New Specification

Rewarding Learning

ADVANCED

General Certificate of Education

2018

Geography

Assessment Unit A2 1

assessing

Physical Processes, Landforms and Management

AGG11

[AGG11]

FRIDAY 8 JUNE, AFTERNOON

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number on the Answer Booklet provided.
Answer **two** questions, one from each of the two options you have studied.

INFORMATION FOR CANDIDATES

The total mark for this paper is 70.
Quality of written communication will be assessed in **the final sub-section** of each question.
Figures in brackets printed down the right hand side of the pages indicate the marks awarded to each question or part question.
You are strongly recommended to read through and consider the questions before choosing those you are going to answer.
This paper is accompanied by a Resource Booklet.

Answer **two** questions, one from each of the two options you have studied.

Option A: Plate Tectonics: Theory and Outcomes

Either

1 **(a)** Explain seismic gap theory and dilation in the context of seismic events. [9]

(b) Study **Resource 1** (page 2 of the **Resource Booklet**) which shows **three** regions of volcanic activity in the Pacific Ocean basin.

With reference to **any two** of the three locations shown (A, B, C), explain the processes that account for the volcanic activity found in that region. [8]

(c) With reference to a small scale study of seismic activity, describe and evaluate the preparation for, and response to, the seismic event. [18]

Or

2 **(a)** Study **Resource 2** (page 3 of the **Resource Booklet**) which describes the impacts of an earthquake in Japan in 2011.

Identify and explain the impacts of **each** of the following seismic events as described in the resource:

- seismic shaking;
- liquefaction; and
- tsunami. [9]

(b) "The process of seafloor spreading at constructive plate margins is fundamental to the understanding of plate tectonic theory".

Explain this constructive process and describe the evidence of its occurrence. [8]

(c) With reference to places for illustration purposes, discuss the socio-economic and environmental hazards and benefits of volcanic activity. [18]

Option B: Tropical Ecosystems: Nature and Sustainability

Either

3 **(a)** Describe the climatic characteristics of the tropical forest and explain how these characteristics influence the biomass of this ecosystem. [9]

(b) Study **Resources 3A** and **3B** (pages 4–5 of the **Resource Booklet**) showing a recreated tropical forest ecosystem, The Eden Project, Cornwall.

Using these resources, describe and explain how the management of tropical forests can be both socio-economically and environmentally sustainable. [8]

(c) With reference to a regional scale case study of an arid/semi-arid tropical environment:

- describe the problems associated with the use of irrigation; and
- evaluate the attempts to find solutions to these problems. [18]

Or

4 **(a)** Describe the climatic characteristics of the desert ecosystem and explain how these characteristics influence its biomass. [9]

(b) Study **Resources 4A** and **4B** (page 6 of the **Resource Booklet**) which show land irrigated by water from the River Nile, Egypt.

Using the resources **to help you**, discuss the environmental benefits and problems associated with the use of irrigation in the arid/semi-arid tropics. [8]

(c) With reference to a regional scale case study of a tropical forest ecosystem, describe and evaluate the threat of large scale development to its trophic structure and nutrient cycle. [18]

Option C: Dynamic Coastal Environments

Either

5 **(a)** With reference to places for illustration, distinguish between eustatic and isostatic processes. [9]

(b) Study **Resource 5** (page 7 of the **Resource Booklet**) which shows a stretch of the Dorset coastline.

Identify **one** erosional and **one** depositional landform shown and, with the aid of a diagram/s, describe and explain the formation of **either** of these landforms. [8]

(c) With reference to a regional or national case study in an LEDC experiencing sea level rise, describe and explain the threats to its human and physical environment. [18]

Or

6 **(a)** Study **Resources 6A–C** (pages 8–9 of the **Resource Booklet**) which show coastal engineering strategies at different locations.

