



GCE AS MARKING SCHEME

SUMMER 2024

**AS
GEOLOGY - COMPONENT 1
B480U10-1**

About this marking scheme

The purpose of this marking scheme is to provide teachers, learners, and other interested parties, with an understanding of the assessment criteria used to assess this specific assessment.

This marking scheme reflects the criteria by which this assessment was marked in a live series and was finalised following detailed discussion at an examiners' conference. A team of qualified examiners were trained specifically in the application of this marking scheme. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners. It may not be possible, or appropriate, to capture every variation that a candidate may present in their responses within this marking scheme. However, during the training conference, examiners were guided in using their professional judgement to credit alternative valid responses as instructed by the document, and through reviewing exemplar responses.

Without the benefit of participation in the examiners' conference, teachers, learners and other users, may have different views on certain matters of detail or interpretation. Therefore, it is strongly recommended that this marking scheme is used alongside other guidance, such as published exemplar materials or Guidance for Teaching. This marking scheme is final and will not be changed, unless in the event that a clear error is identified, as it reflects the criteria used to assess candidate responses during the live series.

GCE AS GEOLOGY
COMPONENT 1 - GEOLOGICAL ENQUIRIES
SUMMER 2024 MARK SCHEME

Instructions for examiners of A Level Geology when applying the mark scheme

1 Positive marking

It should be remembered that candidates are writing under examination conditions and credit should be given for what the candidate writes, rather than adopting the approach of penalising him/her for any omissions. It should be possible for a very good response to achieve full marks and a very poor one to achieve zero marks. Worthwhile answers that meet the requirements of the question, but do not appear on the mark scheme are to be given credit.

2 Tick marking

Low tariff questions should be marked using a points-based system. Each credit worthy response should be ticked in red pen. The number of ticks must equal the mark awarded for the sub-question. The mark scheme should be applied precisely using the marking details box as a guide to the responses that are acceptable. Do not use crosses to indicate answers that are incorrect.

3 Annotated diagrams

Where a candidate has answered a question wholly or partly by use of an annotated diagram, credit must be awarded to the annotations which form credit-worthy responses as outlined in the marking details box. Candidates must be credited only once for valid responses which appear both as annotations to diagrams and within a section of prose in the answer to the same question.

4. Banded mark schemes

Banded mark schemes are divided so that each band has a relevant descriptor. The descriptor for the band provides a description of the performance level for that band. Each band contains marks. Examiners should first read and annotate a learner's answer to pick out the evidence that is being assessed in that question. **Do not use ticks** on the candidate's response. Once the annotation is complete, the mark scheme can be applied. This is done as a two stage process.

Stage 1 – Deciding on the band

When deciding on a band, the answer should be viewed holistically. Beginning at the lowest band, examiners should look at the learner's answer and check whether it matches the descriptor for that band. Examiners should look at the descriptor for that band and see if it matches the qualities shown in the learner's answer. If the descriptor at the lowest band is satisfied, examiners should move up to the next band and repeat this process for each band until the descriptor matches the answer.

If an answer covers different aspects of different bands within the mark scheme, a 'best fit' approach should be adopted to decide on the band and then the learner's response should be used to decide on the mark within the band. For instance if a response is mainly in band 2 but with a limited amount of band 3 content, the answer would be placed in band 2, but the mark awarded would be close to the top of band 2 as a result of the band 3 content.

Examiners should not seek to mark candidates down as a result of small omissions in minor areas of an answer.

Stage 2 – Deciding on the mark

Once the band has been decided, examiners can then assign a mark. During standardising (marking conference), detailed advice from the Principal Examiner on the qualities of each mark band will be given. Examiners will then receive examples of answers in each mark band that have been awarded a mark by the Principal Examiner. Examiners should mark the examples and compare their marks with those of the Principal Examiner.

When marking, examiners can use these examples to decide whether a learner's response is of a superior, inferior or comparable standard to the example. Examiners are reminded of the need to revisit the answer as they apply the mark scheme in order to confirm that the band and the mark allocated is appropriate to the response provided.

