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GCE MARKING SCHEME

SUMMER 2018

GCE (LEGACY) GEOLOGY - GL4 1214/01

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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.

GCE GEOLOGY - GL4 (LEGACY)

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SECTION A

Question 1

(a)	(i)	Granite (1)	[1]
	(ii)	A – Clay minerals (1) B – Iron (oxides) (1)	[2]
	(iii)	Holistic Hydrolysis (R) Hydrogen (and OH) ions in water reacts with minerals particularly of feldspars e.g to give kaolin Oxidation (R) Oxygen reacts with minerals. particularly of iron-rich minerals (biotite, hornblende) (Maximum 3 marks)	[3]
	(iv)	Quartz is lowest in reaction series or vice-versa (1) Quartz is less reactive or vice-versa (1) crystallises at a lower temperature/600 deg or vice-versa (1) More stable at lower temperatures/ closest to crystallisation temp or vice- versa (1) Feldspar has or Quartz lacks cleavage- increases/decreases surface area weathering (1) (Max 3 marks)	for
(b)	(i)	w = \sim 17 cm (range 15 - 19 cm) (1) l = \sim 33 cm (range 31 - 35 cm) (1) Y = angular, rectangular or equivalent versus Z = rounded (1)	[3]
	(ii)	Size joint or fracture R joint or fracture density greater ratio of surface area to volume Shape spheroidal weathering chemical weathering of the corners where the surface area is great	est
		produces rounded blocks size of the block in proportion to the weathering of corners (Max 3 marks)	[3]

(a)	(i)	0.25 GPa (range 0.23 – 0.27) (1) [2	
	(ii)	Maximum Temperature – 600 (range 595 – 605) (1) sillimanite (1) Maximum Pressure – 0.56 (range 0.53 – 0.59) (1) kvanite (1) [4]	41
(b)	(i)	Regional (1)	- 1]
	(ii)	 Buried to increasing depth (1) resulting from continental collision, orogeny/destructive/convergent plate margin/subduction (1) Uplift and/or erosion (1) resulting from crustal shortening/converging plates or equivalent (1) (max 4 marks) 	4] 41
(c)	(i)	No schistose texture/ random orientation of crystal/not foliated (1) No sillimanite present/only andalusite (1)	.1
	(ii)	Pathway 2 low pressure - contact metamorphism (1) only in andalusite zone (1) (max 1 explanation mark) (Max 3 marks)[3Sillimanite formed when the temp/pressure was higher earlier along pathway recrystallisation too slow for complete change to more stable andalusite not enough energy to enable change to occur Credit retrograde metamorphism (Max 2 marks)[3	3] 21

(a)	(i)	Axis (1)	
		Axial Plane trace (1)	[2]

(ii) V shape to north and wider than to the south of the fault (1) V shape to the north centred on the APT (1)

[2]



(a)	(i)	African (1)	[1]
	(ii)	Holistic linear track/volcanic centre has moved age gets older to the North (India) and vice versa. volcanism become extinct further from Réunion both plates show track/trend. (Max 2 marks)	[3]
	(iii)	Holistic rising hot rock/convection current (not rising liquid) rising plume locally hotter than the surrounding mantle causes partial melting at the base of the lithosphere/mantle peridotite decompression melting	
		(Max 3 marks)	[2]
(b)	(i)	$\begin{array}{cc} 0.04 \text{ x } 2 \text{ Ma} = 80,000 \text{ km}^3 \\ (1) & (1) \end{array}$	[2]
	(ii)	Holistic Deccan large plume head (initially) at Deccan Traps compared with smaller tail (later) at Reunion large volume of magma over a short time greater rate of eruption (Max 3 marks)	[3]
(c)	Holisti	 C – K/T mass extinction credited (dinosaurs, ammonites etc) was ~66 Ma Volcanic winter – short term fires, ash, soot, dust, SO₂ in atmosphere reduces photosynthesis by blocking sun Global Warming – Long term increased CO₂ – Ozone depletion acid rain – death of primary producers (Max 4 marks) 	[4]

SECTION B

Question 5

(a)	4. V 3. V 2. E 1. T (1 m	Vrekin Fault Vrekin Quartzite (WQ) Dolerite (D) Fuff (Z) ark per correct pair in order)	[3]
(b)	(i)	More resistant rocks (1) Fault controlled (1) Faults run NE-SW (1) (max 2 marks)	[2]
	(ii)	Holistic underlain by impermeable rockt base of steep ridge - runoff springline – stream fed valley (max 2 marks)	[2]

Total 7 marks

 (a) Granophyre is plutonic/intrusive (1) The granophyre-tuff boundary is discordant/cuts across/has enclosed a tongue of the tuff (1) granophyre is younger than the tuff (or dates stated) (1) (Max 2 marks) [2]

(b)

(c)

(i)		
Rock Type	Igneous	sedimentary
Dip Angle (degrees)	Not applicable	• 40
Dip Direction	Not applicable	• SE
Age	Precambrian	Cambrian
Date	560 Ma (± 1 Ma)	533 Ma (± 13 Ma)
Fossil content	Not applicable	unfossiliferous

Incorrect because: (ii) quartzite is younger / or dates stated (1) no baking/metamorphism of sedimentary rock/chilled margin (1) included fragments of granophyre (1) weathered surface (1) (max 3 marks) [3] (iii) unconformity (1) [1] (i) ripple marks (1) [1] (ii) Holistic shallow water (accept intertidal/marine, lake but NOT river) wave dominated - symmetric ripples sandy beach high energy at base - pebbles/conglomerate/breccia (max 3 marks) [3] (iii) Holistic fossil record is bias in favour of marine organisms with resistant body • living in low energy environments – conglomerate high energy • natural processes can distort or destroy (predation, scavenging, • erosion on beach) diagenesis, decay, weathering/erosion on exposure • Cambrian period - less life to be preserved •

- freshwater lacks marine fossils
- Other fossils not yet found etc.

(Max 4 marks)

[4]

[3]

(a) (i)
$$2.41 * 60 + 2.46 * 40 = 144.6 + 98.4 = 243 = 2.43$$

100 100 100 (1) (1) (2]



 (iii) More dense/less dense – greater mass /less mass (1) More mass/greater density – greater attraction/gravity anomaly/gravity units(1) Precambrian (higher density) v LMS (lower density) (1) Ref to effects of Cluddley and Wrekin faults (R) (2 marks +R)

[3]

Total 8 marks

(a)	(i)	1.9cm or 2.0cm (split seam) * 10 = 19m -20m	[2]
	(ii)	faulting (1) coal splitting (1)	[-]
		washouts (1) variation in seam thickness (1)	
		previous mining removed more than expected (1)	
		collapse of previous mine workings (1)	[2]
	(iii)	Holistic involving:	
		surface/groundwater pollution,	
		waste tipping,	
		dust/air quality	
		noise/vibration,	
		visual intrusion	
		land stability	
		loss of wildlife habitat/recreation amenities/heritage/archaeology.	
		Retention of topsoil	
		(max 4 marks)	[4]

Total 8 marks

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