Evaluate the impact and sustainability of any **two** of the strategies illustrated. [9]

(b) With the aid of a diagram/s, describe and explain the coastal process of wave refraction. [8]

(c) With reference to a regional scale case study, explain why Environmental Impact Assessment and Cost Benefit Analysis are important in coastal management. [18]

Option D: Climate Change: Past and Present

Either

7 **(a)** Study **Resource 7** (page 10 of the **Resource Booklet**) which describes evidence for climate change.

Using the **resource** and **one** other form of evidence, explain how these demonstrate medium-term and long-term climate change. [9]

(b) Define the term Holocene and, with reference to places for illustration purposes, explain why the last glaciation ended. [8]

(c) With reference to a regional scale case study, describe and explain the presence of both glacial and fluvioglacial landforms in the post-glacial lowland environment. [18]

Or

8 **(a)** Study **Resource 8** (page 11 of the **Resource Booklet**) which describes current short-term climate change.

Define what is meant by the term 'enhanced greenhouse effect' and, with the help of the resource, explain the role of air pollution on current climate change. [9]

(b) Explain how **any two** of the following processes may cause medium-term or long-term climate change:

- astronomic;
- solar;
- volcanic. [8]

(c) With reference to places at an international scale, describe and evaluate the progress of international action on climate change. [18]

THIS IS THE END OF THE QUESTION PAPER

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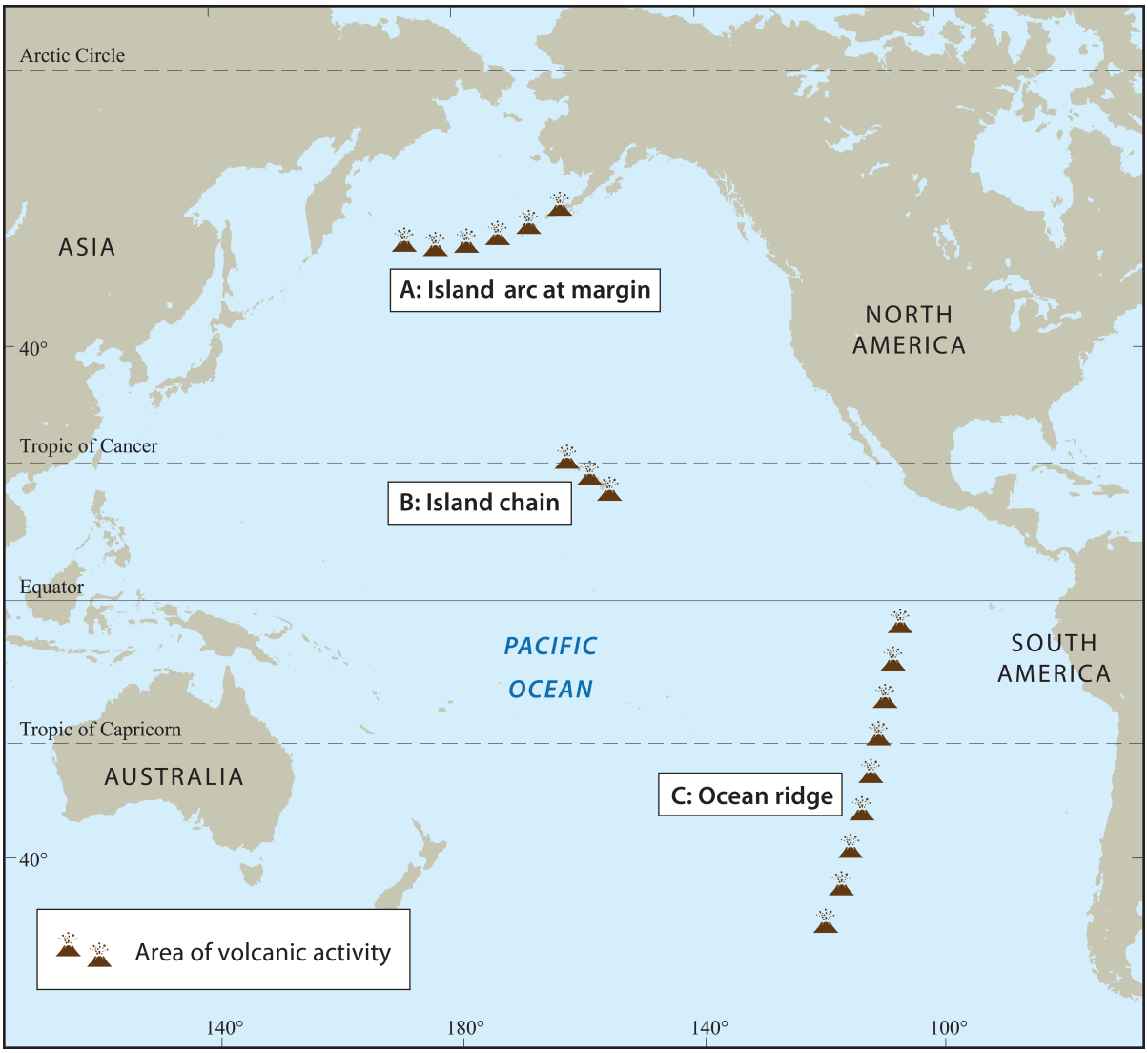
RESOURCE BOOKLET

