OCR
RECOGNISING ACHIEVEMENT

GCE

# Geology

Advanced GCE **A2 7884**

Advanced Subsidiary GCE **AS 3884**

# Report on the Units

# January 2007

**3884/7884/MS/R/07J**

Oxford Cambridge and RSA Examinations

OCR (Oxford, Cambridge and RSA Examinations) is a unitary awarding body, established by the University of Cambridge Local Examinations Syndicate and the RSA Examinations Board in January 1998. OCR provides a full range of GCSE, A- level, GNVQ, Key Skills and other qualifications for schools and colleges in the United Kingdom, including those previously provided by MEG and OCEAC. It is also responsible for developing new syllabuses to meet national requirements and the needs of students and teachers.

The mark schemes are published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by Examiners. It does not indicate the details of the discussions which took place at an Examiners' meeting before marking commenced.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

The reports on the Examinations provide 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.

Mark schemes and Reports should be read in conjunction with the published question papers.

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



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

# Geology

## Advanced Subsidiary GCE Geology 3884

## Advanced GCE Geology 7884

## Chief Examiner's Report

The AS modules taken in January have a mix of AS candidates taking the unit for the first time and a smaller number of resit candidates. The only A2 unit - Palaeontology - is being taken for the first time by nearly all the candidates after one term of A2. The performance of candidates was good on all units although with a wide range of marks. All questions had some candidates who gained full marks.

Many candidates are now performing better on the topics and skills which have proved a problem in the past, including structural geology, although the mean mark for this question is still the lowest in unit 2831. In order for diagrams or sketches to be given credit they must be clear - not artistic with shading - but simple and technical, with the features to be labelled clearly identifiable. This is true for all papers.

General descriptions and not reading the question carefully regularly cause candidates to gain lower marks. The key words used in questions such as *state* and *describe* cause few problems but the key word *explain* is too often ignored, and answers are purely descriptive. Any *explain* question requires candidates to give a reason or to say why. Using technical terms instead of generalisations is essential and correct spelling of these terms should be strongly encouraged. Some candidates struggle with higher demand questions that ask for descriptions, explanations, interpretations or evaluations and resort to writing lists which fail to show their knowledge and understanding of the subject matter.

The examination papers for each unit cover the entire content of the specification over a number of years. It is noticeable that when some of the minor topics come up they are omitted or poorly answered – often on a centre basis. In this session, correlation and derived fossils on 2834 were poorly answered.

The last question may have only one side available for the answer and this will be adequate for concise answers to gain full marks. Where candidates wish to include more detail or if diagrams are large then extra sheets of paper should be requested.

**2831: Global Tectonics and Geological Structures (Written Examination)**
**January 2007**

## General Comments

The overall quality of the papers this year seemed to be very varied. There was no obvious problem with running out of time and there was a wide spread of marks.

As usual it was the structural question (question 4 extended prose) that proved most difficult for candidates. The remaining questions had better responses and many candidates gained good marks with the tabulated and graphical questions.

## Comments on Individual Questions

### Question 1

This question was generally well answered with an average mark of of 12/18.

(a) This proved to be a fairly straightforward introduction to the paper, being well answered with many candidates gaining full marks. The main misconception was regarding the Gutenberg and Moho discontinuities.

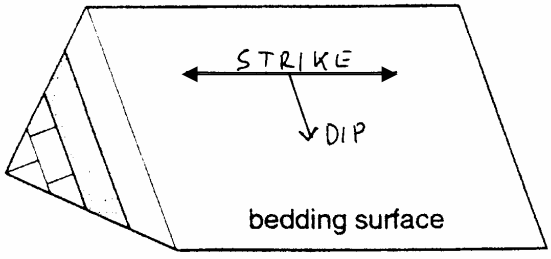
(b) Many candidates gained one of the two marks but few mentioned both changes in velocity of seismic waves or refraction/reflection and fewer still discussed shadow zones to gain the second mark.

