GCE AS MARKING SCHEME

SUMMER 2019

AS (NEW)
GEOLOGY - COMPONENT 2
B480U20-1

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.

GCE AS GEOLOGY

SUMMER 2019 MARK SCHEME

COMPONENT 2 - FOUNDATION GEOLOGY

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.

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
1.	(a)		Trilobite (1)	**1**			**1**		
	(b)	(i)	Eye (1)	**1**			**1**		
		(ii)	**Any two x (1) from:** • Relatively larger in Y than W or vice versa • Extends to underside of cephalon/head on Y • Crescent shaped in W more rounded in Y • Eye contained within cephalon on W eyes project out of cephalon on Y	**2**			**2**		
		(iii)	**Fossil W** Sea floor/benthonic/epifaunal (1) Eyes can only see upwards (1) Spines for support on soft mud (1) Has eyes therefore photic zone/shallow marine (1) or **Fossil Y** **Any four x (1) from :** • Pelagic/nektonic/swimmer • Large eyes for 360° vision/to see predators or prey • Streamlined • Enlarged pygidium for propulsion • Relatively enlarged glabella for buoyancy			**4**	**4**		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(c)		**Any two x (1) from:** • Low energy • Anaerobic/anoxic • Marine		**2**		**2**		
	(d)		**Any four x (1) from:** • Fossil record is biased • Towards marine life • Fossil record is incomplete • Only hard parts are preserved • Scavengers • Some fossils may be destroyed by tectonic/metamorphic activity/weathering/erosion	**4**			**4**		
			Question 1 total	**8**	**2**	**4**	**14**	**0**	**0**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
2.	(a)		Coral (1)	**1**			**1**		
	(b)	(i)	Reference to uniformitarianism or equivalent (1) **And any three x (1) from:** • Shallow • Marine • Warm/tropics • Clear water • Well oxygenated • High energy • Photic zone	**4**			**4**		
		(ii)	Sandstone/red beds (1) Superposition (1) Cross beds are the correct way up or dessication cracks correct way up (1)		**3**		**3**		**3**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(c)		**Indicative content** 1. <u>Limestone</u> Fossil fragments – high energy/death assemblage Coral – high energy 2. <u>Unconformity</u> Erosional surface - high energy 3. <u>Conglomerate</u> Coarse grained – high energy Rounded grains – high energy erosional processes 4. <u>Red Sandstone</u> Large-scale cross beds – dunes/aeolian – high energy/reduction in energy compared to conglomerate/increase in energy compared to mudstone 5. <u>Red Mudstone</u> Fine grained – low energy Desiccation cracks – evaporation – drop in energy			**6**	**6**		**6**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			5–6 marks There is a clear response which describes and explains most of the details linking mudstone, conglomerate, limestone and sandstone to the energy levels during their formation. This includes discussion of **at least 3** of grain size/shape, fossil content, sedimentary structures and the unconformity. *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 response describes and explains many of the details linking some of mudstone, conglomerate, limestone and sandstone to the energy levels during their formation. This includes discussion of **at least 2** of grain size/shape, fossil content, sedimentary structures and the unconformity. Evidence may not be coherently linked to the energy of deposition for all rocks. *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.*						

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			1–2 marks The response describes and explains only a few of the details linking some of mudstone, conglomerate, limestone and sandstone to the energy levels during their formation. This includes discussion of **one or two** of grain size/shape, fossil content, sedimentary structures and the unconformity. There is a lack of detail and explanations are superficial. *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 2 Total	**5**	**3**	**6**	**14**	**0**	**9**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
3.	(a)	(i)	D –Elastic (1) E – Plastic (1) F – Brittle (1)	**3**			**3**		
		(ii)	**Any two x (1) from:** • Smaller elastic zone in Q • Lower yield point/strength in Q • Q does not undergo brittle failure/folds but does not fracture/fault	**2**			**2**		**2**
		(iii)	Hotter deeper in crust therefore more ductile (1)		**1**		**1**		
	(b)	(i)	Folding – E or plastic Faulting – F or brittle		**2**		**2**		
		(ii)	Folding first/faulting last (1) Fault cuts across fold (fig 3b) or Folding occurs before faulting/ductile occurs before brittle deformation as seen in figure 3a (1)		**2**		**2**		
	(c)	(i)	S – Limb (1) T – Hinge/Axial Planar Trace (1)	**2**			**2**		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
		(ii)	$\frac{\text{original length – new length}}{\text{original length}}$ x 100 Original length = 13.9 – 14.7m New Length = 9.7 – 10.1m Both measurements within range recorded (1) Working (1) 27.3 – 34.0% Answer to 3 significant figures (1)		**3**		**3**	**3**	**3**
	(d)		**Any three x (1) from:** • The fault is reverse • Hanging wall gone up/footwall down or equivalent • The folding or reverse fault is due to crustal shortening/compression • Normal faults form due to extension/tension			**3**	**3**		
			Question 3 total	**7**	**8**	**3**	**18**	**3**	**5**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
4.	(a)	(i)	3 correct (2) 2 correct (1) 1-0 correct (0) A – Basaltic B – Andesitic C – Basaltic	**2**			**2**		
		(ii)	**Any three x (1) from:** • Hot rocks brought closer to the surface/isotherm raised • Pressure reduced/decompression • Partial melting • Of mantle peridotite	**3**			**3**		
	(b)	(i)	Location – A or C (1)		**1**		**1**		
		(ii)	Lava erupted under water (1) **Any two x (1) from:** • Rapid cooling • Glassy Skin • Centre stays molten • Tear drop/sagging structure Credit diagrams	**3**			**3**		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(c)		**Indicative content** <u>Volcano A</u> Lava flows – fast moving, low viscosity due to high temperatures. Low silica content and low trapped gas content Eruptions are effusive/passive rather than explosive due to low trapped gas content and low viscosity magma Volcanic gases – poisonous/suffocation – CO_2, SO_2 able to escape due to low viscosity and low silica content magma Credit reference to Ash <u>Volcano B</u> Pyroclastic flows – mass movement of volcanic ash and gas linked to the collapse of the eruption column in an explosive eruption Lateral blasts/explosions due to increased silica content, high viscosity, lower temperature magma blocking vent, gases cannot escape Ash formed as explosive eruptions cause dissolved gases to rapidly expand Credit reference to Lahars/Tsunami	**6**			**6**		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			5–6 marks There is a clear and purposeful response which describes **at least two** of the hazards produced by volcanoes A or B. Hazards are clearly and explicitly linked to the composition and characteristics of the magma generated, including at least two of viscosity, temperature and gas content. *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 response describes and explains **at least two** of the hazards produced by the chosen volcano. Hazards show some link to the composition and at least two of the magma characteristics viscosity, temperature and gas content. *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 describes **at least one** hazard produced by the volcano but fails to link the hazards to the magma composition and characteristics. The response may lack detail and contain irrelevant information. *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.*						