RESOURCE 1

REGIONS OF VOLCANIC ACTIVITY IN THE PACIFIC OCEAN BASIN



Source: Principal Examiner

RESOURCE 2

SELECTED IMPACTS OF THE 2011 EARTHQUAKE OFF NORTHERN HONSHU, JAPAN

- Drowning was the most common cause of death and most people died an hour or more after the earthquake.
- Seismic instruments in Edinburgh registered the event between 10 and 12 minutes after it happened.
- Almost an hour after the seismic activity, defensive seawalls were overwhelmed by water.
- Hours after the earthquake, 11 000 nesting seabirds were killed in Midway Atoll in the mid-Pacific basin.
- During the earthquake, sand and water 'boiled' out of the ground partially burying homes.
- 560 km^2 of Northern Japan up to 10 km inland was inundated to a height of 40 m above sea level.
- The unusually long period of the earthquake – five minutes – explains why so many earthquake-resistant structures failed.
- Many well-built houses were left tilted over or partly sunk into the ground.
- Debris of port structures and buildings that collapsed was later washed inland, destroying other infrastructure.
- 230 000 people lost their homes.
- In 2015 the death toll was 15 891 with 2500 people still recorded as missing.

Adapted from © Japan Earthquake & Tsunami of 2011: Facts and Information by Becky Oskin. Published by Live Science, 13 September 2017

RESOURCE 3A

RECREATED TROPICAL FOREST ECOSYSTEM, EDEN PROJECT, CORNWALL

The Eden Project is an environmental charity working to raise awareness of the threats posed by deforestation of tropical forests.

The Project raises funds used to restore healthy forests in Haiti, Madagascar, Ethiopia, and Nepal, and to reduce extreme poverty by employing local villagers to plant millions of trees.

Source: Principal Examiner

RESOURCE 3B

INFORMATION BOARDS, WHICH DESCRIBE TROPICAL FOREST ECOSYSTEM MANAGEMENT STRATEGIES, EDEN PROJECT, CORNWALL

Wild Rubber (text from information board)

Sky Rainforest Rescue is a partnership between Sky and the World Wildlife Fund that is helping to save one billion trees from deforestation in the Amazon Ranforest.

The Amazon is the only place in the world where rubber trees (*Hevea brasiliensis*) grow in the wild. Sky Rainforest Rescue is working in Acre, Brazil to help improve the market for wild rubber products. Rubber tappers rely on the rainforest to make their living so it is important to keep the trees standing.

There are two types of natural rubber: wild from the native rubber trees in the Amazon and rubber trees that are grown in plantations.

Step into our Wild Rubber exhibit to discover more about this remarkable story and follow wild rubber from the tree to the soles of your shoes.

© Eden Project

Growing with the forest (text from information board)

Growing crops in alleys between rows of trees provides an alternative to slash and burn (the latter is often used by desperate farmers to clear land for crops).

