GCSE MARKING SCHEME

SUMMER 2016

GEOLOGY
4250-01

INTRODUCTION

This marking scheme was used by WJEC for the 2016 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.

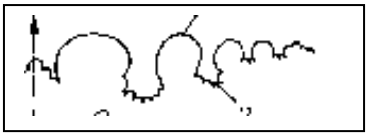
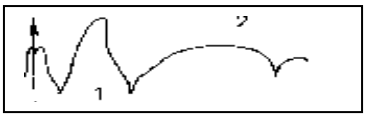
It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

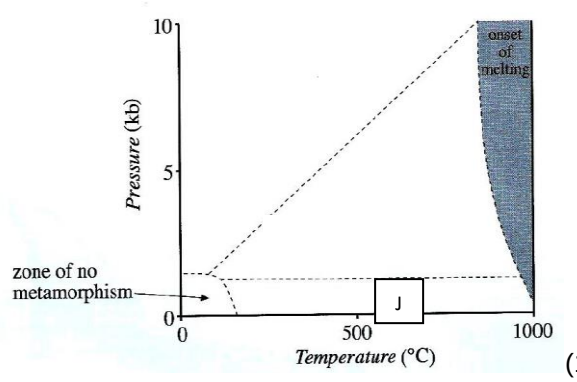
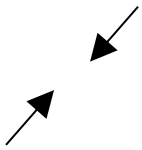
WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

GCSE GEOLOGY

SUMMER 2016 MARK SCHEME

Section	Question	Answer	Mark	Total
1	1	joints are approximately horizontal and vertical	1	
	2	freeze/thaw (1) water enters joints (1) freezes (1) expands (1) forces joint open (1) repeated (1) blocks fall off (1) any **three**	3	
	3	removal of weathered material by water, ice, wind or gravity (1) wearing down of sand grains by collision with other grains (1)	2	
	4	the texture suggests slow cooling at depth (1) feldspar is the most abundant mineral with less quartz and mica (1)	2	
	5	quartz/feldspar hard (1) quartz no cleavage (1) interlocking crystalline (1) non-porous (1) resistant to physical weathering (1) any **three**	3	**11**
2	1	between 1980 and 2012 the area covered by sea ice was reduced by approximately 50% (1) there was less ice on the north coast of Russia in 2012 than in 1980 (1)	2	
	2	melting of sea ice (1) explanation e.g. global warming/climate change (1)	2	
	3	in 2100 sea level could be 500 mm higher than 2008 (1) in 1950 sea level was approximately 10 cm lower than 2008 (1)	2	
	4	**Eustatic** (1) Pleistocene glaciations (1) ice melts in interglacial (1) sea level rises, erodes old cliff line and deposits beach (1) glacial - ice expands sea level lower/lower today (1) **or** **Isostatic** (1) Pleistocene glaciations (1) glaciation - land covered in ice (1) weight of ice pushes crust down (1) higher relative sea level erodes old cliff and deposits beach (1) ice melts interglacial/present day (1) land rises (1) QWC	4	
	5	the enhanced greenhouse effect is caused by increased carbon dioxide in the atmosphere from burning fossil fuels	1	
	6	the injection of carbon dioxide into exhausted oil traps (1) absorption of carbon dioxide by plants during photosynthesis followed by burial (1)	2	
	7	volcanic gases contain carbon dioxide which enters atmosphere (1) carbon dioxide is a greenhouse gas/increases global temperature (1) accept answers referring to water vapour/volcanic ash	2	**15**

