



GCE AS MARKING SCHEME

SUMMER 2025

**AS
GEOLOGY - COMPONENT 2
B480U20-1**

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 2 - FOUNDATION GEOLOGY
SUMMER 2025 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 candidate'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 candidate'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 candidate'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 candidate'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 candidate'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 candidate 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.

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
1	(a)	(i)	Muscle scar (1)	1			1		
		(ii)	Bivalve (1)	1			1		
	(b)	(i)	Two correct lengths (1) PS Length = 1.5cm (accept 1.4 -1.6cm) Length = 5 cm (accept 4.9 - 5.1c m) PSI = 0.3 (1) (accept 0.27 - 0.33)		2		2	2	2
		(ii)	Data plotted correctly for their values (ecf) (1)	1			1	1	1
		(iii)	Identification of appropriate morphological feature (1) Explanation of feature as evidence of mode of life (1) Shallow / deep burrower indicated by: Pallial sinus - to allow long siphons to be retracted into shell. or Streamlined shell - so easy to burrow into soft sediment or Relatively smooth shell - making it easy to burrow into sediment. (ecf) Non-burrower indicated by: Large teeth and sockets - to resist shell being opened when exposed. or Large adductor muscle scars / large muscles - to keep shell closed when exposed. Thick / hard shell – to protect shell while on surface		2		2		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(c)	(i)	Life assemblage (1) Explanation: Any two x (1) from: - complete shells implying little / no transportation after death - range of shell sizes implying a range of age of individuals - range of shell sizes implying little / no transportation and sorting after death		3		3		
		(ii)	Any three x (1) from: - rapid burial - SiO₂ rich water enters the pores / void present - carbonate material dissolves - replacement - by SiO₂ / quartz / silicification		3		3		
			Question 1 total	3	10	0	13	3	3

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
2	(a)		5.3/5.4/5.5 - 4.0/4.1 or Range = 1.5% (1) accept 1.2 - 1.5%	1			1	1	1
	(b)	(i)	Basalt (1)	1			1	1	1
		(ii)	Vesicular (1) Any two x (1) from: - as the magma rises and pressure decreases - gases dissolved in the magma come out in solution - gas bubbles preserved as lava crystallises	3			3		
	(c)	(i)	Both answers correct (1) Mauna Loa – Mafic Mt St Helens – Intermediate		1		1	1	1
		(ii)	Mauna Loa lava less viscous than Mount St Helens (1) Mauna Loa - lower silica / mafic content therefore leading to lower viscosity of lava (1) - lava flows travel further leading to wider base and lower slope angle (1) Mount St Helens - magma has higher silica / intermediate content and therefore has higher viscosity (1) - lava erupted does not flow far and builds up in large amounts nearer the crater leading to a smaller base and steeper sides (1) To a maximum of 4 marks		4		4		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(d)		Answer must evaluate the usefulness of technique. Any three x (1) from: - the volume of gases released by a volcano often increase prior to an eruption - we can accurately measure change in gas release using instruments However, - the viscosity of the magma will impact how much gas will be released - as part of a range of monitoring techniques it can be highly effective, however not always as effective when used on its own - the absolute data values may be unreliable in prediction of eruption - each eruption / volcano is unique Credit other reasonable answers related to pros or cons of gas emission techniques.			3	3		
			Question 2 total	5	5	3	13	3	3

Question			Marking details	Marks Available						
				AO1	AO2	AO3	Total	Maths	Prac	
3	(a)		Two or three correct (1) Four correct (2)	2			2			
			Common in the hydrosphere and atmosphere							Atmophile
			Common in rock forming silicates							Lithophile
			Common in metallic ores containing sulfur							Chalcophile
			Common in the Earth's core							Siderophile
	(b)	(i)	Iron: 30-34% Silicon: 13-17% (1) Two numbers add up to 47% (1)		2		2	2	2	
		(ii)	Similarities - as chondrites thought to be the material from which the Earth formed, their composition is similar to the whole Earth (1) Differences Any two x (1) from: - crust has higher amounts of oxygen and silicon / lower amounts of iron / magnesium than the meteorite - during the Earth's formation dense metals migrated towards the centre - less dense materials stayed near the surface increasing their relative amounts in the crust		3		3			

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(c)	(i)	Olivine (1)	1			1		1
		(ii)	Any two x (1) from: - mantle material is incorporated into magma - magma rises - the magma does not fully assimilate mantle material	2			2		
	(d)	(i)	Sample Q because: The meteorite is older than the mantle xenolith (1) So will have a greater amount of ^{147}Sm decay making it a steeper gradient / so will have a greater amount of ^{143}Nd production making it a steeper gradient (1)		2		2	2	2
		(ii)	The time taken for the number of parent atoms to decay by half (1)	1			1		
		(iii)	Any two x (1) from: - Samarium 147 has a longer half-life / Carbon-14 half-life too short - the meteorite is very old - not enough carbon-14 parent atoms remaining to accurately calculate the age of the meteorite		2		2		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(e)		Max three x (1) from: • meteorites offer only indirect evidence • meteorites formed at similar time to the Earth • only undifferentiated chondrites offer evidence of the composition of the whole Earth • stony meteorites only inform about crust • iron meteorites only inform about the core • meteorites are rare Max three x (1) from: • mantle xenoliths give us direct evidence of the mantle • mantle xenoliths only give evidence of the mantle's composition not the other layers • mantle xenoliths more readily available • mantle xenoliths formed after differentiation • mantle xenoliths weather / breakdown at the surface To a maximum of four marks	1		3	4		
			Question 3 total	7	9	3	19	4	5

