GCSE MARKING SCHEME

SUMMER 2023

GEOLOGY - COMPONENT 1
C480UA0-1

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 1 - 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 Multiple-choice marking

For all questions involving multiple choice (tick box) answers, where a candidate has ticked more than the required number of boxes, deduct 1 mark for each box which is wrongly chosen, to a minimum of 0. The answers to these questions are indicated with a * in the mark scheme. This applies to both on-screen and paper versions of Component 1.

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.

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
1.	(a)	(i)	35 m accept 30 m to 40 m (1) 90 Ma (1)		2		2	2	
		(ii)	Gres de Silves Formation – Mesozoic (1) Brejeira Formation – Carboniferous (1)	2			2		
		(iii)	**Any two (x 1) from:** • folding • uplift • erosion/weathering		2		2		
		(iv)	unconformity (1)	1			1		1
	(b)	(i)	graded bedding and cross bedding (1)	1			1		1
		(ii)	turbidite and desert sandstone (1)	1			1		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(c)		**Maximum of 4 marks available from:** **Brejeira Formation Any three (x 1) from:** • deep water • marine • rapid deposition • turbidity current • submarine fan • high energy/declining energy **Gres de Silves Formation Any three (x 1) from:** • desert environment • terrestrial environment • wind/aeolian • high energy • long distance of transport • oxidising conditions		4		4		
			Question 1 total	**5**	**8**	**0**	**13**	**2**	**2**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
2.	(a)	(i)	convergent oceanic-oceanic (1)	1			1		
		(ii)	**C** = ocean trench (1) **D** = abyssal plain (1)	2			2		
		(iii)	Lithosphere (1) comprises oceanic crust and upper mantle (1) it is cool, rigid and brittle (1)	1	2		3		
	(b)		partial melting of oceanic crust and overlying mantle (1)	1	0		1		
	(c)		**Any one (x 1) from:** • slab drag/slab pull • ridge push • convection currents description of one of the above (1) **or** Up to **2 marks** for detail in description if process not actually named		2		2		
	(d)		there are no earthquake foci in the asthenosphere (1) subduction related earthquake foci increase in depth from east to west (1)	2			2		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(e)		Description: Montserrat highest heat flow/much higher than world average (1) Location C lowest heat flow/much lower than world average (1) Explanation: Montserrat volcanic/magma rising (1) Location C subduction/oceanic trench (1)	2	2		4		
			Question 2 total	**9**	**6**	**0**	**15**	**0**	**0**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
3.	(a)	(i)	12-12.5 hours (1)	1			1	1	1
		(ii)	use of 22 hours (1) 787.27 km/hr^{-1} (accept 787.3 or 787) (1)		2		2	2	2
	(b)	(i)	**A** = Reverse or thrust (1) **B** = Strike-slip (1)	2			2		
		(ii)	No vertical movement/only sideways movement (1) No displacement of ocean water (1)		2		2		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
		(iii)	**Indicative content** **Characteristics:** Both high magnitude Both shallow focus Both reverse/thrust faults Both had 30m waves Both epicentres same distance from shore 2004 event large number of deaths 1960 event small number of deaths 1960 event higher magnitude than 2004 but fewer deaths 2004 event over 137 x more deaths than 1960 event 2004 Indian Ocean/1960 in Pacific Ocean **Reasons for differences in number of deaths**: Variations in population densities around Indian/Pacific oceans Level of technology variations around Indian/Pacific oceans Levels of development/economic situation/education/communication variations around Indian/Pacific oceans Indian Ocean no early warning system/tsunami detectors No warnings issued so no evacuation therefore large number of deaths Pacific Ocean has a tsunami warning system Warnings issued so evacuation orders issued and saved many lives Indian Ocean many LIC so no investment in sea defences Pacific many HIC/NIC so investment in protection measures Indian Ocean more low-lying coastlines than Pacific	4		2	6		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			5–6 marks The answer compares the Chilean to the Indonesian event and refers to a minimum of **three** differences or similarities between them. In addition, a minimum of **two** reasons to support the differences in the number of deaths are clearly explained. *There is a sustained line of reasoning which is coherent, substantiated and logically structured. The information included in the response is relevant.* **3–4 marks** The answer compares the Chilean to the Indonesian event and refers to a minimum of **two** differences or similarities between them. In addition, a minimum of **one** reason to support the differences in the number of deaths is clearly explained. Maximum of 3 marks for citing differences/similarities. *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.* **1–2 marks** The answer compares the Chilean to the Indonesian event and refers to **one** or **two** differences or similarities between them. An attempt to explain **one** reason to support the difference in deaths may be given. 2 marks can be gained by referring to either the similarities/differences or the reasons to explain the differences in deaths. *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.* **0 marks** *No attempt made or no response worthy of credit.*						
