GCE MARKING SCHEME

SUMMER 2019

GCE (LEGACY)
GEOLOGY - GL5 (OPTION 1)
1215/01

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 - GL5 (LEGACY)

OPTION 1

SUMMER 2019 MARK SCHEME

1. (a) (i) Loch Morar is straighter (1) shorter (1) no tributaries (1) deeper (1) steeper (1) U shaped (1), Credit reverse if Milford Haven is used as the example. Milford Haven is V shaped (1). Max (2)

(ii) Different erosion processes created valleys (1) – Loch Morar is glacial, Milford Haven fluvial (1). Loch Morar –fjord, Milford Haven – ria (1). Max (2)

(b) eustatic change (1) as ice accumulates water stored on continents (1) water cycle interrupted (1) sea level falls (1). Credit reverse statements, max (2)

(c) (i) 10 m rise in 2000 years or 10/2000 (1) 0.005 myr^{-1} (1)

(ii) rapid eustatic sea level change in both locations (1) uplift of Loch Morar reduces effect of sea level rise (1) eustatic rise quicker than isostatic uplift (1). Max (2)

(d) (i) Relative sea level decreased at Loch Morar (1) Relative sea level continued to increase at Milford Haven (1) credit measured heights (1). Max (2)

(ii) Isostatic uplift at Loch Morar (1) uplift of flooded land out of the sea (1) continued eustatic sea level change (1) increased relative sea level at Milford Haven (1) effect of isostatic forebulge at Milford Haven (1). Max (3)

Total [15]

2. (a) **Surface drainage pattern** controlled by geological structure, rock permeability and resistance of rock to erosion
Surface river courses
Radial drainage (domes, volcanoes etc)
Trellised drainage (dipping rocks, basin & range etc)
Dendritic drainage (homogenous geology)

(b) **Subterranean river courses**

Caves, swallow holes, springs

Drainage density (amount of water at surface) controlled by permeability of rock
Groundwater drainage controlled by factors affecting permeability – primary and secondary.

Groundwater flow (aquifers, aquicludes etc), effect of topography on water table.
Dry valleys found in limestone and chalk areas (high water table/periglacial conditions).

Credit use of examples

Depth vs breadth

Must have evaluation for access to full marks

Total [25]

3. (a) Description

grain type – peloids, ooliths, bioclasts, microfossils, macrofossils, reef fragments, calcite mud

grain size – coarse to fine

t**extures** – oolitic, bioclastic, pelitic, micrite, sparite, coarse fragments

OR

description of rock types such as oosparite, biosparite, micritic mudstone, breccias (reef debris)

(b) Evaluation

Lithologies
Calcareous precipitate from evaporation of seawater.
Formation of ooids. High energy environment, relationship of ooid size and energy levels.
Precipitation of micrite in back-reef basin / lagoon with shallow marine fossils.
Eroded clasts of limestone.

Sedimentary structures
Wave action of sea in warm shallow lagoon transporting ooids / pisoliths – ripples/cross-bedding
Massive reef deposits
Fossil fragments – shell lags.
Low energy back-reef lagoons.

Organic forms
Algal secretions.
Reef building.
Reef deposits containing corals and other fauna.
Conditions for coral growth (temperature, depth, light).
Symbiotic relationship with algae.
Remains of marine algae – Coccoliths.
Frequently bioturbated. Burrows preserved with other fossils.
Analogy with modern calcareous oozes.

Must be related to processes for access to full marks and must have evaluation of the relative importance.

Total [25]

4. (a) Ice Cores

Continuous records can be obtained from drilling where ice has accumulated for a long time, (Antarctica, Greenland)

Inclusions in the snow of each year remain in the ice, such as wind-blown dust, ash, bubbles of atmospheric gas and radioactive substances.

Water molecules containing heavier isotopes have a lower vapour pressure, when the temperature falls, the heavier water molecules will condense faster than the lighter water molecules. The relative concentrations of the heavier isotopes in the snow indicate the temperature of condensation at the time, allowing for ice cores to be used in local temperature reconstructions.

Air bubbles trapped in the ice cores allow for measurement of the atmospheric concentrations of trace gases such as: carbon dioxide, methane and nitrous oxide.

Volcanic eruptions leave identifiable ash layers that can be dated. Dust in the core can be linked to increased desert area or wind speed.

(b) Pollen

Well preserved, easily fossilised abundant material
Sampled from sediments of different types, particularly lake deposits
Relative abundance of pollen types used to reconstruct vegetation community
Fluctuating climate causes change in the vegetation community
Pollen therefore acts as proxy data for climate
Glacial/pre-temperate climate dominated by Juniper & Birch
As climate warms vegetation dominated by deciduous trees (Oak, Elm, Alder)
As climate cools, conifers (Pine & Fir) begin to dominate followed by Birch
Use of Pollen diagrams to present data
Doesn't allow for quantified climatic reconstruction
Only reconstructs a proxy for the climate

Vertebrates
Examples of Quaternary vertebrates – Wooly Mammoths, Hippopotamus, Hyena, Bison etc.
Application of uniformitarianism – relating modern mammals to fossils
Mammoths found preserved in glacial ice. Heavy fur coats as an indicator of colder conditions.
Use of individual species, rather than community, to reconstruct climate – mutual climatic range
Problems of fossilisation for large vertebrates
"Snapshot" of climatic conditions rather than continuous sequence

Other
Credit for other organisms used e.g. Beetles, Forams (for Oxygen isotopes)

Total [25]