Coastal environments- 2

Name: _____

Class: _____

Date:_____

Time:

Total Marks Available:

Total Marks Archived:

Level: IGCSE Mathematics A

Subject: Geography

Exam Board: Edexcel IGCSE Geography- it is however suitable for use by mathematics student of other boards

Topic: Coastal environments -2

Type: Mark Scheme

To be used by all students preparing for Edexcel IGCSE Geography- Students of other Boards may also find this useful

Mark Scheme

Q1.

Question number	Indicative Content
	AO3 (4 marks) AO4 (4 marks) **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the level-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive, and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. The question is about analysing why the multiple threats to coral reef ecosystems is important. **AO3** • Coral reefs are delicate ecosystems that are subject to a range of physical and human threats. • For coral reefs to grow they need optimal conditions including lots of sunlight, and clear and shallow water around 21-29°C temperature. Climate change has the potential to increase

	water temperatures which could threaten coral growth, but there are a much wider range of threats from human activity. • Coral reefs are important for maintaining biodiversity in the ocean, and represent some of the most biologically diverse marine ecosystems on Earth. For example, the Great Barrier Reef contains over 400 coral species, 1,500 fish species, 4,000 mollusc species. • Coral reefs act as an important natural barrier for the coastline, which can reduce the power of waves hitting the coast. • Coral reefs are often popular sites for tourists to visit, and as such create jobs for many people in the tourist and hospitality industries which means it is important for economies that threats to them are reduced. **AO4** • Fig 2c shows how there are various threats to coral reef ecosystems. • Figure 2c indicates how human activities can threaten coral reef ecosystems through agriculture leading to increased pollution in the water which can affect coral growth. • Figure 2c indicates that pollution can reach water where corals are growing through groundwater flow. • Figure 2c indicates threats can include agriculture, road construction, oil and chemical spills, deforestation, stormwater runoff, coastal developments, chemicals from sunscreens as well leakages from septic tanks. • Figure 2c indicates how there are a range of stakeholders that are involved in the threats to coral reefs from tourists using sunscreens, up to city planners through plans for road construction.

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–3	• Attempts to apply understanding to deconstruct information but understanding and connections are flawed. An unbalanced or incomplete argument that provides limited synthesis of understanding. Judgements that are supported by limited evidence. (AO3) • Uses some geographical skills to obtain information with limited relevance and accuracy, which supports few aspects of the argument. (AO4)
Level 2	4–6	• Applies understanding to deconstruct information and provide some logical connections between concepts. An imbalanced argument that synthesises mostly relevant understanding, but not entirely coherently, leading to judgements that are supported by evidence occasionally. (AO3) • Uses geographical skills to obtain accurate information that supports some aspects of the argument. (AO4)
Level 3	7–8	• Applies understanding to deconstruct information and provide logical connections between concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently, leading to judgements that are supported by evidence throughout. (AO3) • Uses geographical skills to obtain accurate information that supports all aspects of the argument. (AO4)

Q2.

Question number	Answer
	AO3 (4 marks)/AO4 (4 marks) **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include the following. **AO3** • Natural landward migration of a coastal ecosystem may result from a rise in sea level, extreme weather and particularly high spring tides. • Mangrove forests are often cleared to make room for agricultural land, human settlements and infrastructure, such as a harbour. More recently, mangroves have been cleared for tourist developments, shrimp aquaculture and salt farms. • Trees in coastal ecosystems are cut down for a range of different reasons, such as for firewood, construction wood, woodchip and pulp production, charcoal production and animal fodder. • In some coastal areas, afforestation and replanting programmes are replacing those trees that have been cut down but, in some parts of the world, it is no longer sustainable, threatening the biodiversity of the ecosystem. • Dams and irrigation systems can reduce the amount of water in some coastal ecosystems, changing the salinity level of water in the area. If salinity becomes too high, several animal and plant species may not be able to survive and biodiversity falls. In addition, increased erosion due to land deforestation can massively increase the amount of sediment in rivers. • A growing use of chemical fertilisers, pesticides, and other toxic man-made chemicals carried by river systems from sources upstream, can kill animals living in mangrove forests, while oil pollution can smother mangrove roots and suffocate the trees.

	AO4 • Figure 2c shows the natural landward migration of mangrove and the negative impact of building a sea defence, such as a sea wall. The sea wall, while protecting some areas from a rise in sea level, has prevented further landward migration. • Figure 2d shows an example of planning for the development of tourism, as some countries are in the process of doing. Despite some of the mangrove ecosystem remaining, much of it may be cut down to make way for new infrastructure. • Figure 2e shows how the growth in shrimp production in Thailand, Vietnam and Indonesia has a negative relationship with the size of the mangrove forest in these countries.