			Question 3 total	**7**	**4**	**2**	**13**	**3**	**3**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
4.	(a)	(i)	synform (1)	1			1		
		(ii)	Chalk Marl (1)	1			1		
		(iii)	impermeable (1) absence of faults and bedding planes (1)	2			2		
		(iv)	seismic survey (1) geological mapping (1)	2			2		
	(b)		9,000,000,000/50,450 (1) £178,394.45 (accept 178,000 to 178,400)		2		2	2	
	(c)		**Any three (x 1) from:** • faulting/fault reactivation • change in rock type/rock properties • flooding/tunnel leaking water down fault • subsidence/change in level of tunnel/ displacement • rockfalls/seismicity Credit development/explanation of any of the above, up to **2 marks** Credit reference to engineering solution for max **1 mark**		3		3		
			Question 4 total	**6**	**5**	**0**	**11**	**2**	**0**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
5.	(a)	(i)	**Figure 5a** – a fossil from the Burgess Shale **Figure 5b** – a trace fossil **Figure 5c** – the best indicator of a warm, shallow, marine environment **Figure 5d** – disarticulated dinosaur bones	4			4		
		(ii)	Approx. 60mm length of fossil (1) 10 mm (1)		2		2		
		(iii)	a shallow river environment (1) regional metamorphism (1)		2		2		
		(iv)	**Any one (x 1) from:** • one dinosaur will make millions of prints in a lifetime • prints do not decay/do not get scavenged/already in sediment • high probability some will be preserved **Any one (x 1) from:** • but only one body fossil • body fossil low preservation potential/ decay/ scavenged/ eroded			2	2		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(b)		**Indicative content** **Completeness of fossil record** No, disagree that the fossil record is largely complete Chances of preservation very low for many organisms especially on land Soft bodied organisms likely to be missing from fossil record Soft bodied organisms in sea and on land unlikely to be preserved Weathering, erosion and transport by water, wind and ice likely to destroy Many destroyed by metamorphism Many destroyed by weathering/erosion once exposed at the surface **Marine bias** Yes, agree with statement that biased in favour of marine organisms Life evolved in oceans 3500 Ma so many species/numbers likely Life on land only last 430 Ma so fewer species/numbers likely Marine environment more suited for preservation – sediment deposition Organisms die and sink to sea bed and are covered in sediment Many marine organisms have skeletons/shells/hard parts Soft bodied organisms less likely to be preserved in marine environment Land environments less suited for preservation Some limited/rare opportunities-tar pits/amber on land Few opportunities for rapid burial			6	6		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			5–6 marks The answer refers to **both** the completeness of the fossil record and the bias towards marine life. The answer supports each aspect with a minimum of **two** lines of relevant evidence in each case. *There is a sustained line of reasoning which is coherent, substantiated and logically structured. The information included in the response is relevant.* **3–4 marks** The answer refers to **at least one of** the completeness of the fossil record and the bias towards marine life. The answer is supported with a minimum of **two** lines of relevant evidence. *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.* **1–2 marks** The answer refers to **either** the completeness of the fossil record or the bias towards marine life. The answer supports the aspect with a minimum of **one** line of relevant evidence. *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.* **0 marks** *No attempt made or no response worthy of credit.*						
			Question 5 total	**4**	**4**	**8**	**16**	**0**	**0**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
6.	(a)	(i)	West (1) North-South (1)	2			2	1	2
		(ii)	marble (1)	1			1		
	(b)	(i)	4% (1)		1		1	1	
		(ii)	mica (1)	1			1		1
		(iii)	it is equicrystalline (1) it has fine crystals (1)	2			2		2
		(iv)	basalt (1)	1			1		
	(c)		**Any four (x 1) from:** • student is wrong – not a dyke/it is a sill • structure is concordant/follows bedding or equivalent • the thin section is basalt so could be found in a dyke/ in a sill / in a lava flow / is inconclusive • student is correct – sequence is overturned • fragments of limestone **L** in conglomerate • schist is at top of exposure-regional metamorphic=oldest rock • erosion surface of the schist is on the base not the top			4	4		
			Question 6 total	**7**	**1**	**4**	**12**	**2**	**5**
			Total for paper	**38**	**28**	**14**	**80**	**9**	**10**