(c) Many candidates did not give precise answers on the properties of the mantle, core and Asthenosphere, for example, using *semi molten* for the asthenosphere or *only iron* for the inner core.

**Teachers' Tip**
Layers of the Earth with depths, state and composition make good card matching activities to help learn this topic as they can be laid out to match the order.

(d) Not many candidates gained full marks, many mentioning use of iron meteorites without saying how they could be used to estimate the density. Few knew about how to work out the average density of the Earth. The better candidates were able to quote correct densities for various parts of the crust, the whole Earth and then the core.

(e) Part (i) was generally good but candidates need to be careful with the rubric and add labelled arrows and also make sure the dip direction is accurate. The clearest answers used the top face rather than the side. Students should be familiar with the diagram below:




Not many candidates got both definitions correct in parts (ii) and (iii), but knowledge is slightly improving. Strike is understood better than true dip. Candidates need to learn the definitions such as *maximum angle of inclination* of a plane measured from the horizontal for true dip.

**Question 2**

This was well answered in general with the average about 10/16 marks.

(a) The description in part (i) of why earthquakes occur produced a good range of marks with better use of technical terms than in previous exams. Many candidates gained 2 out of 3 of the marks, with the missed mark generally to do with elastic rebound/elastic limit reached as the rocks fault.
Parts (ii) and (iii) on names of seismic instruments form a common question but a minority of candidates got the terms the wrong way round.

(b) In part (i) the magnitude of the earthquake proved to be the most difficult question on the paper with some candidates confused by *amplitude* or *distance* (though few mentioned 'from epicentre'), and very few got both.

**Teaching tip**
Use the virtual earthquake website:
http://www.sciencecourseware.org/eec/Earthquake/
This gives tutorials on working out magnitude linked to lag time and amplitude.
Candidates can work on this independently.

In parts (ii) and (iii) there was some confusion between *magnitude* and *intensity*.
Answers for part (iv) were not always specific enough and gave general comments on development of countries rather than the construction of buildings and nature of the ground.

(c) The definition of the term focus in part (i) was fairly well done although answers need to specify *underground* or be specific: e.g. "*where the fault moves and energy is released". Where the earthquake starts* or *the centre of the earthquake* are too vague.
Part (ii) was not so well done, very few candidates getting full marks. Candidates do need to be familiar with the potential seismic activity in all plate tectonic settings.

**Question 3**

This question on hotspots was generally well done with an average of 11/16 marks with part (a) allowing even weak candidates to gain marks.

(a) In part (i) there were occasional inaccurate answers.
A number of the graphs in part (ii) were not well drawn. Candidates need to use sensible scales and have best fit lines which are straight and in this case and go through the origin.
Part (iii) showed that candidates still have difficulty with this type of common calculation - about 50% of candidates got this correct (ecf was allowed). Candidates should be encouraged to show working even if it has not been requested.

(b) (i) The definition of the hotspot was surprisingly poorly done with vague phrases such as 'hot rising magma'. Candidates should know about: stationary mantle plumes and (generally) the position within plates.
(ii) Candidates generally know about the formation of the volcanic islands and the plate moving over the hotspot. I would encourage candidates to add an annotated diagram to show how the chain of islands forms. A few candidates thought this was an island arc.

(c) (i) Most candidates gained at least one mark by reference to pillow lavas and the MOR but few knew the detail of the layers of the oceanic crust.

Part (ii) was fairly well answered but candidates are still confused about palaeomagnetism and how magnetic stripes form.

**Teaching tip**
**Thermal Remnant Magnetism (TRM).** Iron rich minerals in basalt may preserve the direction of the Earth's magnetic field when the rocks cool through the Curie temperatures of those minerals, for magnetite this is about 580°C, whilst the rock is completely crystallised at over 900°C. The mineral grains are not rotated to align with the Earth's field, but record the orientation of that field.