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Level 2	4–6	• Applies understanding to deconstruct information and provide some logical connections between concepts. An imbalanced argument that synthesises mostly relevant understanding, but not entirely coherently, leading to judgements that are supported by evidence occasionally. (AO3) • Uses geographical skills to obtain accurate information that supports some aspects of the argument. (AO4)
Level 3	7–8	• Applies understanding to deconstruct information and provide logical connections between concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently, leading to judgements that are supported by evidence throughout. (AO3) • Uses geographical skills to obtain accurate information that supports all aspects of the argument. (AO4)

Q3.

Question number	Answer	Mark
(i)	**AO1 (1 mark)** A (Where plant roots grow into cracks in the rocks). The answer cannot be B, C or D as these are all incorrect.	**(1)**

Question number	Answer	Mark
(ii)	**AO1 (1 mark)** Award 1 mark for any of the following. • Landslide (1) • Soil creep (1) • Rotational slumping (1) • Rock fall (1) Accept any other appropriate response.	**(1)**

Question number	Answer	Mark
(iii)	**AO1 (1 mark)/AO2 (1 mark)** Award 1 mark (AO1) for initial point and a further mark for explanation of the reason (AO2) up to a maximum of two marks. • Groynes (1) to prevent movement of sand down the coastline (1). • Sea walls (1) to reduce energy of the waves hitting the coastline (1). • Gabions (1) to protect the base of a cliff (1). Accept any other appropriate response.	**(2)**

Q4.

Question number	Answer	Mark
	AO2 (2 mark)/AO3 (2 mark) Award 1 mark (AO3) for identification of any idea from fig 2a and a further mark for explanation of the reason (AO2) up to a maximum of two marks each. • Hard engineering / sea walls (1) can limit the effect of coastal erosion (1). • Hard engineering / seawalls (1) can reduce damage to high value land (1). • Soft engineering / beach replenishment (1) can limit the effect of erosion at the coast (1). • Soft engineering / beach replenishment (1) is used as a more sustainable/aesthetically pleasing approach to coastal management (1). • Soft engineering / beach replenishment (1) creates a buffer zone in front of cliffs (1). Accept any other appropriate response.	**(4)**

Q5.

Question number	Answer	Mark
(i)	**AO1 (1 mark)** B is the correct answer - cave A,C and D are all depositional landforms	**(1)**

Question number	Answer	Mark
(ii)	**AO1 (1 mark)** Award 1 mark for any of the following. • landslides (1) • slumping (1) • rock fall (1) • rotational slip (1) • sliding (1) • mud slides (1) Accept any other appropriate response	**(1)**

Question number	Answer	Mark
(iii)	**AO1 (1 mark)/AO2 (1 mark)** Award 1 mark (AO1) for a point about physical weathering and 1 mark (AO2) for further explanation, up to a maximum of 2 marks. • Freeze thaw (1) moisture in rock surfaces freezes and ex-pands causing rock to break off (1) • Onion-skin weathering / exfoliation (1) • Wetting and drying (1) Accept any other appropriate response	(2)

Q6.

Question number	Answer	Mark
	AO2 (3 mark) Award 1 mark for the identification of a cause and 2 marks for development through further explanation up to a maximum of 3 marks. • Lack of sea defenses (1) due to poor levels of economic development (1) means that coastal areas are more susceptible to flooding (1). • Polar ice melts (1) this is caused by global warming (1) resulting in increased sea levels (1). • Extreme weather events such as storm surges (1) create large waves (1) which result in increased tidal range resulting in exceptional high tides (1). • Tectonic movement (1) causes a tsunami which reaches the coast (1) and particularly damages low lying areas (1). Accept any other appropriate response.	**(3)**

Q7.

Question number	Answer	Mark
	AO2 (3 marks) Award 1 mark for identification of a way and 2 marks for development and further explanation, up to a maximum of 3 marks. Temperature, light, water depth, salinity, wind direction, level of shelter. For example: Coastal mangroves need a high level of rainfall (1) of between 1500 and 3000 mm per annum (1) this can be obtained from rainfall or moisture in the air making tropical climates ideal (1) Mangroves need a high temperature (1) around 27 degrees (1) otherwise they will not grow (1) Mangroves need a shallow water (1) between 0.5 to 2.5 meters depth (1) but can survive where tidal ranges go slightly above or below this level (1) Mangroves need high levels of humidity (1) between 75 and 80% (1) to enable them to grow (1) Accept any other appropriate response	**(3)**

Q8.

Question number	Answer	Mark
	AO2 (3 marks) Award 1 mark for the identification of a way in which tourism can threaten coastal ecosystems and 2 marks for further explanation up to a maximum of 3 marks. Candidates could identify: • Increased number of tourists walking on sand dunes (1) can damage structure (1) and prevent succession (1). • Tourists can leave litter behind (1) which can damage natural habitats (1) and discourage wildlife (1). • Tourist boats visiting coral reefs cause water pollution (1) which can kill some wildlife (1) and reduce biodiversity (1). Accept any other appropriate response.	(3)

Q9.

