



GCSE MARKING SCHEME

SUMMER 2019

GEOLOGY - COMPONENT 2
C480U20-1

INTRODUCTION

This marking scheme was used by WJEC for the 2019 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
SUMMER 2019 MARK SCHEME
COMPONENT 2 - INVESTIGATIVE GEOLOGY

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

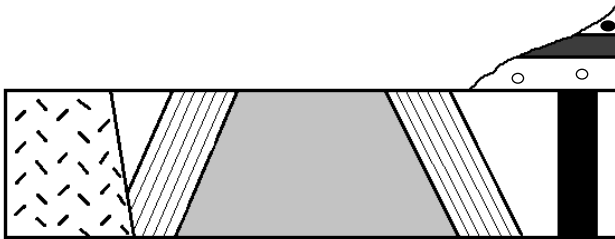
Once the band has been decided, examiners can then assign a mark. During standardising (marking conference), detailed advice from the Principal Examiner on the qualities of each mark band will be given. Examiners will then receive examples of answers in each mark band that have been awarded a mark by 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)	Interlocking crystals (1) Majority between 4 and 6mm (1) with a smaller amount between 2 and 4mm (1)		3		3	1	3
		(ii)	Equicrystalline or coarse grained (1)	1			1		
		(iii)	One stage of cooling (1) R Any one x (1) from: • Slow /moderate cooling rate • From magma • Intrusive/within the crust		2		2		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(b)	(i)	4 additional crystals N-S, total 10 crystals (1) 2 additional crystals NE – SW, total 5 crystals (1)	2			2	2	2
		(ii)	3 correct plots = 2 marks (2) 1 or 2 = (1)	2			2	2	2
		(iii)	NW to SE or SE to NW (1) (R) Any two x (1) from: • Most crystals aligned in that direction • The flow of magma causes the alignment • Long length of crystal in the direction of flow			3	3		
		(c)	Granite (1) Granite has a coarse crystal size or >3mm (1) Granite contains quartz, feldspar and mica / silicic (1)		3		3		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(d)	(i)	Difference: Any one x (1) from: • B is irregular whereas A is linear / sheet like • Reference to size difference • A is younger than B (or vice versa) Similarity: Any one x (1) from: • Both are discordant (1) • Both are intrusions (1)	2			2		
		(ii)	A – dyke (1) B – pluton or batholith (1)	2			2		
			Question 1 total	9	8	3	20	5	7

Question			Marking details	Marks Available											
				AO1	AO2	AO3	Total	Maths	Prac						
2.	(a)	(i)	Base of Rock Unit F (1) Upper and lower margin of Rock Unit H (basalt) (1) Dyke plotted (1) Dyke vertical (1) 		2	2	4	4	4						
		(ii)	Vertical fold axis in Rock unit D (1)  (1)		2		2								
		(iii)	600/6 (1) 100m (1)		2		2	2							
		(iv)	100m from edge of igneous body B at the surface (1)	1			1								
		(v)	<table border="1"><tr><td>Strike Directions</td><td>N-S</td></tr><tr><td>Dip angle</td><td>60</td></tr><tr><td>Dip Direction</td><td>W</td></tr></table>	Strike Directions	N-S	Dip angle	60	Dip Direction	W	3			3	3	3
Strike Directions	N-S														
Dip angle	60														
Dip Direction	W														

Question			Marking details		Marks Available													
					AO1	AO2	AO3	Total	Maths	Prac								
	(b)	(i)	<table><tr><td>mean size of crystals (mm)</td><td>1.3 - 1.7 mm (1)</td></tr><tr><td>name of mineral P</td><td>Quartz (1)</td></tr><tr><td>rock group</td><td>Metamorphic (1)</td></tr><tr><td>name of rock</td><td>Metaquartzite (1)</td></tr></table>		mean size of crystals (mm)	1.3 - 1.7 mm (1)	name of mineral P	Quartz (1)	rock group	Metamorphic (1)	name of rock	Metaquartzite (1)	4			4	1	4
mean size of crystals (mm)	1.3 - 1.7 mm (1)																	
name of mineral P	Quartz (1)																	
rock group	Metamorphic (1)																	
name of rock	Metaquartzite (1)																	
		(ii)	Map 1 – Rock unit G is on top of Basalt (1) Rock G - is metamorphic therefore in the baked margin (1) Lava flow would not have an upper baked margin/sills have baked margins above and below (1)			3		3										
	(c)	(i)	Fault and Rock Unit B Fault is older (1) Rock unit B cuts the fault (1) Rock Unit A and Rock Unit B Unable able to say (1) as they do not cross cut (1)				4	4										
			Question 2 total		8	9	6	23	10	11								

