



GCE AS MARKING SCHEME

SUMMER 2018

AS GEOLOGY - COMPONENT 2 GEOLOGICAL INVESTIGATIONS

B480U20-1

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INTRODUCTION

This marking scheme was used by WJEC for the 2018 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.

EDUQAS AS GEOLOGY - COMPONENT 2 GEOLOGICAL INVESTIGATIONS

SUMMER 2018 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 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.

0.	Question		Marking datails	Marks Available							
Q	Jestic	n		AO1	AO2	AO3	Total	Maths	Prac		
1	(a)	(i)	Theca/thecae (1)	1			1				
		(ii)	132mm/4 (1) accept 130-134mm/4 33.0mm (1) accept 32.5 – 33.5mm or cm equivalent. No units max 1		2		2	2	2		
	(b)	(i)	Didymograptus (1)	1			1				
		(ii)	Middle Ordovician (1)	1			1				
	(c)	(i)	 Any two x1 from: Pendant/scandent or hanging down/pointing up Closely spaced thecae/wider spaced thecae Simple thecae/straight/complex or hooked thecae Lots of thecae 14/fewer thecae 7 Thecae on inside/outside Credit reference to ages 	2			2				
		(ii)	 Any three x1 from: Evolved rapidly/short time range Facies-free planktonic floaters Worldwide distribution achieved quickly Abundant Easily recognised/identified 	3			3				
	(d)	(i)	Pyrite/iron pyrite (1)	1			1				
		(ii)	 Any three x1 from: Current aligned Well sorted-all similar size Some are fragmented/broken Only graptolites present/Low diversity Not in life position as they were floaters/planktonic 		3		3				
			Question 1 total	9	5	0	14	2	2		

)	lan	Merking deteile			Marks A	vailable		
	luesti	ion	Marking details	A01	AO2	AO3	Total	Maths	Prac
2	(a)	(i)	83.1% (1)		1		1		
		(ii)	Metals in core – Siderophile Silicates – Lithophile Atmosphere/hydrosphere – Atmophile Metallic ores – Chalcophile 2 or 3 correct (1) all 4 correct (2)	2			2		
	(b)	(i)	40% (1)		1		1		1
		(ii)	Orthoclase feldspar (1) Any 2 x 1 from: • Largest crystal > 2cm first to form more time to grow • Euhedral/straight edges/well formed could grow unimpeded • Orthoclase feldspar crystal shows zoning Credit other acceptable answers			3	3		
		(iii)	Basalt (1)	1			1		
		(iv)	Xenolith/ accept included fragment or enclave(1) Older fragment of country rock (1) Included in the igneous rock as it was intruded (1) or Credit different magma viscosity of basalt (1) Would not mix/homogenise with viscous silicic magma (1)	3			3		
			Question 2 total	6	2	3	11	0	1

Question		• •	Marking dataila	Marks Available							
Q	uesti	on	marking details	AO1	AO2	AO3	Total	Maths	Prac		
3	(a)	(i)	Four – six correct plots (1) or Seven correct plots (2) Line drawn connecting the plots (1) (no credit for line of best fit)	3			3		3		
		(ii)	 Any 2 x 1 from: UK moved North From southern hemisphere to northern hemisphere Crosses equator at 280Ma Moved from 44°S to 50°N/Crossed 94°of latitude Moved at non-linear/variable rate. (Do not credit "moved up") 	2			2		2		
		(iii)	Any 2 x 1 from: 280 - 65 = 215 million years 215/10 = 21.5 Use of 50° 50/21.5 = 2.33° (or 2.3) (1) (Reserved mark)		3		3	3	3		
	(b)		It reveals nothing (1) Same value for all locations on the same line of latitude/ Magnetic inclination does not change along a given line of latitude (1)	2			2				
	(c)		 Any 4 x 1 from: 400 Ma Red ssts/breccias = oxidising conditions Desert/arid/terrrestrial UK hot dry climate 280 Ma Limestone or coal – hot tropical conditions, vegetation rainforest UK on/close to equator warm shallow seas corals- hot tropical condidions 230 Ma red ssts/breccias/evaporites = oxidising conditions terrestrial/dune bedding, desert/arid conditions 100 Ma Chalk = warm seas covered southern England similar to Spain/Med today Must refer to rocks of a mínimum of 2 different ages 	4			4				
			Question 3 total	11	3	0	14	3	8		

C	Quest	ion	Marking Details	AO1	AO2	AO3	Total	Maths	Prac
4	(a)	(i)	Divergent (constructive) (1)		1		1		
		(ii)	K 0.78 Ma (1) L 0.90 Ma (1)		2		2		2
		(iii)	 Any 3 x 1 from: Bands of normal and reversed polarity Bands are linear or ribbon-like Bands are of unequal width Bands run parallel to the ocean ridge Symmetrical pattern about the ocean ridge Bands are offset /not continuous Greater extent of normally polarised crust than reversed. 	3			3		
	(b)	(i)	Number of anomalies = 7 (accept 6) (1)		1		1		1
		(ii)	2,000,000/7 = 0.2857 (1) or 0.286 or 0.29 Ma or 0.3 Ma or 2,000,000/6 = 0.3333 (1) or 0.333 or 0.33 Ma or 0.3 Ma		1		1	1	1
		(iii)	 Any 3 x 1 from: Basalt/mafic rocks Magnetic minerals/magnetite/iron containing minerals Take on orientation/angle of inclination of Earth's magnetic field at the time Pattern locked in/retained/remanent magnetism once below Curie point 	3			3		
	(c)		 Any 2 x 1 from: Along transform faults – differential spreading rates intermittent movement pressure builds up as locked together due to friction then is released reference to volcanic activity 		2		2		

