WELSH JOINT EDUCATION COMMITTEE
CYD-BWYLLGOR ADDYSG CYMRU

General Certificate of Education **Tystysgrif Addysg Gyffredinol**

EXAMINERS' REPORTS

JANUARY 2006

AS/Advanced
Geology

WJEC
CBAC

Statistical Information

This booklet contains summary details for each unit: number entered; maximum mark available; mean mark achieved; grade ranges. *N.B. These refer to 'raw marks' used in the initial assessment, rather than to the uniform marks reported when results are issued.*

Annual Statistical Report

The annual *Statistical Report* (issued in the second half of the Autumn Term) gives overall outcomes of all examinations administered by WJEC.

Geology

General Certificate of Education

January 2006

Advanced Subsidiary/Advanced

Principal Examiner: David Evans, King George V College, Southport.

Unit Statistics

The following statistics include all candidates entered for the unit, whether or not they 'cashed in' for an award. The attention of centres is drawn to the fact that the statistics listed should be viewed strictly within the context of this unit and that differences will undoubtedly occur between one year and the next and also between subjects in the same year.

Unit	Entry	Max Mark	Mean Mark
GL1	360	60	32.0

Grade Ranges

A	41
B	36
C	31
D	26
E	22

N.B. The marks given above are raw marks and not uniform marks.

Unit GL1

This examination tested many aspects of the specification and was felt to give students across the ability range a chance to demonstrate their knowledge.

Q.1 Most students correctly identified Feature X as the umbo, but very few were able to recall that feature Y was the pallial sinus. Question (b) revealed that whilst the knowledge of the differences in symmetry between bivalves and brachiopods is well understood, the presence of diductor muscle scars in brachiopods is less familiar.

In section (c), many candidates recognized the cavities as moulds, but surprisingly few could explain the role of acidic waters passing through the sandstone in dissolving the calcite valves.

Most students were able to explain the meaning of the term life assemblage, although relatively few were able to phrase it succinctly as an assemblage preserved in life position or in situ, or showing no transport before preservation. In section (d) (ii) most candidates identified the death assemblage but fewer used the evidence of fragmented valves as evidence of transport prior to preservation.

Overall this proved to be a question on which candidates scored surprisingly lower than anticipated.

Q.2 Nearly all students correctly identified mineral G as biotite mica, although slightly fewer identified orthoclase feldspar for mineral H. Some candidates named other minerals showing a pink colour on the mineral identification sheet, without reference to the stem of the question which identified the rock as having 60% feldspar.

In section (a) (ii), most students recognized the role of different rates of crystallization of minerals G and H, but fewer could explain why they had these different rates in terms early or late stage crystallization, or having crystallized at different depths in the crust. Most students correctly identified the rock as granite.

In section (b) it became clear that surprisingly few students understand the difference between weathering and erosion, and the properties of the minerals that influence the rates of these, hence the difference in hardness of the minerals was often incorrectly linked to weathering rather than erosion. The best candidates noted differences in hardness, cleavage and susceptibility to chemical weathering to explain the change in composition.

In part (c) (i) the confusion between weathering and erosion again became apparent. Most students were correctly able to note that shales are typically deposited in low energy, aquatic sedimentary environments such as marine or deltaic environments.

Many candidates recognized the crystalline and foliated nature of a schist and illustrated this reasonably well. Many candidates also correctly two minerals which may be found in this rock.

Q.3 Many students coped quite well with this question, on what is often regarded as a difficult topic.

In section (a) (i), the better candidates read the question properly and gave an answer within the range of 50°-55°. Incorrect answers related to the total movement shown over the last 380 million years, rather than that which was asked.

Section (a) (ii) proved surprisingly difficult with a significant number of candidates not recognizing the need to calculate the distance moved and then to divide this by the time elapsed. Students who gave an incorrect answer in part (i) were given full marks in part (ii) if they performed a correct calculation based of the initial incorrect value. The best students recognized, in part (iii), the horizontal magnetic inclination at the equator, and a value of less than 72°into the Earth at location B.

The questions in (b) were generally answered competently, and the formation of remnant magnetism seems to be well understood. In section (c), most candidates recognized the tropical requirements of many modern corals, but did not refer to the role of uniformitarianism in helping us deduce conditions 300 million years ago, nor did they quote that Figure 3 showed our latitude at the equator at this time. Part (d) was well answered with clear explanation of the mobile nature of the partially molten asthenosphere due to convection currents within it, and the consequent movement of the lithospheric plates above.

Q.4 Most candidates correctly drew an axial plane on Figure 4. A pleasing number also recognized that a reverse fault needs a non vertical fault plane and shows a downthrow side in the opposite direction to which the fault plane dips. Many also noted the discordant nature of a dyke and the need for it to be displaced if it is to be seen to be older than the fault.

In part (b) it was encouraging to read the high number of correct responses to both of the two laws. However only the better candidates recognized that the included fragments indicated that the sequence was overturned, and that consequently the sandstone is older than the lava flow despite it now lying on top of the lava.

Section (c) proved to be an excellent discriminator, with the best candidates giving excellent sketches and descriptions of relevant sedimentary structures such as mudcracks, current bedding, graded bedding and flute casts. A number of students wasted time explaining how such features had formed, which was not required. An explanation of how this feature could be used to determine "way-up" was however needed. The best candidates noted the scale of the features and could give a precise field location of where they had seen them. A few students offered examples of sedimentary structures which cannot be used to determine "way-up", such as asymmetrical ripple marks which are only of use if they show internal lamination. Other disappointing answers included "way-up" features which are not sedimentary structures, such as pillow lavas.