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
3.	(a)		Bed 3 correctly plotted (1) Bed 4 correctly plotted (1) Bed 5 correctly plotted (1)		3		3	3	3
	(b)		Ripple marks (1) Any two x (1) from: • current • shallow • marine/beach/river or wind • arid		3		3		
	(c)	(i)	Correct scale (1) 2 stipes (1) Detail of thecae (1)		3		3	1	3
		(ii)	Correct location of theca inside the stipe (1)	1			1		
		(iii)	Graptolite (1)	1			1		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(d)		Indicative content Interpretation of evidence There are two sedimentary environments with changing energy levels. A deep sea turbidite with two changes of energy (beds 1-3). Interpretation is based on grain size change and the erosional base of bed 2. There is an increase in energy between bed 1 and 2. There is a decrease in energy within bed 2. There is a decrease in energy between bed 2 and 3. Shale is deposited from suspension in a low energy environment and the medium grained sedimentary rock in a high energy turbidity current. Environment changes from deep marine (beds 1-3), to shallow marine (beds 4-6) / or river (beds 4-5) to marine Bed 6. A change of environment from a deep sea to shallow marine environment from bed 3 to 4 with an increase in energy. Interpretation is based on an increase in grain size and the erosional base of bed 4. Beds 4-6 represent a shallow marine environment. There is a decrease in energy between Bed 4 and 5. Conglomerate (bed 4) has formed in a high energy shallow marine environment. Decrease in energy leading to the deposition of sandstone Ripples are found in the sandstone which indicates a lower energy environment than the conglomerate Coral is found in a limestone which indicates a relatively high energy environment (oxygenated waters) The statement is evaluated coherently with some recognition and appraisal of potentially conflicting evidence e.g. bed 5 and 6 similar grain size but different process of formation with sandstone and limestone. Bed 4 could be interpreted as base of a turbidity current rather than a change to a shallow marine environment. Changes in energy are linked not only to changes within a sedimentary environment but also to a change in the sedimentary environment – deep sea to shallow marine			6	6		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			5–6 marks There is a clear response which makes at least four valid analytical comment related to changes in energy and environments in Figure 3a, as outlined in the indicative content above. The sources of evidence are interpreted coherently as outlined in the indicative content above. A conclusion regarding the statement is drawn that is consistent with the evidence as interpreted. <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 There is a clear response which makes at least three valid analytical comments related to changes in energy and environments in Figure 3a, as outlined in the indicative content above. 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 regarding the statement is drawn that is consistent with the evidence as interpreted. <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 The response makes use of the interpretation of only one or two pieces of evidence of energy change and change in environment 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> 0 marks <i>No attempt made or no response worthy of credit.</i>						
			Question 3 total	2	9	6	17	4	6

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
4.	(a)	(i)	To scale (1) Fault (1) One marker bed shown appropriately displaced either side of the fault (1) Accuracy of sketch (appropriate dip angles and bed thickness) (1) Additional bedding planes or joints (1)		5		5	1	5
		(ii)	Label on northern side of fault (1)	1			1		
		(iii)	1.2 m (accept range 1.0 – 1.3 m) (1)		1		1	1	
	(b)		Compression (1) R Any two x (1) from: - It is a reverse fault - Hanging wall upthrown/footwall downthrown - Crustal shortening		3		3		
			Question 4 total	1	9	0	10	2	5

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
5.	(a)	(i)	Reaction with cold dilute HCl (1) Drop acid on mineral (1) Cleavage (1) Three regular surfaces (1) Scratch mineral with finger nail, copper coin (1)	5			5		5
		(ii)	Limestone (1)	1			1		1
	(b)		Any four x (1) from: Advantages - Limestone strong rock so stable dam foundations - Horizontal beds to the East - so stable - High run off from the east to fill reservoir Disadvantages - Leakage from faulting/jointing - Leakage from permeable limestone - Limestone collapse/sink holes - Fault movement possible so instability - Beds dipping away therefore leakage along the bedding plane			4	4		
			Question 5 total	6	0	4	10	0	6
			Component total	26	35	19	80	21	35