GCE MARKING SCHEME

SUMMER 2019

GEOLOGY - GL1
1211/01

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 GEOLOGY - GL1

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1. (a) (i) dip direction north (1)
dip angle: accept 50°-60° (1)

(ii) Mesozoic rock – arrow pointing into Jurassic limestone **OR** rock **A** (1)
Unconformity junction between Ordovician and Carboniferous **OR**
Unconformity junction between Jurassic and Carboniferous (1)

(iii) Rock A Dolerite (1)
Formed Permian or Triassic (1)

(b) (i) half-life 700 million years (1)

(ii) 225 million years (accept 201 to 249 million years) (1)

(iii) Accept 2 max of
Possible loss of daughter atoms (1)
Daughter atoms not retained until cooled below blocking temperature/curie point (1)
Minor intrusion will cool over a considerable time period (1)

(iv) Yes, upper part dyke (1)
Discordant to Carboniferous (1)
No, lower part sill (1)
Concordant with bedding in Ordovician (1)

Total 14

2. (a) (i) Accept 3 max of:
Three sets of joints (1)
Vertical/near vertical (1)
Horizontal/sub-horizontal (1)
Intersect at right angles/90° (1)
Unevenly distributed (1)

(ii) Accept 2 max of:
Cooling (1) and contraction (1)
Pressure release/unloading/dilatation (1) as mass eroded from above (1)
Credit reference to tectonics/orogeny-(Variscan) (1)

(iii) freeze-thaw/frost shattering (1) Credit reference to chemical or biological processes
Water enters joints and freezes (1)
Expands by 9% and sets up internal stresses (1)
Repeated many times (1)
1 mark for named process, 2 marks for explanation/elaboration

(b) (i) Orthoclase feldspar (1)

(ii) Accept 4 max of:
Porphyritic (1) (R)
Crystalline (1)
Euhedral (1) Phenocrysts (1)
Finer grained groundmass (1)
Flow banding/alignment of long axes of phenocrysts (1)
Credit reference to sizes (1)

(iii) Accept 3 max of:
Two stage cooling (1)
Phenocrysts formed first/slow cooling (1)
Groundmass formed later (1) rapid cooling (1)
Credit reference to initially at depth/slow then later moved up/cooled faster
Credit reference to flow banding/convection

Total 16

3. (a) (i) J-K convergent continental-continental (1)
L-M convergent oceanic-continental (1)
N-P divergent (1)

(ii) Island arc – Malaysian Islands north east of dashed line (1)
Transform fault – any of the faults on the Carlsberg ridge (1)

(b) (i) Accept 3 max of:
Continental crust is very thick here/twice the average 70-90 km thick (1)
Magma is granitic/silicic due to high silica content (1)
Any magma generated at depth will crystallise before reaching the surface (1)
Crustal shortening/thickening/collision zone (1)
No subduction (1)
Reference to both plates being of the same density (1)

(ii) Accept max 2 of:
Movement of magma (1)
Crustal extension (1) normal faulting (1)
Credit reference to movement along transform faults

(iii) Accept max 3 for L-M or N-P only. Max 4 for both.
L-M andesitic magma (1)
Produced by partial melting of the mantle/subducted plate (1)
Higher silica content/viscous (1) High gas pressure (1)
Credit reference to release of water and lowering melting point of mantle/lower crust(1)

N-P basaltic magma (1) Low silica content/low viscosity (1)
Produced by partial melting of the mantle (1)

Total 14

4. (a) (i) Horizontal line drawn between the valves on fossil Q (1)
Vertical line drawn through the middle of fossil R, through feature T (1)

(ii) Fossil Q = Bivalve Fossil R = Brachiopod (1)
Both correct for 1 mark

(iii) S = Umbo/beak (1) T = Pedicle opening/foramen (1)

(b) (i) Accept max 3 of:
Rise from 10/15 genera to 200 genera 500-480 Ma (1)
Fluctuates 480 – 250 Ma from 200 to 120 genera (1)
Sudden drop at 250 Ma to 30 genera from 200 genera (1)
250 Ma to present lower number of genera fluctuating 20 - 70 genera (1)
Drop to just 12 genera 66 Ma (1)
Slight increase from 50 Ma to present (1)
Credit ref to changes during the eras rather than Ma

(ii) Brachiopods:
Evolved earlier (1)
Reached peak much earlier (1)
Fewer species than bivalves Triassic onwards (1)
Affected by PT extinction more than bivalves (1)
Any 2 from the above 1 mark each (Accept vice-versa.)

(iii) Pyrite/Iron Pyrite (1)
Original shell material dissolved (1) then replaced by iron pyrite (1)

(iv) Accept 3 max of:
Marine organisms (1)
Many are benthonic living on or in sea bed (1)
Live in an environment of sediment accumulation (1)
Long time ranges through geological time (1) Abundant (1)
Had hard shells suitable for preservation (1)

Total 16