**Question 4**

This question proved to be a very strong discriminator with many candidates struggling with the different types of joints. Candidates did not know the detail about tectonic joints often getting confused and linking it to plate tectonics. Candidate's answers on cooling joints were better and knowledge about the hexagonal shape was good though not but not why this shape occurred. Candidates need to mention contraction or shrinkage. Candidates struggled with unloading joints often simply rewording the question, e.g. 'due to release of pressure'. Candidates need to be aware it is due to removal of rock from above (by erosion) therefore the rock expands upwards creating joints parallel to the surface.

Candidates did not always make the best use of diagrams and where they were drawn they often had few or no labels.

The angular unconformity was well answered and this is where many candidates gained marks giving a history of events backed up with a sequence of diagrams. Candidates should be encouraged to indicate that such unconformities represent a time gap with rocks above and below the unconformity dipping at different angles

QWC This was poor compared with that of previous years, possibly because candidates found the extended writing question challenging and did not always express themselves coherently. Spelling and sentence construction by a minority of candidates were very weak.

## 2832: The Rock Cycle - Processes and Products (Written Examination)

### General Comments

This session's examination paper again gave a wide range of results. There were variations between centres as well as between candidates. Marks ranged from 9 to 57 out of the maximum 60 marks. There was no evidence that the paper could not be completed in the time allowed.

### Comments on Individual Questions

**Question 1**

Many candidates gained their highest marks on this question and both diagrams were capably interpreted.

1 (a) (i) Many candidates gained both marks for this question. Those who didn't either confused acid with basic or wrote down types of eruption rather than types of lava.

(ii) Responses to this varied by centre. Some were descriptive with little explanation or reference to the processes involved. Geological terms were at a premium in some answers, with magma appearing through 'gaps', 'cracks' or 'spaces' rather than fissures or at mid ocean ridges for example. Some very good answers referred to mantle decompression at C and water lowering the melting pint of subducted rocks at D.

(b) Well answered by most candidates. If there was a mistake it tended to be mixing the igneous with the metamorphic field on the graph.

(c) Mostly answered correctly. Less well prepared candidates referred to metamorphic rocks in the upper mantle.

(d) (i) Most candidates were better at describing the characteristics of a rock than a mineral.

(ii) and (iii) Generally successfully answered. Occasionally a candidate would write two of the characteristics of only one of the classes of rocks. It was necessary to say how these were different from the other class. This could be done quite simply by saying 'not in sedimentary / metamorphic / igneous' according to which ones were being distinguished.

**Question 2**

The full range of marks was awarded to responses to this question. It was found to be more of a challenge than question 1, but it did discriminate well, with as many candidates receiving top marks as those receiving none.

2 (a) (i) The majority gained full marks here. Less well prepared candidates had not learnt what 'cumulative' meant and so got the wrong numbers in their table. If they plotted these wrong numbers correctly they were awarded a mark to avoid penalising them twice for the same mistake. This only applied to a few candidates. It seemed to be the case that if they completed the table incorrectly, they weren't very good at plotting the numbers either.

(ii) and (iii) Although the question told candidates that sediments E and F were deposited in a hot desert, there were some who suggested beaches, glacial environments or the ocean floor as the most likely environments of deposition. These candidates had not read the question carefully. Some did not know that grains with negative phi values are coarser than those with positive values and this led them to wrong conclusions about the grain size distributions, and

therefore the environments of deposition of the two sediments.

(b) (i) The correct order of deposition of evaporites (by insolubility / reverse order of solubility) from the edge of the lake to the middle was not that well known. Candidates at some centres had no trouble with it, but many seemed to be guessing and gained only one mark.
(ii) Quite a sizeable minority shaded the middle of the lake. Some didn't shade an area, just patches here and there, which is incorrect.

(c) (i) Chemical weathering was known by most. Some named types of chemical weathering were allowed, but not evaporation, which leads to deposition and isn't a weathering process.
(ii) *Solution* was well known, but *suspension* was the next most frequent incorrect response, followed by *saltation* in a few cases.
(iii) Most candidates correctly suggested an argillaceous sediment.