Indicative content is also provided for banded mark schemes. Indicative content is not exhaustive, and any other valid points must be credited. In order to reach the highest bands of the mark scheme a learner need not cover all of the points mentioned in the indicative content but must meet the requirements of the highest mark band. Where a response is not creditworthy, that is contains nothing of any significance to the mark scheme, or where no response has been provided, no marks should be awarded.

Specimen H (Gneiss), Specimen E (Desert Sandstone), Specimen L (Galena) and Specimen C (Brachiopod)

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
1.	(a)		It formed by cooling at a constant rate (1) It formed by cooling beneath the Earth's surface (1)		2		2		2
	(b)	(i)	Biotite mica (1)	1			1		1
		(ii)	Must state False (no mark awarded) (if True is stated, then no mark can be awarded) Any one x (1) from: • Augite has two cleavage planes (or mineral Q has no cleavage) • Augite is black (or mineral Q is colourless/grey/not black)			1	1		1
	(c)		Similarity: Any one x (1) from: • both composed of coarse crystals (or both have crystals greater than 2mm) • both equicrystalline • both have anhedral/subhedral crystals Difference: Any one x (1) from: • Photograph 1 shows no alignment, Specimen H is banded • Photograph 1 has coarser crystals		2		2		2

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(d)	(i)	Gneiss (1)		1		1		1
		(ii)	Any three x (1) from: • high directed pressures and high temperatures • regional metamorphism • formed deep within a mountain range/at a convergent plate boundary • no melting/solid state recrystallisation	3			3		
			Question 1 total	4	5	1	10	0	7

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
2.	(a)		Rounded grains (1) Appropriate scale (1) Well-sorted (1)		3		3	1	3
	(b)	(i)	Plot on the graphic log with Specimen E plotted within medium grain range and extends for 1 metre (1)		1		1		1
		(ii)	Indicative content All beds could have formed in an arid environment, with intermittent water flow (reference to desert environment with occasional wet seasons or floods). Can argue all one desert environment or might argue that each bed represents a particular environment in an arid location. Either approach justifiable. Many beds are red and therefore oxidation occurring on land. Arid environment with wind-blown sediments in Bed 5 and specimen E. Unlikely to be same energy levels as desiccation cracks form from the evaporation of water from mud in low energy environments (shown in photograph 3 from bed 4), and rootlets indicate enough water for growth, while bed 3 has small scale cross bedding indicating changes in flow direction (water rather than wind due to small scale of cross-bedding). All beds could be a facies on land with intermittent water where rivers flow (bed 2), within a desert environment (bed 5) and remaining water evaporates to form clay with desiccation cracks (bed 4). Bed 2 is likely a high energy fluvial or alluvial environment. Large grains surrounded by finer material suggests a fast deposition. Energy levels must be high as very large grains (over 5cm)			6	6		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			Some candidates may argue bed 3 is medium-grained with cross bedding and so the small scale is unlikely to be desert. Could be beach (with two directions of current) or fluvial (cross bedding caused by meandering of river). Need more information to confirm. Bed 1 is a fine clay but lacks any structures. Could be deep ocean? Highly variable energy levels but mostly land based evidence. Can argue that beds 1 and 3 require more information in order to establish terrestrial nature. 5–6 marks A thorough answer. The answer refers to at least three of Specimen E, Figure 2b, Photograph 2 and Photograph 3. This response relates to both the environments and levels of energy, considering the rock types and sedimentary structure based evidence. Response has strong explanation and description. <i>There is a sustained line of reasoning which is coherent, substantiated and logically structured. The information included in the response is relevant.</i> 3–4 marks A sound answer. The answer refers to at least two of Specimen E, Figure 2b, Photograph 2 and Photograph 3. This response focuses more on environments or energy or does not fully use the rock types and sedimentary structure evidence given. Response lacks full explanation, focusing more on description. <i>There is a line of reasoning which is partially coherent, supported by some evidence and with some structure. Mainly relevant information is included but there may be some irrelevant information or minor errors.</i>						

