



GCSE MARKING SCHEME

SUMMER 2019

**GEOLOGY - COMPONENT 1
GEOLOGICAL PRINCIPLES
C480UA0-1**

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 - COMPONENT 1
GEOLOGICAL PRINCIPLES - HIGHER TIER
SUMMER 2019 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)	90° (1)	1			1	1	1
		(ii)	Palaeozoic (1)	1			1		1
	(b)	(i)	Poorly sorted (1) Angular clasts (1)	2			2		2
		(ii)	Sandstone (accept Greywacke/Turbidite) (1) Marine (1) Deep (1) Turbidity current/ underwater landslide/submarine fan(1)		3	1	4		
	(c)	(i)	Devonian rock has undergone more transport (1) Devonian rock is better sorted (1)	2			2		
		(ii)	Any two (x1) from: • High energy conditions • Preservation potential is low • Erosion – unlikely to be preserved • Devonian/desert environment-limited organisms for preservation		2		2		
	(d)	(i)	Unconformity (1)	1			1		1
		(iii)	Any four (x1) from: • Deposition/burial/compaction/lithification of Silurian sediment • Uplift/Folding of Silurian rock • Erosion of Silurian rock • Formation of a plane of unconformity • Devonian rocks deposited on top/after erosion/terrestrial or desert environment • Gradual processes operating over a long time period		4		4		
			Question 1 total	7	9	1	17	1	5

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
2	(a)	(i)	Meteorite/asteroid impacts (1)	1			1		
		(ii)	Circular (1)	1			1		
		(iii)	Correct measurement of diameter/radius 120/60 km (1) Correct answer 11,311 km ² (1) Accept 10,500 km ² – 12,000 km ²		2		2	2	
		(iv)	Q (youngest) Hadley P (oldest) All 3 correct (1)		1		1		1
		(v)	Cross cutting relationships (1)	1			1		
	(b)		Indicative content Earth atmosphere causes most to burn up Mars no atmosphere/thin atmosphere so meteorites do not burn up 2/3 of Earth is ocean not easy to find/see Mars is all land and 100% exposure so craters visible everywhere Earth-wilderness areas Antarctic/Siberia covered by ice/snow. Only likely to be preserved in hot desert environments on Earth Can be preserved all over the Martian surface Earth much further away from asteroid belt-less chance of a hit Mars closer to asteroid belt-more likely to be hit Impact craters soon obliterated by mechanical and chemical weathering, erosion and growth of vegetation on Earth Mars is dry, limited/minimal weathering and erosion so preserved-only wind erosion, no vegetation Over 200 Ma and in ocean destroyed by subduction on Earth No plate tectonic activity on Mars so no craters subducted	6			6		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			5–6 marks The answer explains a minimum of three points referring to scarcity and poor preservation. Reference to Mars and the Earth should be made in each case to highlight the contrasts. <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 answer explains a minimum of two points referring to scarcity and/or poor preservation. Reference to Mars and the Earth should be made in each case to highlight the contrasts. <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 answer explains a minimum of one point with reference to either scarcity or poor preservation. Reference to Mars and the Earth should be made in each case to highlight the contrasts. <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>						
			Question 2 total	9	3	0	12	2	1

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
3	(a)	(i)	$45 + 45 + 39 + 43 = 172/4 = 43^\circ$ (1)	1			1	1	
		(ii)	Cephalopods (1)	1			1		
		(iii)	Suture Line (1)	1			1		
		(iv)	C (1) Any one (x1) from: - Simple zig-zag suture line - Carboniferous age		2		2		
		(v)	Any three (x1) from: - Rapidly evolving - Easily recognisable/identifiable - Abundant - Facies-Free - Global distribution - Hard Parts	3			3		
	(b)		Fossil A Location 3 (1) Fossil B Location 1 (1) Fossil C Location 2 (1) Up to 3 marks for explanations from the 5 points listed below, with a maximum of two of the following three : Relative age based on suture line complexity (1) Relative age based on precise fossil names (1) Relative age based on knowledge of age order of periods (1) Credit a minimum of 1 mark from below to gain full marks Relative age based on understanding of unconformity/cross cutting (1) Relative age based on understanding of superposition (1)			6	6		
			Question 3 total	6	2	6	14	1	0

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
4	(a)		A convergent ocean-continent (1) B conservative (1) C convergent ocean-continent (1)	3			3		
	(b)	(i)	Shallow focus earthquakes found closest to ocean trench (1) Earthquakes increase in depth from the SE to NW (1)		2		2		
		(ii)	Any two (x1) from: - Pacific plate is being subducted beneath Indo-Australian plate - Plates locked together due to friction/stress build up - Intermittent movement/stress released as earthquake occurs		2		2		
		(iii)	70,000,000/25,000,000 (1) 2.8 cm yr ⁻¹ (1)	2			2	2	
		(iv)	Thrust fault (1) Formed by volcanic activity (1)		2		2		
	(c)		Indicative content Subduction of Pacific Plate Water released from upper part of plate as it heats up Causes partial melting of overlying mantle/subducted plate Preferential melting of feldspar and smaller amounts of augite Forms andesitic magma Credit reference to appropriate mineral content Low density/buoyant rises upwards Viscous does not allow gases to escape-pressure builds up Infrequent but explosive eruptions Mainly pyroclastic flows and ash and some lava			6	6		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			5–6 marks A balanced answer that explains in detail how andesitic magma is formed and how its properties result in explosive activity. <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 answer explains both magma formation and reasons for explosivity. <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 answer refers to formation and/or explosivity but is descriptive rather than explanatory and may contain generalisations and misconceptions. <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>						
			Question 4 total	5	6	6	17	2	0

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
5	(a)		1500 x 750 x 2 (1) 2,250,000 m ³ (1)		2		2	2	
	(b)	(i)	Galena (1)	1			1		1
		(ii)	Calcite (last) E Haematite (first) All 3 correct (1)		1		1		1
	(c)		Maximum of any one (x1) from: - Hydrothermal activity - Pluton heats groundwater 50 - 500°C - Circulates through joints, bedding planes, faults, pore spaces And Dissolves out small amounts of trace elements from a large volume of rock (1) Cools and redeposits minerals in a more concentrated form in spaces available such as faults and joints (1) i.e. must refer to the concept of dissolving and redepositing for max 3	3			3		
			Question 5 total	4	3	0	7	2	2

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
6	(a)	(i)	The optimum for oil formation are 1900m depth and 75°C (1) Oil and gas not formed deeper than 5100m depth and 210°C (1)		2		2	2	
		(ii)	Use of 200°C (1) 40°Ckm ⁻¹ (1)		2		2	2	
	(b)	(i)	1.0mm (1)		1		1	1	
		(ii)	High porosity and high permeability (1)		1		1		
	(c)	(i)	Fault and salt dome (1)	1			1		
		(ii)	Borehole correlation using micro-fossils (1) Seismic survey (1)	2			2		
		(iii)	Reserves are the proportion of resources that can be extracted at a profit (1)	1			1		
	(d)		Any three (x1) from: - Carbon capture and storage - Carbon dioxide released by burning fossil fuels captured - Stored in liquid or solid state - Existing depleted oil/gas fields could store carbon dioxide at depth especially in the North Sea - Carbon dioxide not released into the atmosphere - Rate of global warming slows down	3			3		
			Question 6 total	7	6	0	13	5	0
			Component Total	38	29	13	80	13	8