(d) Desiccation cracks were well drawn by the majority with some high quality diagrams showing them in plan view as well as cross section. A few candidates drew and wrote about salt pseudomorphs and these were also credited. A few candidates drew graded bedding or cross bedding, perhaps because they had not read the question carefully or had not prepared well enough.

**Teaching Tip**

## Evaporate a lake

Use sea water, or make up your own solution of tap water, which usually contains dissolved $CaCO_3$ especially if you are in a hard water area and some table salt.
Place some of the solution on a watch glass, which represents a playa lake. You can either use a heat source to evaporate it or let the process happen naturally on a window ledge during the week. White deposits should be seen on the glass. Add a drop of dilute HCl to the deposits around the outer rim of the glass; they will effervesce (calcite).

**Question 3**

Candidates performed well overall on this question. Everyone succeeded in gaining at least some of the marks.

3 (a) (i) and (ii) Generally well recognised, although there were some cones and calderas offered in (ii).
(iii) There was some confusion between *pyroclast* and *pyroclastic flow*. This may be because the flows are more memorable, with all the drama of high velocities and scorching temperatures being recalled. Most of those who wrote about flows managed to gain one of the marks by mentioning ash, bombs or some other relevant fragment.
(iv) Generally well described, although a minority still wrote about the flows. There was no need to try to explain the variation in this part of the question.
(v) Only the better candidates could relate size to the mass of the pyroclast and use this to explain the distribution they had described in part (iv). A few wrote about the crystal grain sizes within the pyroclasts, which would not be significantly different since they all cool quickly.

(b) Caldera formation was well understood by the majority of candidates although some less well prepared wrote about the crater simply being blown up.

(c) (i) Quite successfully described, usually in a non technical way. There was little reference to how the historic patterns could be dated, but the overall logic was described.

(ii) A few more candidates knew about the technical details with tiltmeters, lasers and computers being mentioned. Some answers would have benefited from being more specific, for example by stating that 'rising magma causes the ground to bulge', rather than simply 'the ground bulges'.
(iii) Some thought that this method was to do with volcanoes being affected by earthquakes along Benioff zones, rather than the harmonic tremors due to the vibration of magma as it moves up in the volcano.

**Teaching Tip**

**Make your own caldera**

Use a balloon, partly inflated, and a tray of sand or flour. The balloon represents a magma chamber. Bury the balloon and build the sand or flour up so that it resembles a volcano. Using a long pin, empty the magma chamber, by piercing the balloon. The sand or flour volcano will collapse into the space left by the balloon and you can watch a caldera form.

**Question 4**

This question was well answered by a large number of candidates with about 11% gaining full marks. The question succeeded in producing a wide spread, using the full range of marks. Written communication was usually clear. Candidates appeared not to have run out of time.

Almost all candidates knew enough about this part of the specification to be able to score some marks. The best responses were very well learnt and contained precise details of the new products in terms of mineralogy and textures. Other candidates knew some of the details but not as consistently as the best. In particular, there is confusion between the products of thermal and regional metamorphism. Slate, schist and gneiss appeared in a sizeable proportion of responses. Another area for potential improvement is the distinction between baked margins and metamorphic aureoles, the two being used interchangeably with seemingly little or no idea of scale or the type of intrusion that might have formed them. A few candidates wrote about the intrusion rather than the metamorphic rocks. Most candidates wrote knowledgeably about limestone and marble, but the mineralogical changes in shale were not as well known. Some candidates thought the rocks were melted, but still regarded them as metamorphic, which seems to indicate that they do not have a convincing grasp of the concept of metamorphism. Some very good responses included clear diagrams which generally took the form of a map showing increasing metamorphic grade and the products formed in both limestone and shale.

**Teaching Tip**

**Metamorphic aureoles and baked margins**

Use containers of different sizes to represent different sizes of igneous intrusion. Fill them with hot water and bury them in sand. Using a thermometer, take the temperature of the sand at varying distances from the buried containers. The smaller ones heat up a narrow zone (baked margin of a dyke or sill) whereas the larger containers affect a wider area (metamorphic aureole of a batholith or pluton).

