GCE MARKING SCHEME

SUMMER 2018

GCE (LEGACY)
GEOLOGY - GL1
1211/01

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.

GCE GEOLOGY - GL1 (LEGACY)

SUMMER 2018 MARK SCHEME

Q1 (15 marks)

(a) (i) Limestone (1)

(ii) NW – SE (1) (accept 135°-315°)

(b) (i) Both edges of graph to start at 0.5 mm (1)
Highest point on the graph is at 8.0 mm or slightly higher in the centre (1)

(ii) Fine grained at the edges (chilled margins) due to rapid cooling (1)
Larger crystals in the centre due to slower cooling (1)

(c) (i) Orthoclase Feldspar (1)

(ii) Max 2 of
Crystalline or reference to crystals (1)
Porphyritic or reference to phenocrysts or groundmass (1)
Reference to crystal size of phenocrysts or groundmass (1)
Also
Reference to long axes alignment of phenocrysts/flow texture (1)
or
Credit random orientation of groundmass (1)
although credit both if clear which refers to Phenocrysts and Groundmass

(iii) Max 2 of
Two stage cooling (1)
Phenocrysts formed first – slow cooling at depth (1)
Groundmass crystallised later – more rapid cooling nearer surface (1)
Must refer to order of crystallization and cooling rate for 2 marks

(iv) Max 4
Sill (1) most likely but could be a vertical dyke (1)
Concordant to the bedding or not discordant (1)
Linear, tabular or sheet-like in shape (1)
Two baked margins = sill/dyke (1)
Crystal size is too large to be a lava flow (1)
Wrong shape, too small to be a pluton (1)

Q2 (15 marks)

(a) Max 2 of
Horizontal beds are above folded rocks (1)
Included fragments of shale in breccia (1)
Ammonite fossils are above trilobite fossils (1)
Credit reference to fault stopping at the unconformity (1)

(b)

dip direction of fold axes	• south	1
dip angle of fold axes	• 60° accept 55° - 65°	1
strike orientation of the axial plane traces	• east – west or west – east or 90°-270°	1
symmetry of folds	• asymmetrical/ none-limbs different lengths	1

(c) (i) Normal Fault (1)
Hanging wall downthrown or Footwall upthrown
or Fault dips towards the downthrown side (1)

(ii)

vertical displacement (throw)	• 10 metres (allow 8-12 metres) (1)
horizontal displacement	• 15 metres (allow 13 -17 metres) (1)
type of tectonic stress	• Tension/extension (1)

(d) Max 4 of
Shale low energy (1)
Unbroken ammonite fossils (1)
Clay minerals can only settle out under very low energy conditions (1)
Breccia unconformable/coarse grained/erosion surface (high energy) (1)
Angular/poorly sorted high energy but short distance of transport (1)
Limestone high energy (1)
Broken corals (1)
Uniformitarianism corals shallow water/wave action/oxygenated water (1)
Holistic must refer to change in energy across the sequence
Max 1 if no reference to energy

Q3 (16 marks)

(a) (i) Reference to something being older or younger than something else (1)

(ii) Max 3 (including at least one explanation mark) of
Pluton is older than the Quaternary sediments (1) does not cut sediments (1)
Pluton is younger than the Mesozoic sediments (1) as pluton cuts through them/metamorphism of sediments (1)
Pluton is younger than the Precambrian schist (1) as pluton cuts schist (1)
No credit for stating it is 60 Ma

(iii) Triassic, Jurassic, Cretaceous
Two correct = 1 mark Three correct = 2 marks
If four boxes ticked then 1 mark max
If five boxes ticked then no marks

(b) (i) Time taken for half the original parent atoms to decay (1)

(ii) 25 and 75 on the bottom line (1)

(iii) 3 x 1251 (1)
3753 million years (1)

(iv) Max 3 incl reserve of
Older at P/younger date obtained at Q (1) R
Contact metamorphism/aureoleby pluton has re-set the clock (1)
Daughter atoms lost due to be heating above 300 C (1)
Credit reference to blocking temperature (1)

(d) Max 3 of
Limited/restricted use (1)
Short half-life 5730 years can only date back to 60,000 – 75,000 years (1)
Can only date organic matter not minerals (1)
Quaternary is up to 2.6 million years old can only date last 3% of Quaternary (1)
All other rocks far too old (1)
Holistic

Q4 (14 marks)

(a) (i) Maximum temperature 200 C
Maximum depth 12 km (1) (Allow 11-13 km)
Both needed for 1 mark

(ii) Igneous – box on right
Contact metamorphism top centre
Regional metamorphism lower centre
Two correct (1) Three correct (2)

(iii) Max 2 of
Mineral content of parent rock (1)
Water content of rocks (1)
Depth of burial/amount of pressure (1)

(b) (i) Mineral X = Biotite Mica , Mineral Y = Chiastolite (1) Both correct for 1 mark

(ii) Mudstone, Clay, Claystone, Shale or Siltstone (1) (Accept greywacke,arkose, slate and schist)

(iii) Max 2 of
Foliated/Gneissose banding in 4b Non-Foliated/Random crystal orientation in 4c or implication-banded/layered (1)
Granoblastic/Equicrystalline in 4b Porphyroblastic in 4c (1)
Coarse grained in 4b and finer grained in 4c (1)

(iv) Figure 4b = N (1)
Figure 4c = L (1)

(v) Max 3 of
Convergent/destructive plate margin (1)
Associated with formation of a fold mountain belt/continental collision (1)
Ref to subduction/burial of rock (1)
Ref to increase in temperature and pressure (1)
Recrystallization under directed stress (1)
Holistic