Question	Marking Details	AO1	AO2	AO3	Total	Maths	Prac
(d)	Indicative ContentDecompressive partial melting of mantle produces basalticmagmaAscending mantle convectionPillow lavas formed by submarine eruptions of basaltVertical parallel dolerite dykesMassive and layered gabbroLayered peridotite at the baseSerpentinisation of peridotiteReference to olivine, augite, plagioclase feldsparCrystal size of rocks increase with depthRelates to cooling ratesMagmatic segregation to form layered peridotiteProcess of sea floor spreadingReference to top layer of recent marine sedimentsCredit relevant diagram	6			6		
	 5–6 marks There is a clear response which describes and explains the layered structure and composition of the oceanic lithosphere. A minimum of three layers from pillows/dykes/gabbro/peridotite/marine sediments must be described and explained to achieve maximum marks. An annotated diagram may be expected. There is a sustained line of reasoning which is coherent, substantiated and logically structured. The information included in the response is relevant.						

Question	Marking Details	A01	AO2	AO3	Total	Maths	Prac
	 3–4 marks The response describes and explains the layered structure and/or composition of the oceanic lithosphere and includes reference to a minimum of two layers from pillows/dykes/gabbro/peridotite/marine sediments. 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 response makes some reference to the layered structure and/or composition of the oceanic lithosphere and refers to a minimum of one layer from pillows/dykes/gabbro/peridotite/marine sediments. 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 4 total	12	7	0	19	1	4

	uaati	0 12	Marking dotails	Marks Available							
Q	uesti	on		AO1	AO2	AO3	Total	Maths	Prac		
5	(a)	(i)	 Exfoliation/granular disintegration/insolation/onion skin w. (1) Any two x 1 from: Rock surface heats up/expands during the day Cools/contracts at night Large diurnal temperature range Rock splits into thin layers Credit granular disintegration description up to (2) Credit chemical weathering/salt crystal growth up to (2) No credit for reference to erosion 		3		3				
	(b)	(i)	 Any three x1 from: Clastic/fragmental Poorly sorted Reference to appropriate particle size variation, up to 8cm Angular/sub angular clasts Matrix support Texturally immature 	3			3		3		
		(ii)	 Alluvial fan (1) Any two x 1 from: Poorly sorted = short distance of transport/rapid deposition Angular particles = limited abrasion/attrition=short transport Coarse = high energy 			3	3				

Question	Marking dataila	Marks Available						
Question	Marking details	AO1	AO2	AO3	Total	Maths	Prac	
	Indicative contentDescribes and explains processes of wind and water erosion in deserts and clearly states the differencesAssess the relative effectiveness of wind and waterWind more effective than waterWind erosion – abrasion and attritionVery well sorted sedimentLimited grain size transported 0.25-1.0 mm by windRounded/spherical more so than by water due to air havingless of a cushioning effect as grains collide.Grains transported very long distancesGrains transported for a long timeWind blows almost continually/dailyWater erosion-abrasion, attrition, hydraulic actionSediment poorly sortedSediment sub angular to sub roundedWide range of particle sizes 256 mm down to <1/256 th mmMixture of rock fragments and mineral grainsGrains transported for a short time/durationWater=flash floods, rare events 5–6 marks There is a clear response which discusses the processes of erosion by wind and water and links the characteristics of the sediments to the method, distance and duration of transport. An assessment of the relative effectiveness is made and justified by supporting evidence.		AUZ	6	6			
	coherent, substantiated and logically structured. The information included in the response is relevant.							

Question	Marking details	Marks Available							
Question		AO1	AO2	AO3	Total	Maths	Prac		
	 3-4 marks The response includes reference to processes of erosion, sediment characteristics and transport history. Relative importance of the effectiveness may be inferred rather than clearly stated. 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 response compares erosional processes in a generalized fashion and demonstrates some understanding how transport history can determine sedimentary characteristics. 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	3	3	9	15	0	3		

	ussti	• •	Marking datails	Marks Available							
Q	uesti	on		AO1	AO2	AO3	Total	Maths	Prac		
6	(a)	(i)	Schist (accept gneiss) (1)	1			1				
		(ii)	Dip angle 10°(1) accept range 8°-12°(1) West (1)		2		2	2	2		
	(b)	(i)	 Any 3 x 1 from: Dyke Discordant/cross cuts older structures Linear, tabular, sheet or wall-like in form Intusive/younger than other features 		3		3				
		(ii)	Vertical thickness is 39-23m =16m (1) 16 x cos 61° (accept 59°- 63°)/ 16 x 0.48 (0.51- 0.45) (1) 7.76 metres (accept 7.26 - 8.24) (1)		3		3	3	3		
	(c)		 Any 4 x 1 from: Antiforms and synforms /anticlines and synclines Asymmetrical folds/ limbs different lengths Limbs of equal angle of dip Fold limbs dip at 45° Fold limbs dip to the east and west Folds strike north – south Axial planes are vertical Interlimb angle of 90° Open fold as inter-limb angle between 70° and 120° 		4		4				
	(d)		 Any 4 x 1 from: Rock P is the hanging wall Schist is metamorphic so must be older than sandstone Older rock is thrown over younger So hanging wall is upthrown Formed by compression not tension Normal faults often steep angle, this is very shallow angle Thrust fault/accept reverse fault 			4	4		4		
			Question 6 total	1	12	4	17	5	9		
			Paper Totals	42	32	16	90	12	27		

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