## 2834: Palaeontology (Written Examination)

**General Comments**

The length of the paper appears to have been right and there was little evidence that candidates were unable to complete the paper in the time allocated and virtually all candidates attempted the two extended questions. The paper discriminated well with a wide range of raw marks from 88 at the top to 5 at the bottom.

Most candidates appear to have been well prepared for this examination. However, there were some very poor scripts. In particular, it was clear that some candidates had little knowledge of derived fossils, varves or the use of biostratigraphic and chronostratigraphic correlation methods. Candidates must be encouraged to appreciate the meaning of the command words given in questions and need to recognise there is an important difference between a description and an explanation. Some candidates made significant errors in their use of technical terminology, spelling, punctuation and grammar and a minority of candidates' handwriting was so poor it was very difficult to decipher their scripts.

**Comments on Individual Questions**

**Question 1**

This question on identifying fossil groups from written descriptions and focussing on morphology and mode of life and was generally answered well. Responses are skewed towards the top end with most candidates attaining at least half marks.

(a) (i) The vast majority of candidates were able to correctly identify fossils B, C, D and E as a crinoid, bivalve, coral and echinoid respectively. However, a significant number of candidates misidentified fossil A, the gastropod, as an ammonite and many did not specify that fossil E was an <u>irregular</u> echinoid. Almost all candidates attained some marks.

(ii) There were many excellent, accurately drawn and well labelled diagrams of a gastropod which attained the maximum 3 marks. However, errors included drawing a living gastropod with soft parts as opposed to a fossil one which is what the question asked for. Those who misidentified the fossil in part (i) were still able to attain a maximum of 2 marks for error carried forward.

(iii) This part question asking for one similarity and one difference in <u>morphology</u> between a crinoid and an irregular echinoid was poorly answered and many candidates struggled to use appropriate A2 terminology for morphological features. Some candidates got either a similarity or a difference correct for 1 mark, but few managed to get both correct. A common error was to state similarities already given in the question such as five-fold symmetry. Some candidates misread the question and compared mode of life which was not credited, while others who discussed morphology failed to make a direct comparison between the two fossils, e.g. fossil B has a holdfast, <u>whereas fossil E does not</u>.

(iv) The quality of response to this part question requiring candidates to match the fossils identified in part (i) to their modes of life was variable. It was clear that some candidates did not know the technical terms for modes of life despite their being listed in the specification and others contradicted themselves by stating more than one mode of life. More subtle and only recognised by the strongest candidates was that a pallial sinus for fossil C, the bivalve, denotes a burrowing, infaunal mode of life.

(b) (i) Many candidates were able to correctly calculate the possible thickness of limestone that could accumulate in 500,000 years. However, a minority of candidates incorrectly converted millimetres to metres and, hence, incorrectly placing the decimal point in their answers.

(ii) Most candidates responded well to this part question asking why the maximum thickness of limestone is unlikely to accumulate. The most common correct answer cited was erosion but with very little in the way of explanation. Better answers included suggestions that it would be unlikely for the specific environmental conditions required for coral growth to remain constant for 500,000 years, or that rises or falls in sea level and tectonic movements would limit the thickness.

## Question 2

This question on graptolites was well answered by most candidates. However, some candidates resorted to writing a list of factors that make graptolites a good zone fossil rather than explaining them.

(i) Very few candidates were able to correctly state the composition of a graptolite skeleton as (sclero)protein. Carbon was accepted as correct.

(ii) Only the strongest candidates gained all three marks for describing the mode of life of a graptolite. Most candidates knew graptolites are thought to have been pelagic, planktonic or nektonic, but there was some confusion over these terms and some just listed all three or defined them for one mark. A significant number of candidates stated graptolites were filter feeders, but less were aware, or didn't state explicitly, that graptolites lived in colonies. Higher level answers discussed ideas that some graptolites may have been attached to external floats in the water column (e.g. seaweed) or may have had their own floatation device such as gas or fat filled tissue, while others described the possibility that graptolites may have been able to move downwards in the water column in a spiralling motion.