GEOLOGY

General Certificate of Education

January 2006

Advanced Subsidiary/Advanced

Chief Examiner: Peter Loader, St. Bede's College, Manchester

Unit Statistics

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Unit	Entry	Max Mark	Mean Mark
GL3	355	50	29.4

Grade Ranges

A	36
B	31
C	27
D	23
E	19

N.B. The marks given above are raw marks and not uniform marks.

Unit GL3

General comment

The general response to the data questions was good and both were accessible to weaker candidates but discriminated well at the upper end of the mark range. Full marks were achieved by a few candidates for both questions. The quality of the essays was similar to previous years but with few full marks gained. Few candidates chose questions 3 or 5 and question 4 proved by far the most popular.

Section A

Q.1 An accessible question which allowing candidates to score well.

(a) Examiners were disappointed at the level of response to this question with many explanations using vague terms. Some candidates were not able to identify the plate margin as being destructive. Conservative and constructive were also quoted and the pressure was often referred to as resulting from tension. Subduction was generally mentioned.

(b) (i) A surprising mix, although most candidates gave an acceptable value between 1.75 and 2 inclusive. Some preferred to give the answer in hours and minutes, which was accepted as long as the answer was clear e.g. 1hr 45 min was accredited while 1.45 (hr) was not. 7hr was not an uncommon incorrect answer.

(ii) Not well-answered. Many misconceptions are apparent concerning the mechanism of tsunamis and few made clear reference to how the waves were generated on reaching shore. Tunamis were sometimes not referred to at all or incorrectly as "tidal waves". It was frequently claimed that tsunamis speed up as they travel. Many imply that they involve a giant wall of water crossing an ocean. Hardly any candidates made the important point that their devastating properties owe much to the fact that little energy is lost during transit. Many candidates confined their answers to the effects of the tusanmis in areas of lower economic development.

(c) Well-answered. Clearly candidates are well informed on this topic.

(d) Generally well-answered.

Q.2 An accessible question with part (a) proving to be the most difficult.

(a) (i) A very disappointing response. A significant number had little idea of the nature of the dyke and were unable to give a reason. Many candidates did not consider the data carefully and thought that the feature was a fault. Of those who did recognise the dyke many gave the reason that dykes must be vertical without mentioning the discordant relationship.

(ii) When the difference in height was not attributed to faulting, this was generally answered well with candidates showing good reasoning related to the data.

(b) This area of the specification is clearly well understood and the majority of candidates scored well. A few candidates penalised themselves with incorrect definitions though examiners were encouraged by the number who went into extra detail suggesting that clasts within the breccia might exhibit vesicular textures which would enhance porosity.

(c) (i) Well-answered although many candidates apparently still do not understand exactly what is meant by the "water table". Hence comments were made such as "well C is in the water table".

(ii) Again generally well-answered by candidates who referred to the possible drop in the water table with time and explained why.

(iii) Possible salt water incursion is well understood and was usually quoted. Other common correct suggestions were exhaustion and subsidence, although a significant number gave "landslides" which were not accepted.

(d) A varied response. Many candidates stated a hazard but with no qualification. For example, "it will be hot" or "there could be earthquakes" for which little credit was given. However, "heat which will make working conditions unbearable" was credited; as was, "earthquake activity could cause the tunnel to collapse." Many candidates thought that there was a very strong possibility that workers could tunnel into the magma chamber and release the magma causing an eruption!

Section B

General comment :

Question .4. was by far the most popular and well answered. It is noted that the weaker candidates often misplaced their case study material in both "time" and "place". Examiners expect that correct geographical location and appropriate dates are given to well known geological hazard incidents e.g. the eruption of Mt St Helen's.

Q.3 Not generally well answered by the few who chose this option. Some candidates attempted to answer both parts (a) and also (b), without reference to a single rock or mineral. This, in spite of the fact that (b) asked for reference to mining operations that had been studied. This made it very difficult for candidates to obtain high marks.

(a) A very mixed response. Some candidates made very vague, general statements such as "ground water may cause difficulties" but then failed to satisfactorily elaborate. Few candidates were able to discuss more than two or three problems to any degree.

(b) Most candidates repeated sections of (a) showing that they had not planned their response before attempting the question.

Q.4 The vast majority of candidates had little difficulty quoting relevant case studies although occasionally some were confused. For example, Heimay (which was spelt in every conceivable way) was sometimes claimed to have exhibited pyroclastic flows and Mt St Helens basaltic lava flows. Also, there were claims such as "houses are built on stilts" and "vegetation is planted" as means to reduce the effects of lavas. Another common claim was that "tunnels are built to channel lavas away from settlements".

(a) Most scored well with some excellent accounts. Case studies well used though were not always accurate. Exaggerated claims were not uncommon, such as, "barriers or walls may melt". Only the better candidates attempted to describe the "extent" to which lava might be controlled for which full credit was given.

(b) Some excellent accounts although many candidates wrote extensively about the origin of basaltic and/or andesitic magmas including their associations with plate margins. Some candidates are of the opinion that $Si0_2$ is an acid and a few that it is a (toxic) gas. A few candidates confused silica, silicate or even silicone. Sometimes even the better candidates confused the terms viscous/non viscous though weaker candidates were usually consistent in their erroneous ideas about viscosity, gas content and silica percentage.

Q.5 Not a popular essay and very rarely well done. Candidates often repeated information from part a in part b also. A significant number of candidates spelt groyne as groin and few mentioned anything but e.g. rip-rap, wave baffles etc.

(a) Accounts tended to be very superficial with little detail. Responses failed to locate actual examples and there was a lack of appropriate terminology: swash, backwash, updrift and downdrift directions etc rarely used. Many candidates spelt groyne as groin. Few candidates mentioned anything apart from groynes - no rip-rap, wave baffles etc.

(b) Again these tended to be very superficial with much repetition of material used in (a).

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