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# **GCSE MARKING SCHEME**

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**SUMMER 2023**

**GEOLOGY - COMPONENT 2  
C480U20-1**

## **INTRODUCTION**

This marking scheme was used by WJEC for the 2023 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

**GCSE GEOLOGY**  
**COMPONENT 2 – GEOLOGICAL PRINCIPLES**  
**SUMMER 2023 MARK SCHEME**

**Instructions for examiners of GCSE 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. 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.

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
1.	(a)	(i)	Augite (1)	1			1		1
		(ii)	<b>Any three x (1) from:</b> <ul style="list-style-type: none"> <li>• crystalline / interlocking</li> <li>• a correct size quoted</li> <li>• phenocrysts</li> <li>• fine / groundmass</li> <li>• porphyritic</li> <li>• accept reference to crystal shape</li> </ul>	3			3		3
		(iii)	Two different crystal sizes/ larger and smaller/ reference to phenocrysts and groundmass/ two actual sizes (1) Phenocrysts slower / groundmass faster (1) Feldspar deeper (first) / groundmass shallower (second) (1)		3		3		
		(iv)	Andesite (1)	1			1		
	(b)	(i)	Columnar jointing (1)  <b>Any two x (1) from:</b> <ul style="list-style-type: none"> <li>• cooling of magma / lava</li> <li>• contraction / shrinkage</li> <li>• forms horizontal / hexagonal joints</li> </ul>	3			3		1
		(ii)	50 cm (1)		1		1	1	1

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(c)	(i)	Correct plot of value stated in 1(b)(ii) (1)	1			1	1	
		(ii)	<b>Any two x (1) from:</b> <ul style="list-style-type: none"> <li>• use of numbers</li> <li>• as the body width increases so does the structure thickness</li> <li>• positive correlation</li> </ul>	2			2	2	
		(iii)	Wider body - slower cooling or vice versa (1) Slower cooling the thicker the columns or vice versa (1)			2	2		
	(d)	(i)	<b>Any two x (1) from:</b> <ul style="list-style-type: none"> <li>• grid reference</li> <li>• orientation</li> <li>• scale</li> </ul> Credit any other sensible alternatives Do not credit labels e.g. baked margin	2			2		2
		(ii)	<b>Indicative content</b>  <b>Figure 1a</b> Rock unit A is igneous so it could be a pluton It has fine crystals therefore can't be a pluton / plutons have coarse crystals It could be from the chilled margin of a pluton and fine grained  <b>Map 1</b> Plutons are large igneous bodies whereas Rock Unit A is small scale Plutons are rounded / oval in shape whereas Rock Unit A is linear Both plutons and dykes are discordant, and Rock Unit A is a dyke			6	6		

Question		Marking details	Marks Available					
			AO1	AO2	AO3	Total	Maths	Prac
		<p><b>Figure 1b</b>  Columnar jointing is an igneous structure so could be a pluton  Columnar jointing forms when lava flows onto the surface and cools and contracts.  Columnar jointing can also form in sills and dykes that are intrusive  Plutons are unlikely to have columnar jointing  The igneous body is only 25m wide which is too small for a pluton</p> <p><b>Figure 1d</b>  It is discordant so could be a dyke or pluton  It has two baked margins which suggests that the heat from the magma has metamorphosed Rock Unit C as happens in plutons.  Baked margins are narrow suggesting it is not a pluton  Fragments of Rock Unit C have been included in Rock Unit A – indicates an intrusion (reference to the law of included fragments) but not conclusive evidence of a pluton  Rock Unit A is linear and discordant and is a dyke</p> <p><b>5–6 marks.</b>  There is a clear response which draws upon valid interpretation of a minimum of <b>three</b> of the <b>four</b> sources (<b>three figures and the map</b>).  The sources of evidence are interpreted coherently as outlined in the indicative content above. There is some attempt at an evaluation of the evidence. A conclusion is drawn that the evidence supports the view that has been argued.  <i>There is a sustained line of reasoning which is coherent, substantiated and logically structured. The information included in the response is relevant.</i></p>						

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			<p><b>3–4 marks.</b> The response draws upon some valid interpretation of a minimum of <b>two</b> of the <b>four</b> sources. The sources of evidence are interpreted quite well as outlined in the indicative content above. There is some attempt at an evaluation of the evidence. A conclusion is drawn that supports the view that has been argued. <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></p> <p><b>1–2 marks.</b> The response makes use of some valid interpretation of only <b>one</b> or <b>two</b> of the four sources with rather superficial comment. There may be a lack of relevance in places. There is little evidence of evaluation, although there is a conclusion that supports the view that has been argued. <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></p> <p><b>0 marks</b> <i>No attempt made or no response worthy of credit.</i></p>						
			<b>Question 1 total</b>	<b>13</b>	<b>4</b>	<b>8</b>	<b>25</b>	<b>4</b>	<b>2</b>

Question		Marking details	Marks Available					
			AO1	AO2	AO3	Total	Maths	Prac
2.	(a)	Calcite (1) Accept between 0.5 – 1.5 mm (1) Non-foliated / equicrystalline (1) Marble (1)	4			4	1	4
	(b)	<b>Any three x (1) from:</b> <ul style="list-style-type: none"> <li>• heat from the igneous body</li> <li>• recrystallised</li> <li>• contact metamorphism</li> <li>• limestone parent rock</li> </ul>		3		3		
		<b>Question 2 total</b>	<b>4</b>	<b>3</b>	<b>0</b>	<b>7</b>	<b>1</b>	<b>4</b>