(iii) This straightforward question asking for an explanation of three factors that make graptolites a good zone fossil was not answered particularly well. Many candidates resorted to writing lists and did not make full use of the two lines provided on the question paper for each factor to provide explanations. Careless and incorrect phrases such as "only lived for a short period of time" abounded.

(iv) Many candidates were correctly able to name another macrofossil used as a zone fossil for the Palaeozoic, with trilobites and corals being the most common correct answers. Some candidates confused the terms macrofossil and microfossils.

(b) (i) There were some excellent, well labelled diagrams of a typical Ordovician graptolite such Tetragraptus or Didymograptus that attained full marks. Only a minority of candidates erroneously drew a diagram of Monograptus for a maximum of 2 marks for labels. However, some diagrams were so poor as to be unrecognisable and some candidates did not have a good command of the correct morphological terms and used words such as arms or limbs rather than stipes.

(ii) The morphological changes that occurred in graptolites as they evolved was well known with the majority of candidates gaining both of the marks available. Vage terms like "they lost their arms" or "the arms moved upwards" were not credited.

(c) (i) Although there were some very good answers explaining that derived fossils are fossils that have been eroded out of the original rock in which they were fossilised and then transported and redeposited in a younger rock some candidates did not give sufficient detail to attain both marks. It was also clear that some candidates had no knowledge of derived fossils and either left the question blank or guessed an answer.

(ii) There were some very pleasing responses to this part question asking why graptolites are unlikely to be derived fossils. Some of the best answers referred to the fact that graptolites are often preserved by carbonisation and, hence, are unlikely to survive erosion and transport processes.

**Question 3**

Question 3 on cephalopod morphology, mode of life and evolutionary changes and fossil stratigraphic ranges produced a wide spread of marks and proved to be a good discriminator. The basic information was well known, but some candidates struggled to give sufficient detail in their answers.

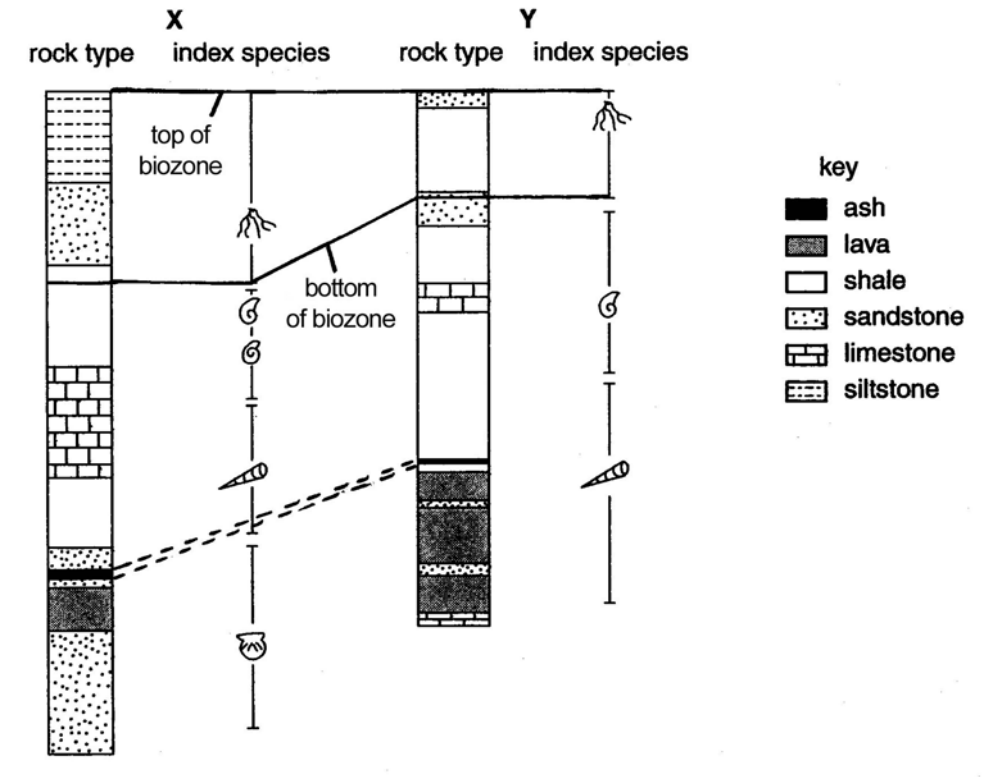
(a) (i) Although a significant number of candidates answered correctly that fossils J to M belong to the class Cephalopoda, a common error was to attribute all of them, including the nautiloid and belemnite, to the ammonoid group.
(ii) The morphology of cephalopods was well known and most candidates attained marks for correctly identifying the labelled features.
(iii) Most candidates attained some credit for describing how nautiloids and ammonoids were able to alter their vertical and horizontal position in the sea and there were some excellent descriptions that gained all 3 marks. However, some candidates only discussed vertical **or** horizontal movement for a maximum of 2 marks. Some candidates discussed addition of water or gases into the shell to adjust vertical buoyancy but did not refer to chambers or the siphuncle. Although horizontal movement by jet propulsion was well known, some candidates incorrectly referred to the squirting of gases rather than water.