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			1–2 marks A brief answer. The answer refers to at least one of Specimen E, Figure 2b, Photograph 2 and Photograph 3. The response refers to environments or energy only but is poor. Reference to sedimentary structures and rock types. <i>There is a basic line of reasoning which is not coherent, supported by limited evidence and with very little structure. There may be significant errors or the inclusion of much irrelevant information.</i> 0 marks <i>No attempt made or no response worthy of credit.</i>						
			Question 2 total	0	4	6	10	1	4

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
3.	(a)	(i)	Density: feels heavy in hand (1) <u>Description</u> Any one x (1) from: • use of equipment to determine hardness • scratch mineral on streak plate • observe cleavage • observe crystal shape <u>Result</u> Any one x (1) from: • scratched by copper coin/fingernail • lead grey streak • 3 good 90° cubic • cubic crystal shape		2	1	3		3
		(ii)	Galena (1)		1		1		1
	(b)		24 / 7 (1) 3.4 g/cm ³ or 3.4 g cm ⁻³ (1)		2		2	2	2
	(c)		Any two x (1) from: • natural variation in the mineral/presence of impurities • the different minerals could have been altered by processes that occurred after formation (e.g. weathering) • using small specimens makes it difficult to obtain accurate readings of mass or volume • lack of resolution in apparatus • reference to errors in experimental technique (e.g. failure to appreciate the meniscus when reading the cylinder, not resetting the electronic balance to zero etc)		2		2		2
			Question 3 total	0	7	1	8	2	8

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
4.	(a)		Drawn to correct scale (1) Shape of the valves (1) Detail - foramen or growth lines (1) Foramen labelled in correct place (1) Line of symmetry through the valve (1)	2	3		5	1	5
	(b)		Brachiopod (1)	1			1		
			Question 4 total	3	3	0	6	1	5

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
5.	(a)	(i)	Approximately 10 degrees (1)	1			1	1	1
		(ii)	Dip angle correctly located using grid ref placed on bed D (1) Dip direction facing south (1)	2			2		2
		(iii)	Beds have strikes direction at right angles/dip directions at right angles (1) East-West crustal shortening (for E, F, G) and North-South crustal shortening (for C-D) (1) C and D cross-cut E, F, G so C, D orogenic belt forms after E, F, G / one dip is above the unconformity and one below showing the different angles and strikes are the result of different processes (1)		3		3		3
	(b)	(i)	42 degrees (1)		1		1	1	1
		(ii)	Any two x (1) from: - angles and directions of dip may vary locally due to minor folding in beds - undulations/irregularities in the bedding planes - compass not a sensitive measurement - iron in the rocks may interfere with the compass measurement - erosion may have altered bedding planes - some may be measurements of apparent dip Credit other sensible points.		2		2		2
			Question 5 total	3	6	0	9	2	9

Question			Marking details		Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
6.			F1 upwards (1) reverse (1)	F2 northeast (1) thrust (1)		4		4		4
			Question 6 total		0	4	0	4	0	4

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
7.			Beds C and D placed horizontally (1) Correct plot of pluton (1) Metamorphic aureole (1) F1 at correct location and direction (1) Arrows on F1 showing correct displacement direction (1) Dyke in correct position and vertical (1) Boundary of Rock Unit E-F, F-G in correct location and dipping to the west under unconformity (1) Boundary of Rock Unit E-F in correct location and dip creating synform west of F1 (1) Boundary of F-G in correct direction and dip creating synform west of F1 (1) Boundary of Rock Unit E-F in correct location and dip creating antiform east of F1 (1) Boundary of F-G in correct direction and dip creating antiform east of F1 (1) 2 or more of the 3 fold axes correctly drawn and labelled (1) Correct cross-cutting relationship of F1 with unconformity (1)		1	1 1 1 1 1 1 1 1 1	13	13	13
			Question 7 total	0	6	7	13	13	13
			Paper Totals	10	35	15	60	19	50