Inga trees are used because they:

- provide the shade required for cocoa, coffee and tea crops;
- can fix nitrogen from the air to provide fertiliser;
- can be pruned (coppiced) and the soft branches used as mulch to feed soil and suppress weeds;
- produce tasty fruit – 'ice-cream beans'.

The Inga Foundation works in Central and South America promoting alley cropping to help the environment and promote food security – good for rainforest and livelihoods.

© Eden Project

RESOURCE 4A

IRRIGATED LAND ADJACENT TO THE VALLEY OF THE KINGS, EASTERN DESERT, EGYPT

Source: Principal Examiner

RESOURCE 4B

SURFACE SALT DEPOSITS ON IRRIGATED LAND, LUXOR, EASTERN DESERT, EGYPT

Source: Principal Examiner

RESOURCE 5

DORSET COASTLINE, SOUTHERN ENGLAND

Source: Principal Examiner

RESOURCE 6A

RIP-RAP: JESOLO, ITALY

Source: Principal Examiner

RESOURCE 6B

DUNE REGENERATION: VILAMOURA, PORTUGAL

Source: Principal Examiner

RESOURCE 6C

PIER AND SEA WALL: LYME REGIS, ENGLAND

Source: Principal Examiner

RESOURCE 7

ROCK FOSSILS AND CLIMATE CHANGE

Today, it is readily apparent that differing plant and animal species need particular environmental conditions in order to survive. While some species tolerate a range of conditions, others are particularly sensitive to climate and do not adapt easily to change. A modern day example is coral reefs, which only thrive in tropical waters at a specific temperature range, a particular water depth and a high quantity of light. It follows that where rocks containing fossil corals are found, the original environment can be closely estimated. Using this idea, scientists have also identified small changes in the chemical composition of fossil shells showing that, in the past 2 million years, the world's climate has warmed and then cooled down between 20 and 30 times.

Fossils and microfossils provide evidence of the planet's climate and how it has changed over many millions of years. Palaeontologists study fossil clues to identify variations in temperature and precipitation of past climates. Examples of this research include the microscopic study of the tooth enamel of fossil sea-cows, that points to significant global climate change during the Eocene era (34 to 56 million years ago). Even the study of fossilised soils, known as palaeosols, has allowed researchers to identify regional variation in climates that can be dated according to the geological record.

Adapted from © Past Climates – evidence by British Geological Survey.
Adapted from © National Science Foundation. "Fossil sirenians, related to today's manatees, give scientists new look at ancient climate." ScienceDaily 24 April 2011.

RESOURCE 8

POLLUTION INCREASES GLOBAL WARMING, THREATENING WATER SUPPLIES IN ASIA

A team of scientists has concluded that the **enhanced greenhouse effect** is a major contributor to the melting of Himalayan and other tropical glaciers. Led by Professor Ramanathan, the team has found that pollution-filled brown clouds have helped heat the lower atmosphere by about 50%. This finding gives hope that the region may be able to stop some of the alarming retreat of such glaciers by reducing its air pollution. The scientists based their conclusions on data gathered by a fleet of drones.

The combined heating effect of greenhouse gases and these brown clouds containing soot and other particles from urban, industrial and agricultural sources, explains the retreat of Himalayan glaciers observed in the past half century. The glaciers supply water to major Asian rivers, including the Yangtze, Ganges and Indus, which are the main water supply for billions of people in China, India and other south Asian countries. Therefore, the continued rapid melting of these glaciers would have unprecedented downstream effects.

The knowledge of this threat should spur the international community to ever greater action. Dealing with the twin challenges of climate change and brown clouds should reap wider benefits, such as reduced air pollution, secure water supplies and improved agricultural yields.

The study produced an estimate that the region's atmosphere has warmed by 0.25°C per decade since 1950 between 2000 and 5000 m above sea level (the height at which many Himalayan glaciers are found). The amount of heating correlates with observed levels of glacial retreat.

Pollution Amplifies Greenhouse Gas Warming Trends to Jeopardize Asian Water Supplies by Robert Monroe. Published 01 August 2007.

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