(b) Many candidates struggled with this part question asking for diagrams to compare the similarities and differences between the internal morphology of fossils J (a nautiloid) and L (an ammonoid). Diagrams were sometimes poor, or unlabelled. Some candidates failed to notice the word internal and described external differences such as type of coiling and ornament. There were some excellent diagrams and descriptions of the shift in position of the siphuncle towards the venter and the change in the septal necks from retrosiphonate to prosiphonate that gained all 4 marks available.

(c) This part question asking for identification of the stratigraphic ranges of four fossils produced a varied response. There appeared to be some confusion regarding the stratigraphic ranges of trilobites versus graptolites.

**Teaching Tip**

One possible correct answer is illustrated below:




Biostratigraphy is correlation using fossils and involves matching the top and bottom of individual fossil biozones. The 'most correct' answers correlated from borehole to borehole, as above, but answers that correlated from index species to index species were credited.

Chronostratigraphy is correlation using events and the only correct answer was to join the ash band in the two boreholes.

## Question 4

This question on stratigraphic correlation, varves and relative dating was poorly answered. Answers were often Centre dependent.

(a) (i) and (ii) Only a few candidates gained all three marks for correctly correlating the two boreholes using biostratigraphic methods and then explaining their choice. Most joined rock types and ignored the fossil zones even though there was a prompt in the question to use a biozone. Explanations were also very poor with few candidates even mentioning fossils. Those who did, mainly concentrated on the idea that identical fossils should be of the same age, with little mention of the key idea that correlation is done by first appearance, last appearance or stratigraphic range of individual fossils.

(iii) and (iv) Slightly more candidates successfully joined up the ash band in both boreholes to attain the mark for correlation using chronostratigraphic correlation, but follow up explanations were weak with very few gaining more than one of the two marks available.

(b) (i) Some candidates gave excellent descriptions of varves forming in proglacial lakes with coarser, lighter silt being deposited in the spring/summer under higher energy conditions and finer, darker clay being deposited during the rest of the year when the lake freezes over.
(ii) Candidates who could successfully explain varve formation in part (i) generally obtained both of the marks available for explaining how varves could be used to give an absolute age. The most common correct answers were that varves represent annual or seasonal layers that could be counted to give an absolute age in years.