Question			Marking details	Marks Available									
				AO1	AO2	AO3	Total	Maths	Prac				
4	(a)	(i)	Any four x (1) from: • clastic • coarse clasts • sub-angular / sub-rounded • poor sorting • matrix of finer sediment • some evidence of clast orientation • use of numbers	4			4	1	4				
		(ii)	Bed C completed greater than 2mm (1)	1			1	1	1				
	(b)	(i)	Saltation	1			1						
		(ii)	<table><tr><td>Maximum length of clast Z</td><td> • 10cm or 100mm (1) </td></tr><tr><td>Minimum velocity needed for transportation of clast Z</td><td> • 10m s⁻¹ (1) </td></tr></table>	Maximum length of clast Z	• 10cm or 100mm (1)	Minimum velocity needed for transportation of clast Z	• 10m s⁻¹ (1)	2			2	2	2
Maximum length of clast Z	• 10cm or 100mm (1)												
Minimum velocity needed for transportation of clast Z	• 10m s⁻¹ (1)												
		(iii)	Any three x (1) from: • largest clasts suggest high energy • large clasts will have been transported by traction • smaller clasts will have been transported by suspension and saltation • poor sorting implies rapid loss of energy where a range of transportation types are likely to have occurred			3	3						

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(c)		Indicative content The graphic log represents a desert environment containing the following: Playa lake Fine sized sediment Desiccation cracks River channel / wind-blown sand dunes Sand sized sediment Cross bedding Wadi Channel / alluvial fan Coarse, poorly sorted, sub rounded sediment with some orientation of clasts and a red haematite coating. 5-6 marks There is a clear response which describes and explains most of the details linking the beds and sedimentary structures to a desert environment. This includes discussion of all three key environments using grain size / rock type and sedimentary structures as evidence. <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	3		6		6

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			3-4 marks The response describes and explains many of the details linking some of the evidence presented. This includes discussion of at least two key environments using grain size / rock type and sedimentary structures as evidence. Evidence may not be coherently linked to the depositional environment. <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> 1-2 marks The response describes and explains only a few of the details linking some evidence present. This includes discussion of at least one key environment using at least one of grain size / rock type and sedimentary structures as evidence. There is a lack of detail and explanations are superficial. <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 4 total	11	3	3	17	4	13

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
5	(a)		Any three x (1) from: - as temperature decreases the extinction rate increases - as temperature increases the extinction rate increases - the rate of change increases as temperature change becomes more extreme - extinction rates are greater with temperature increase rather than decrease - use of values	3			3	3	3
	(b)	(i)	Permian and Triassic (1)	1			1		
		(ii)	Any three x (1) from: - the rate of extinction is high - use of values - this occurs rapidly / over a short period of time - this will have impacted a wide range of ecosystems - on a global scale	3			3	1	3
	(c)	(i)	Any three x (1) from: - the mantle is hot - the mantle rises because it is low density - causing a decrease in pressure - decompression melting	3			3		
		(ii)	Any two x (1) from: - the mantle plume is more buoyant / less dense and naturally rises - the lithosphere is a more rigid layer than the asthenosphere - the lithosphere acts as a barrier - more material rising / pressure causes the plume to spread out under the lithosphere	2			2		
			Question 5 total	12	0	0	12	4	6

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
6	(a)	(i)	Any three x (1): - crystalline - foliated / schistosity - porphyroblastic - use of numbers	3			3	1	3
		(ii)	Schist	1			1		
	(b)	(i)	Crystalline (1) Equal size of crystals (1) Anhedral crystals (1) Coarse crystals (1)		4		4	1	4
		(ii)	One rate of cooling Equicrystalline – all crystals are the same size implying a steady rate of cooling (1) Slow Cooling Coarse crystals – crystals had time to grow to a coarse size implying a slow rate of cooling (1)		2		2		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(c)		Indicative content • metamorphic rocks present to the north of the granite • the arrangement of the metamorphic rocks does not have the highest-grade rocks to the north • schist and gneiss are regional not contact metamorphic rocks • contact metamorphism produces non-foliated rocks • the age of the metamorphic rocks is older than the granite • the granite would be the same age as the metamorphic rocks if their creation was linked • there is a metamorphic aureole to the north of the intrusion where contact metamorphism has occurred 5-6 marks There is a clear response which correctly evaluates the statement using a range of evidence present. This includes discussion of all three parts of the statement on the metamorphic rocks, the changing grade of the rocks, and the role of the granite in the metamorphism. <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 The response correctly evaluates many of the details linking some of the evidence presented. This includes discussion of at least two parts of the statement on the metamorphic rocks, the changing grade of the rocks, and the role of the granite in the metamorphism.			6	6		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			<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> 1-2 marks The response evaluates only a few of the details linking some evidence present. This includes discussion of one or two parts of the statement on the metamorphic rocks, the changing grade of the rocks, and the role of the granite in the metamorphism. <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 6 total	4	6	6	16	2	7
			PAPER TOTALS	42	33	15	90	20	37