Section	Question	Answer	Mark	Total
3	1	graptolite	1	
	2	stipes (1) reduce in number with time e.g. 8,4,2,1 (1) accept other changes described e.g. pendent/scandent or thecal shape	2	
	3	coral	1	
	4	 **2**  **3**  **1** all correct for (2) (computer marked) if zero award (1) for one correct	2	
	5	fossil **B** restricted environment (1) fossil **C** widespread different environments (1) fossil **C** swimmer (1) fossil **B** lives on sea bed (1) any **three**	3	**9**
4	1	0.5 - computer marked (2) if incorrect check to see if calculation worth (1)	2	
	2	reached flat abyssal plain/decrease in gradient	1	
	3	the grains fine upwards (1) the structure is graded bedding (1)	2	
	4	clast **Q** is an angular fragment (1) poorly sorted (1) medium-grained clasts (1)	3	
	5	higher the energy larger the grain size (1) bed **D** medium to coarse sand (1) bed **E** fine-grained/clay (1) decrease in energy between **D** and **E** (1) bed **E** deposited from suspension (1) any **three**	3	
	6	turbidites and black graptolitic shale – Lower Palaeozoic (1) till and flood basalts – Cenozoic (1) limestones and clays with ammonites present – Mesozoic (1) coral limestone overlain by coal and cross-bedded well sorted sandstones – Upper Palaeozoic (1)	4	
	7	coral limestone – tropical (1) coal – tropical (1) cross-bedded well sorted sandstones – desert (1) Mesozoic limestones – warm seas (1) till – glacial (1) palaeomagnetism (1) drift northwards with time (1) must use rocks **and** fossils **and** refer to **drift north** for full marks QWC	4	**19**

Section	Question	Answer	Mark	Total
5	1	the outcrop of the granite is discordant (1) boundary **Z–Z** is an unconformity (1)	2	
	2	1 (1) recognise granite as pluton (1) recognise fold as anticline (1)	3	
	3	correct order as follows: intrusion of granite deposition of sandstone and limestone uplift and erosion of black and grey slate folding of black and grey slate if incorrect check to see if **two** correct for (1)	2	
	4	superposition of strata	1	
	5	the strike direction of the cleavage in the slates would be **N-S** (1) slate is formed by regional metamorphism (1)	2	
	6	crystalline (1) non-foliated (1)	2	
	7	 (1) in metamorphic aureole (**Fig 12**) - heat only (1) non-foliated (**Fig 13**) - no pressure (1) crystalline (**Fig 13**) - heat (1) must have one mark from **Fig 12** and one from **Fig 13**	3	**15**
6	1	earthquakes show the position of a rift valley (1) earthquakes are deepest under the trench (1)	2	
	2		1	
	3	andesitic lava – at the surface of an island arc system (1) basalt with pillow structures – at the axis of a mid-ocean ridge (1) granite batholith – at a depth of 10 km within a fold mountain chain (1)	3	
	4	the higher the viscosity of the magma the steeper the volcanic cone (1) andesites produce explosive volcanoes (1)	2	
	5	ore minerals – minerals containing valuable metal (1) semi-precious stones – minerals which are rare and valued for their appearance (1) gangue minerals – waste minerals found with useful minerals (1)	3	

Section	Question	Answer	Mark	Total
6	6	**granites** (1) provide hot water (1) left from crystallisation (1) or heat groundwater (1) hot water dissolves minerals (1) rises through **fractures/faults** (1) cools, crystallises around **granites** (1) or along **faults** (1) not all faults or granites have hydrothermal minerals (1)	4	
	7	pollution of groundwater/soils/rivers by metals/acids (1) impermeable (1) plastic liner **prevents toxic chemicals entering groundwater** (1) collection of leachate which is then treated and disposed of (1) look for description **not** restatement of diagram	3	**18**
7	1	**N** halite (1) **P** calcite (1)	2	
	2	evaporation in the deep ocean will produce thicker evaporite deposits (1) slow subsidence of the shallow basin would not allow thick evaporates to form (1)	2	
	3	**Y** and **Z**	1	
	4	high porosity and high permeability	1	
	5	16 % (2) if incorrect check to see if calculation worth (1)	2	
	6	seismic survey (1) description e.g. method, geological structures (2) credit gravity survey (1) description e.g. low density salt domes (2)	3	
	7	Examples of possible answers • oil washed ashore effect on wildlife such as birds, coastal ecosystems, food chain • deeper water effect on plankton /benthonic organisms, ecosystems, food chain	2	**13**
		Paper Total		**100**