(c) (i) This part question asking for a labelled diagram to explain the Law of Included Fragments was done surprisingly poorly for such a fundamental principle of relative dating. Diagrams were poor and in some cases unlabelled so did not achieve the mark. In some cases candidates got their explanations the wrong way round and suggested the included fragments would be younger than the rock containing them.
(ii) This part question asking for a labelled diagram to explain the Law of Cross Cutting relationships was also not well done. Although there were some excellent well labelled diagrams, others were unlabelled. Many candidates correctly explained that the cross cutting feature must be younger than the feature cut, but did not give enough detail to gain the third mark available.

**Question 5**

The two extended answer questions on the morphology of trilobites and their adaptations to planktonic and nektonic modes of life and the fossil assemblages that would be found in different environments produced a range of responses. At the top end there were some excellent answers which were well written and illustrated with detailed, accurate, and fully labelled diagrams, but others let themselves down with a lack of detail and appropriate A2 level terminology.

(a) There were some excellent answers to this question asking candidates to describe the morphology of a benthonic trilobite and explain how changes in morphology allowed trilobites to exploit planktonic and nektonic modes of life for the maximum 12 marks. Unfortunately, some candidates did not read the question carefully and instead of *describing* the morphology of a benthonic trilobite they elected to explain how a benthonic trilobite such as Trinucleus was adapted to an infaunal mode of life for a maximum of 1 mark. Some Centres have obviously inspired candidates with interesting trilobite adaptations to different modes of life so that they wrote about these rather than answering the question set. As a result many candidates only attained the morphology marks in passing when they were describing mode of life. There also seemed to be some confusion between planktonic and nektonic modes of life with some candidates attempting to do both at once or confusing the trilobites that had these modes of life. In addition, many candidates *described* rather than *explained* the morphological adaptations to these modes of life.

(b) Responses to the question asking for descriptions of the fossil assemblages which would be found in the low energy continental shelf, high energy continental shelf and deep ocean basin were variable in quality and the question proved to be a good discriminator. The wide range of valid possible answers benefited well prepared candidates, but all too often answers merely repeated the marking points that fossil assemblages in the low energy shelf are likely to be intact, life assemblages, those in the high energy shelf are likely to be broken, fragmental, death assemblages, while those in deep ocean basins are likely to reflect low energy conditions for a maximum of 3 marks.

Better answers suggested that fossil assemblages in the low energy shelf would include thin shelled, less ornamented fauna, whereas those in the high energy shelf would be mainly thick shelled, highly ornamented, robust fauna.

Lists of fossil assemblage were often given for each environment, but with little amplification of specific adaptations, and a common error was to list pelagic forms such as ammonites and graptolites as part of the high energy shelf assemblage with little appreciation that such organisms would be too delicate to survive in this environment. Fossil assemblages in deep ocean basins were poorly known with only a minority of candidates giving good descriptions of a death assemblage of micro-organisms and other pelagic forms that live in the water column and fall to the bottom on death.

**Advanced GCE (Geology) (3884/7884)**
**January 2007 Assessment Series**

**Unit Threshold Marks**

| Unit | | Maximum Mark | a | b | c | d | e | u |
|---|---|---|---|---|---|---|---|---|
| **2831** | Raw | 60 | 44 | 39 | 34 | 29 | 25 | 0 |
| | UMS | 90 | 72 | 63 | 54 | 45 | 36 | 0 |
| **2832** | Raw | 60 | 45 | 39 | 34 | 29 | 24 | 0 |
| | UMS | 90 | 72 | 63 | 54 | 45 | 36 | 0 |
| **2834** | Raw | 90 | 68 | 60 | 53 | 46 | 39 | 0 |
| | UMS | 90 | 72 | 63 | 54 | 45 | 36 | 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 |
|---|---|---|---|---|---|---|---|
| **3884** | 300 | 240 | 210 | 180 | 150 | 120 | 0 |
| **7884** | 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 |
|---|---|---|---|---|---|---|---|
| **3884** | 0.0 | 28.6 | 57.1 | 78.6 | 85.7 | 100 | 14 |
| **7884** | 0.0 | 50.0 | 100 | 100 | 100 | 100 | 4 |

18 candidates aggregated this series.

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: helpdesk@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**