not possible to decipher. Candidates need to be reminded of the black ink rule.

Comments on Individual Questions:

Question No.

1 Candidates found this question straightforward and scored well. They clearly understood the concept of 'slash and burn' farming. However, many thought it only involved 1 hectare of land annually. The percentage was well calculated in (b)(ii), with the commonest error being to put the numbers the wrong way up. Some candidates struggled with the concept of carbon being stored in (c)(ii) with carbon dioxide being a common answer from weaker candidates. Part (c)(iii) revealed quite a depth of misunderstanding. Most realised that carbon dioxide is produced when vegetation is burned, but often accused it of damaging the ozone layer.

2 Candidates had few problems with the parts of this question which could be taken directly from the text. Some were hazy about what the term 'flow diagram' meant, but this didn't affect their marks. Their knowledge of nitrogen fixation, however, was woeful. Many believed that it meant there would be a fixed amount of nitrogen released; a significant number suggested that nitrogen needed to be removed because it is poisonous. Few mentioned nitrates or ammonium compounds.

3 This proved to be the most difficult question for students who find interpreting the text difficult. They would tend to just copy chunks of the passage and hope they had chosen the right bit. This meant that in (a), if they failed to describe an experiment, they scored no marks.
This was a straight forward question for good candidates, who frequently scored full marks.

4 Again, candidates fared well where they simply had to find the answer in the text, and they made sensible suggestions as to why crops might not be expected to grow well under trees. However, few realised that the harvesting of crops would result in a net loss of phosphate which would need to be replaced. The calculations were not easy, and many struggled with them. The commonest error in (e)(ii) was to calculate the number of Inga trees per hectare, rather than in the whole orchard.

2843/02 and 2846/02 - Coursework components

427 candidates were entered for AS Science coursework and 102 candidates for the A2 coursework. This represented 25 AS Centres (2843/2) and 18 A2 Centres (2846/2). Again it is pleasing to report that very few Centres had to be scaled. In fact there is some evidence in the last year of 2843 that Centres who have been out of line in the past are now coming into line. This is a very stable cohort producing work of a very similar standard year on year. However, there is some evidence that Centres that have done 2843 for years have stopped doing it and are probably entering candidates for triple Science.

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. Centres are required to send CSS160 with the sample.

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.

- They enable the candidates to collect ample data with suitable precision and accuracy.
- They usually allow candidates to plot one or more line graphs (bar charts and similar are not appropriate at this level).
- They enable candidates to do some detailed processing (calculating the average values for three readings is *not* detailed processing);
- They allow opportunities for candidates to evaluate their experiments both in terms of the quality of the data and the limitations of the method.

A few of the coursework tasks chosen did not meet these criteria.

Interpretation of criteria and work of candidates

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.

Next year 2846 will be assessed as before but there are new coursework arrangements for AS Science (H178). The coursework component (G643) is worth 20% and has two components.

1. The Case Study
2. Assessment of Practical Skills

The set tasks are available now on the Interchange website. Only these tasks can be used for AS Science.

Because there are few centres distributed around the country it is almost impossible to get a viable number of teachers together for training. One meeting was held last May and two meetings are scheduled in the Autumn.

Centres are always able to seek advice about training that is available through a Qualifications Manager at OCR. A coursework consultancy service is available for centres to have their standards of marking checked before moderation.

2845

The performance of candidates in this paper matched that of previous years with a small number of excellent candidates who excelled in the three contrasting sections of the paper; a larger number who performed well in one or more of the sections, and a significant tail of candidates who struggled with the demands of this paper.

This paper continued the trend of giving candidates some help in structuring their essays; the result was that almost all candidates produced some creditable work for at least one of the longer answers. However, generally the examiners felt that the overall demand of the paper was greater than last year and this was reflected in the slightly lower scores seen

Question 1: The best candidates worked successfully through this question and made sensible biological comments on the answers they obtained. There was, unfortunately an error in the question paper on part (b); some candidates clearly spotted this and the examiners ensured that no candidate was disadvantaged – answers with working which yielded an answer of 1000 or 10,000N were given full credit. The main problems in the latter part of the question resulted from not converting cm into m for the calculation of cross-sectional area.

However there were a significant number of candidates who failed to score even in the more straightforward questions in part (a), being unable to handle the given formulas. A particular problem, commonly seen, was to evaluate πr^2 as $(\pi r)^2$

Question 2: This was a demanding question requiring some detailed understanding of electron energy levels. Few candidates could fully make the link between the electron shells and the emission spectra and almost no-one saw the link with the converging lines. The graph plotting in the second half of the question was unusually demanding although most could derive a reasonable value for f from the graph. Many forgot the factor of 10^{15} in selecting a number for the final calculation and, less forgivably, an equal number failed to give 3 sig. figs in the final answer

Question 3: Most answers did not realise that farming disrupts the nutrient cycle and did not score the marks available for stating that fertilisers replace the nitrogen compounds lost in harvesting. Almost all candidates scored the 3 marks for a discussion of eutrophication; but in the other sections few could get beyond the level of “N is needed for plant growth”

Question 4: This revealed confusion between intermolecular forces and bonds within the molecule – Hydrogen bonding was often confused with covalent bonding to hydrogen atoms. However many candidates successfully explained the solubility of the soluble aspirin by discussing the hydration of the ions. The minor error in the soluble aspirin structure did not hinder the candidates in any way

Question 5: This was disappointing in many cases. Despite all the hints about structure, candidates still sometimes reverted to repeating and rephrasing the article. Of equal concern were the candidates who leapt into a discussion of the greenhouse effect, revealing a poor understanding of both the role of the ozone layer and the mechanism of the greenhouse effect. Other common errors included suggesting that ozone reflects uv (also that *deodorants* cause ozone depletion!). Many candidates attempted to explain the mechanism of cancer (how?) rather than the much more familiar explanation of how mutations arise. Epidemiology was only rarely recalled and mentioned.