Question number	Answer	Mark
	AO1 (1 mark)/AO2 (3 mark) Award 1 mark for initial point (AO1), and 3 further marks (AO2) for the extension of this point up to maximum of 4 marks. • Spits are created through a dominant longshore drift along a section of coastline (1) material is deposited and extends the coastline/beach (1) through constructive waves (1) the build-up of these materials over a long period of time results in spit formation (1). • Sediment moved along a coastline by longshore drift (1) in direction of prevailing wind (1). The coastline changes direction (1) but the deposition of sediment continues (1). Accept any other appropriate response.	**(4)**

Q10.

Question number	Answer	Mark
	AO2 (2 mark)/AO3 (2 mark) Award 1 mark (AO3) for identification of any idea from Figure 2a and a further mark for explanation of the reason (AO2) up to a maximum of two marks each. Recreation associated with harbours (A) (1) may disturb coastal ecosystems through fuel pollution or marina development (1) Development of buildings / hotels (B) (1) can threaten coastal environments by a "land grab" disturbing the plants and animals in the coastal ecosystem (1) Tourism (C) may cause beach pollution (1) from Litter (1) /too many people (1) Development of concrete walls / hard defences (D) / Pier may cause pollution (1) or damage sensitive coastal habitats (1) Accept any other appropriate response.	(4)

Q11.

Question number	Answer	Mark
(i)	**AO1 (1 mark)** A the community of interacting living and non-living organisms (1)	(1)

Question number	Answer	Mark
(ii)	**AO1 (1 mark)** the non-living elements within an ecosystem (1)	(1)

Question number	Answer	Mark
(iii)	**AO1 (1 mark)/AO2 (1 mark)** Award 1 mark (AO1) for a point about control of saltmarsh distribution and 1 mark (AO2) for further explanation up to a maximum of 2 marks. Coastal position – salt marshes form in sheltered areas of coastline (1) where there are large amounts of deposition of material due to low energy waves (1) Low topography – causing shallow water (1) allowing sediment to be deposited and vegetation to build up (1) Accept any other appropriate response.	(2)

Q12.

Question number	Answer	Mark
	AO3 (1 mark) Award 1 mark for the following: • Cave (1)	(1)

Q13.

Question number	Answer	Mark
	AO1 (1 mark) C (complex root system) The answer cannot be A (sand dune), B (shallow gradient at the coastline) or D (requires warm temperatures to grow)	**(1)**

Q14.

Question number	Answer	Mark
	AO1 (1 mark) B is the correct response short wavelength and strong backwash A is not correct as it describes a constructive wave C is not the correct answer as it describes only some elements of a destructive wave correctly D is not the correct answer as it describes only some elements of a destructive wave correctly	**(1)**

Q15.

Question number	Answer	Mark
	AO2 (2 mark)/AO3 (2 mark) Award 1 mark (AO2) for a way changes in sea level could have created a coastal landform and a further mark (AO3) for further development, shown on Figure 2a, up to a maximum of 2 marks each. Through the reduction in sea level (1) a raised beach has been created (1). Changes in sea level have left behind raised beaches (1) and over time this new beach feature becomes vegetated. (1) Creation of wave cut notch (1) by marine erosion due to a reduction in sea level there is an Due to a fall in sea level (1) old sea caves caves have been created (1) Changes in sea level have left behind old sea caves (1) with fossilised remains of sea creatures (1) wave action from previous sea level has eroded cliff (1) to expose fossilised remains / left behind old relic wave cut notches (1) Due to an increase in sea level (1) landforms such as rias / fjords have been created (1) Accept any other appropriate response	(4)

Q16.

Question number	Answer indicative content
	AO3 (4 marks) AO4 (4 marks) **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the level-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive, and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. This question is about analysing the positive impact of mangrove development of Coastal areas. The resource gives candidates an idea of a range of benefits. Candidates will be expected to make the link between the positive effects of coastal erosion reduction and the high amount of dependence that India has on coastal areas. For higher level response there is an expectation for both human and physical advantages to be identified. Candidates may make a statement of the idea of Mangroves being very important in the defence against flooding.

	AO3 • Mangroves are a very beneficial ecosystem that can have a range of positive effects. • India is very focused on development at the coast with 250 Million people living within 50miles – this means that there is a reliance of the coast to provide a way of life through fishing and tourism. This is supported by the high number of major and minor ports. • Nursery areas for small fish and marine invertebrates – food source as well as sea defense. • Many coastal communities depend on fish as a main food source. • Coastal areas provide areas where trade can take place with other countries.

	AO4 • Fig 2c shows that coastal areas in India are under threat from coastal erosion. • Fig 2c demonstrates that a large amount of the (250 million) population lives near the coast working in the fishing industries. • Fig 2c identifies that the mangrove acts as buffer to coastal erosion • Fig 2c mangroves acts as a filter for pollutants. • Fig 2c mangroves provide a range of habitats for different species and fodder for farm animals. • Fig 2c mangroves can provide a managed source of timber if carefully controlled. • Fig 2c mangroves benefit other coastal environments e.g. sea grass.

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