GCSE MARKING SCHEME

SUMMER 2018

GEOLOGY
4250/01

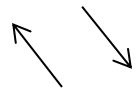
INTRODUCTION

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.

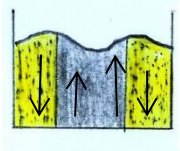
It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

GCSE Geology – On-screen Examination 2018

Section	Question	Answer	Mark	Total
1	1	reaction with organic acids is a process of biological weathering (1) chemical weathering of the limestone gravestone by weak acids has made the date difficult to read (1)	2	
	2	54/36 = 1.5 ratio 1:1.5 Correct answer (2) if incorrect check calculation for possible 1 mark (1)	2	
	3	Relative **strength** of shale and sandstone (or ratio 1:1.3) (1) **relative resistance** of shale and sandstone (1) **scarp** in sandstone/**vales** in shale alternatives; shale bedded - weak least resistant sandstone massive-strong resistance	3	
	4	CO_2 levels are lowest during glacial periods at approximately 160ppm (1)	1	
	5	ice cores (1) bubbles in ice (1) trapping or equivalent of atmospheric composition (1)	3	
	6	formation and burial of limestone leads to an increase in CO_2 in the atmosphere (1)	1	
	7	solar (1) wind (1)	2	
	8	albedo effect (1) larger area - increased reflection of heat (1) cooler (1) OR smaller area- less reflection (1) hotter (1) credit absorption of CO_2 in greater volume of ocean up to 3 marks	3	
	9	could be caused by global warming or melting Arctic sea ice (1) when a weather event is significantly different from the historical average (1)	2	**19**
2	1	in San Francisco earthquake intensity was IX on the Modified Mercalli Intensity Scale (1)	1	
	2		1	
	3	conservative (1)	1	
	4	a transform fault (1) a strike-slip fault (1)	2	
	5	shallow focus earthquakes only (1)	1	
	6	VIII (1)	1	
	7	Foundations modified e.g. rubber bearings (1) strong metal frame bracers (1) building materials e.g. precast concrete (1) or other acceptable solutions description required for 2 marks	2	
	8	24 000 000cm/ 4000000 years = 6 cm/year Correct answer (2) If incorrect check calculation for possible 1 mark	2	
	9	levels reached their peak one month before the earthquake(1) for two months before the earthquake levels went up and down frequently but the general trend was a decrease(1)	2	**13**

<table>
<tr><th>Section</th><th>Question</th><th>Answer</th><th>Mark</th><th>Total</th></tr>
<tr><td>3</td><td>1</td><td>
<table>
<tr><th>texture</th><th>Sample A</th><th>Sample B</th></tr>
<tr><td>grain size</td><td>fragment from A is coarse grained</td><td>fragment from B is medium grained (1)</td></tr>
<tr><td>grain shape</td><td>fragment from A is angular (1)</td><td>fragment from B is subrounded to rounded</td></tr>
<tr><td>sorting</td><td>poorly sorted (1)</td><td>well sorted (1)</td></tr>
</table>
</td><td>4</td><td></td></tr>
<tr><td></td><td>2</td><td>breccia</td><td>1</td><td></td></tr>
<tr><td></td><td>3</td><td>formed by wind blowing from the north east (1)
formed by wind blowing towards the south west (1)</td><td>2</td><td></td></tr>
<tr><td></td><td>4</td><td>C trace fossil (1)
D desiccation cracks (1)</td><td>2</td><td></td></tr>
<tr><td></td><td>5</td><td>• coarse bed high energy poorly sorted angular erosional surface not transported far channel/wadi? uses fig 9 and 10 (1)
• sandstone dune cross bedding well sorted rounded desert arid uses fig 9 10 11 12 (1)
• shale water drying out desiccation cracks red continental lake? uses fig 9 and 12 (1)
• halite evaporation wet high temperature low energy lake? uses fig 9 (1)
• grain size decrease suggests lowering of energy
Any one piece of evidence well explained = 2 marks
Any less well explained evidence = 1 mark QWC</td><td>4</td><td>13</td></tr>
<tr><td>4</td><td>1</td><td>granite E is older than the Leadhills Fault (1)
the Leadhills Fault is older than the Lower Palaeozoic rocks (1)</td><td>2</td><td></td></tr>
<tr><td></td><td>2</td><td>partial melting of continental crust beneath a fold mountain(1)</td><td>1</td><td></td></tr>
<tr><td></td><td>3</td><td>flood basalts (1)</td><td>1</td><td></td></tr>
<tr><td></td><td>4</td><td>G (1)</td><td>1</td><td></td></tr>
<tr><td></td><td>5</td><td>the texture suggests two stages of cooling (1)
the rock is basalt (1)</td><td>2</td><td></td></tr>
<tr><td></td><td>6</td><td>pillow lavas</td><td>1</td><td></td></tr>
<tr><td></td><td>7</td><td>Lava/magma (1)
extruded into water (1)
surface cools quickly forming skin (glassy)(1)
lava fills skin like a balloon / vesicles trapped (1)
pile on top of each other/ moulded bottom surface (1)</td><td>3</td><td></td></tr>
<tr><td></td><td>8</td><td>minerals in the rock are formed by recrystallisation (1)
non-foliated (1)</td><td>2</td><td></td></tr>
<tr><td></td><td>9</td><td>Test 1 hardness: test with a steel pin/penknife/test with copper coin (1) (1)
Result: metamorphosed sandstone not scratched by steel pin/penknife but marble is (1)
Test 2 streak (1)
Result:marble white streak, metamorphosed sandstone none (1)
OR cleavage (1)
marble minerals have three, metamorphosed sandstone minerals have none (1)
OR dilute HCl (1)
marble reacts, metamorphosed sandstone does not (1)</td><td>4</td><td>17</td></tr>
</table>