The bias in this question towards ideas encountered mostly in the AS year may well make the poor performance on this question understandable

Question 6: This generally scored much more highly than question 5 – probably because more material linked closely to A2 material. Candidates were strong on details of cell and enzyme activity as well as, in some cases TLC. Some familiar errors were spotted – for example the commonly held belief that low temp denatures enzymes.

2846/01 Science & Global Processes

General comments

In general the paper was well attempted with few blank questions. However, as ever, some candidates, who obviously had knowledge of the subject, failed to score as well as they might because they hadn't read the question carefully enough. This was particularly evident on questions 1 and 4.

Comments on Individual Questions:

Question No.

1 This was probably the question that was most poorly answered on the paper. Few scored well in part (a). Their knowledge of the layers of the Earth was sketchy and few remembered that waves refracted towards the normal when passing into the asthenosphere. Only a handful of candidates had any idea what a seismometer trace might look like, the majority drew a sine wave. Many candidates did not read the question in part (iv) carefully enough, and assumed they were being asked why earthquakes last a long time, rather than about their detection. They were therefore answering in terms of aftershocks, rather than about the time taken for the waves to reach the detectors. Similarly in part (v), they were simply stating that s waves cannot travel through liquids without going on to give the evidence for this, which is the existence of s wave shadow zones. Part (vi) was usually well answered. Part (b) proved troublesome. Some candidates were unfamiliar with the concept of magnetic polarity and others only had a very vague idea of how it could be interpreted.

2 Overall this was the easiest question on the paper with some weaker candidates scoring well. Practically every candidate knew that copper has a metallic structure and could have a reasonable stab at explaining why it conducts electricity. It was very easy to score at least half marks on part (c), yet some candidates lost marks by failing to compare the properties. Few could come up with an explanation for the difference in thermal conductivity.

3 Not surprisingly, responses to this question were very varied, but it was heartening to see that the majority persevered and scored well. Candidates could usually select the correct equation to use. The units of force, newtons, and of energy, joules, were not well known. Q(b)(i) proved to be the most challenging with some candidates giving up when it came to finding a square root. In (c)(i), the commonest error was to square everything, rather than just the velocity, but candidates, on the whole, were quite adept at coping with the large numbers in standard form. Answers to (c)(ii) were often disappointingly vague, many simply stating that the kinetic energy was 'lost'.

4 In (a)(ii), candidates could usually describe what was happening to the temperature of the water, but explanations were more mixed. Some tried to link it to pressure; few mentioned the effect of the sun. In (ii), a startling number suggested that salt is less dense than water and therefore floats, yet the formation of deep ocean currents was well understood, although a sizeable number assumed that the curving arrow in the diagram in (b)(ii) was illustrating the North Atlantic gyre.
Part (c) was a classic example of candidates failing to answer the question. Many would explain in great detail about hydrogen bonding, but would fail to say the effect it has in ice. A disturbing number believed the open structure of ice allowed 'air molecules' into the structure.

In part (d), few candidates understood that it is the assymmetrical nature of the charge distribution that leads to a permanent dipole in a molecules. Hydrogen bonding was well understood, but some were not careful enough to stress that they form between molecules.
Candidates found part (e) difficult. Many failed to realise that they were being asked to compare water to other liquids in (i), and in (ii), they assumed that the question was about the Gulf Stream and launched into how it arises.

Grade Thresholds

Advanced GCE Science 3885/7885
June 2008 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A	B	C	D	E	U
2841	Raw	60	41	36	31	27	23	0
	UMS	90	72	63	54	45	36	0
2842	Raw	60	42	37	32	27	23	0
	UMS	90	72	63	54	45	36	0
2843 Option A	Raw	120	96	86	76	66	57	0
	UMS	120	96	84	72	60	48	0
2843 Option B	Raw	120	96	86	76	66	57	0
	UMS	120	96	84	72	60	48	0
2844	Raw	90	61	54	48	42	36	0
	UMS	90	72	63	54	45	36	0
2845	Raw	90	53	46	39	33	27	0
	UMS	90	72	63	54	45	36	0
2846 Option A	Raw	120	84	76	68	61	54	0
	UMS	120	96	84	72	60	48	0
2846 Option B	Raw	120	84	76	68	61	54	84
	UMS	120	96	84	72	60	48	0

Specification Aggregation Results

Overall threshold marks in UMS (ie 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	9.4	23.2	41.4	61.6	81.2	0	405
7885	3.0	14.9	31.7	63.4	93.1	0	101

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

Statistics are correct at the time of publication.

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