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			0 marks *No attempt made or no response worthy of credit*						
			Question 4 Total	**14**	**1**	**0**	**15**	**0**	**0**

<table>
<tr><th colspan="3" rowspan="2">Question</th><th rowspan="2">Marking details</th><th colspan="6">Marks Available</th></tr>
<tr><th>AO1</th><th>AO2</th><th>AO3</th><th>Total</th><th>Maths</th><th>Prac</th></tr>
<tr><td>5.</td><td>(a)</td><td></td><td>Axial plane of syncline or anticline drawn in the appropriate location (1)</td><td></td><td>1</td><td></td><td>1</td><td>1</td><td>1</td></tr>
<tr><td></td><td>(b)</td><td></td><td>Dyke (1)
Linear (1)
Cross cutting (1)</td><td></td><td>3</td><td></td><td>3</td><td></td><td></td></tr>
<tr><td></td><td>(c)</td><td></td><td>Phenocrysts to scale (1)
Groundmass to scale (1)
Phenocrysts more euhedral than groundmass (1)
Phenocrysts make up a minimum of 25% of the rock (1)</td><td></td><td>4</td><td></td><td>4</td><td>1</td><td>4</td></tr>
<tr><td></td><td>(d)</td><td>(i)</td><td>Straight line below isochron (1)
K older than J (1)
J cross cuts K (1)
Sm^{147} decreases/Nd^{143} increases with time (1)</td><td></td><td>4</td><td></td><td>4</td><td></td><td>4</td></tr>
<tr><td></td><td></td><td>(ii)</td><td><table><tr><th>Plagioclase</th><th>Whole Rock</th><th>Clinopyroxene</th><th>Orthopyroxene</th></tr><tr><td>2</td><td>• 1</td><td>• 3</td><td>5</td></tr><tr><td>• 6</td><td>3</td><td>9</td><td>15</td></tr></table></td><td></td><td>3</td><td></td><td>3</td><td>3</td><td>3</td></tr>
<tr><td></td><td></td><td></td><td>Question 5 total</td><td>0</td><td>15</td><td>0</td><td>15</td><td>5</td><td>12</td></tr>
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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
6.	(a)	(i)	$\frac{\text{Velocity at V – Velocity at U}}{\text{Velocity at V}}$ x100 V = 8.7km/s (8.6– 8.8) U = 7.8km/s (7.7 – 7.9) Both measurements within range recorded (1) Working correct (1) Correct answer to 3 significant figures (1)		**3**		**3**	**3**	**3**
		(ii)	Mantle rocks (peridotite) are close to their melting points (1) Reduction in rigidity/ductile/incompressibility (1)	**2**			**2**		
	(b)		Asthenosphere is ductile (1) Allows lithosphere to move above it (1)	**2**			**2**		
	(c)	(i)	Subduction (1) Oceanic crust denser than continental crust (1) **Any two x (1) from:** • Eclogite denser than surrounding mantle • By 3.5 compared to 3.2 • Sinks and pulls rest of plate	**2**	**2**		**4**		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
		(ii)	Mantle drag force (1) **Any two x (1) from:** • Convection cells in the asthenosphere • pull bottom of plates • Away from mid ocean ridges or Ridge push (1) **Any two x (1) from:** • New material created at mid ocean ridge pushes older material aside causing movement • Gravitational potential difference – ridge more elevated than slab	**3**			**3**		
			Question 6 total	**9**	**5**	**0**	**14**	**3**	**3**
			Paper Totals	**43**	**34**	**13**	**90**	**11**	**29**