Section	Question	Answer	Mark	Total
5	1	the beds in all three boreholes are the correct way up (1)	1	
	2	not limited to a specific environment (1)	1	
	3	formed by deposition on the continental shelf during the Cambrian Period (1)	1	
	4	changes in **suture line** (1) from zig zag to frilly/more complex (1) e.g. goniatites zigzag, ammonites frilly (1) easily identified / rapid changes (1) explanation of correlation/reference to relative dating (1)	3	
	5	single cells such as bacteria (1)	1	
	6	extinction of the dinosaurs (1) a mass extinction event (1)	2	
	7	Oceans/underwater (1) hot water (1) hydrothermal vents (1) black smokers (1) ocean ridge/volcanic (1) reference to chemistry of water (1)	3	**12**
6	1	→	1	
	2	difference in width of sandstone noted (1) sandstone outcrop wider in west/narrower in east (1) shallower dip in the west/steeper dip in the east(1)	2	
	3	the axial plane of the fold dips towards the west (1)	1	
	4	 (1) downthrow side is on side of younger rock - sandstone / shale is upthrown (1) faults have to be vertical not dipping (1)	3	
	5	seismic survey (1)	1	
	6	anticline (1)	1	
	7	P (1)	1	
	8	reservoir rock is less well cemented	1	
	9	low energy organic-rich conditions, often anaerobic (1)	1	
	10	squeezed out of source rock (1) due to compression/burial (1) oil less dense than water (1) migration upwards through reservoir rock (1) because reservoir rock porous. (1) reservoir rock permeable (1) stopped by impermeable cap rock (1) unconformity trap (1) QWC	4	**16**
7	1	a linear pattern orientated NE-SW approximately 175m wide (1)	1	
	2	a straight vertical vein under part of the area (1)	1	
	3	1/0.005 = 200 Correct answer (2) if incorrect check working for (1)	2	
	4	grow plants (1) then disposal/recycling (1) credit reference to phytomining (1) OR remove soil (1) replace with new soil (1)	2	

Section	Question	Answer	Mark	Total
	5	**Quarry S many negatives** leakage of toxic leachate (1) emits methane gas but can be collected (1) permeable limestone (1) but can be engineered with liner (1) dips towards wells (1) affects water supply/aquifer (1) river unlikely to be affectedas up dip(1) some wells deep so unaffected (1) **Quarry T fewer negatives** leakage of toxic leachate (1) emits methane gas but can be collected (1) impermeable shale contains leachate (1) can be engineered with liner in addition to shale (1) may affect SSSI (1) but SSSI up dip (1) may affect springs at shale boundary but up dip (1) mark reasons not chosen quarry; also credit reasons for not choosing the alternative quarry **Ignore non-gelogical reasons**	4	**10**
		Paper Total		**100**