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
3.	(a)		40° (1) Synform / syncline (1) West- East (1)		3		3	3	
	(b)	(i)	2 correct plots along Rock Unit F (1)	1			1	1	1
		(ii)	Correct width of sill (1) Sill E-W strike (1) Rock Unit F cross-cutting sill (1)		3		3	3	3
		(iii)	Correct width of Rock Unit B (1) Rock Unit F cross cuts Rock Unit B (1)		2		2	1	2
			<b>Question 3 total</b>	<b>1</b>	<b>8</b>	<b>0</b>	<b>9</b>	<b>8</b>	<b>6</b>

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
4.	(a)	(i)	Colour (1) Cleavage (1) No cleavage (1) The way the mineral reflects light (1)		4		4		4
		(ii)	Garnet	1			1		1
	(b)	(i)	$v = 20/4.2$ or correct re-arrangement $v = m/d$ (1) 4.76 (accept 4.8, 4.761, 4.762 etc) (1)		2		2	2	
		(ii)	<b>Any one x (1) from:</b> <ul style="list-style-type: none"> <li>irregular shape</li> <li>accuracy of reading ruler</li> <li>credit any other sensible alternative</li> </ul>		1	0	1		
		(iii)	Amount of water displaced (1) Matches the volume of the mineral/ takes into account the irregular shape / $1 \text{ ml} = 1 \text{ cm}^3(1)$		2	0	2		2
			<b>Question 4 total</b>	<b>1</b>	<b>9</b>	<b>0</b>	<b>10</b>	<b>2</b>	<b>7</b>

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
5.	(a)	(i)	Synform (1) Accuracy of sketch – appropriate dip angles (1) Accuracy of sketch – appropriate bed thickness (1) Accuracy of sketch – all beds represented and smaller scale features e.g. precise changes in bed thickness, laminations (1)		4		4	1	4
		(ii)	60 (accept between 55-65)	1			1	1	1
	(b)		<p><b>Difference</b>  <b>Any one x (1) from:</b></p> <ul style="list-style-type: none"> <li>Map 1 synform axial plane trace has an east-west strike whereas Figure 5a has a north-south strike</li> <li>the two synforms have limbs with differing angles of dip/ dip angle of limbs in Map 1 is 40° and Figure 5a has dip angle of 60°</li> <li>Map 1 has limbs that dip to the north and south whereas Figure 5a has limbs dipping towards the east and west</li> </ul> <p><b>Similarity</b>  <b>Any two x (1) from:</b></p> <ul style="list-style-type: none"> <li>both synforms / both have limbs that dip towards one another</li> <li>both have a vertical fold axis</li> <li>both have limbs with equal dip</li> <li>both formed by compression</li> </ul>			3	3	3	3
			<b>Question 5 total</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>8</b>	<b>5</b>	<b>8</b>

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
6.	(a)		Bed 3 correctly plotted (1) Bed 4 correctly plotted (1) Bed 5 with erosional base (1) Bed 5 correctly plotted (1)	1	3		4	3	4
	(b)	(i)	Mean grain size 5mm (1) Grains different sizes <b>and</b> in contact, or with a matrix (1) Grains rounded (1)		3		3	1	3
		(ii)	<b>Any two x (1) from:</b> <ul style="list-style-type: none"> <li>• attrition</li> <li>• grain contact with other grains</li> <li>• edges of grains knocked off</li> </ul> <b>or any two x (1) from:</b> <ul style="list-style-type: none"> <li>• abrasion</li> <li>• grain contact with bed</li> <li>• edges of grains knocked off</li> </ul>	2			2		
	(c)		Increase in energy / shale lower energy / sandstone higher energy (1) Higher the energy the larger the grain size (1)		0	2	2		
	(d)		<b>Any one x (1) from:</b> <ul style="list-style-type: none"> <li>• marine – trilobite</li> <li>• low energy because well preserved fossil</li> </ul> <b>Any one x (1) from:</b> <ul style="list-style-type: none"> <li>• low energy because shale / fine grained</li> <li>• water – fine grains settle out of water</li> <li>• anaerobic – black</li> </ul>			2	2		
<b>Question 6</b>				<b>3</b>	<b>6</b>	<b>4</b>	<b>13</b>	<b>4</b>	<b>7</b>

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
7.	(a)	(i)	Suture line drawn correctly with frilly saddles and lobes (1) Three full saddles getting progressively larger towards D (1)		2		2		2
		(ii)	Ammonite (1) Suture line is complex or frilly / frilly saddles and lobes (1)	2			2		
	(b)		Ceratite (1)	1			1		
	(c)		Ceratite (G) is older / ammonite (F) younger (1) Older rock (G), upthrown side/younger rock (F), downthrown side (1) The hanging wall has gone down / footwall has gone up (1)			3	3		
			<b>Question 7 total</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>8</b>	<b>0</b>	<b>2</b>
			<b>Paper totals</b>	<b>26</b>	<b>36</b>	<b>18</b>	<b>80</b>	<b>24</b>	<b>36</b>