River environments- 3

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: River environments -3

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	Answer indicative content	Mark (8)
	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 identifying and analysing which factors have affected the flood risk in Bangladesh. Candidates will need to be able to identify that there are a mix of physical and human factors that affect the flood risk. **AO3** • There are many physical processes that affect flood risk in Bangladesh: there is a dense river network which runs through the country; a large proportion of the country is only a small height above sea level. • The Monsoon season and snow melt from the Himalayas contribute greatly to the risk of flood. • Flooding risks are exacerbated by high population densities, particularly along flood plain areas. • Flooding is not necessarily managed effectively; greater flood prevention schemes are needed to protect livelihoods.	

	AO4 • Figure 1c shows how a large proportion of the country is at risk from flooding. • Figure 1c indicates how around 70% percentage of the country is not at risk of flood during the monsoon season. It shows how areas such as Sylhet in the north should remain flood free. • Figure 1c shows how the Eastern part the country is more affected by flooding caused by rainfall. • Figure 1c indicates how there is limited management of the river. It suggests there is are flood defenses on the eastern side of the Brahmaputra.

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	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 importance of dams for managing the demand and supply of water. Candidates will need to be able to identify the different ways dams are used, how dams can affect different areas of water supply through interrogation of the resource. **AO3** • Dams are used to typically to store water in a reservoir and allow the release of water in a controlled way, which can be used to generate hydroelectric power (HEP). This is a technique used widely across the globe: in Africa there are over 600 dams, in Europe there are nearly 1200. • The storage of water in reservoirs behind dams, gives countries greater control over the flow of water so can reduce the chance of flooding in some areas, but can also controls flows of water in periods where supplies are lower (e.g. during a drought). This can reduce water insecurity, particularly where rainfall is seasonal.

	• Dams such as the Grand Renaissance Dam have been controversial since their inception because of the potential impacts of their creation, as well as the physical changes required for its construction. There are concerns from Egypt around the lack of control over their water supplies which are vital for the livelihoods and survival of its people. There are concerns from Sudan that when water is released from the dam it may overwhelm dams and rivers which have a much smaller capacity. • The ability of dams to control water supplies where rivers cross international boundaries means there are potential issues created about who controls the supply of water, as seen in the GRD example. **AO4**

	• Figure 1c shows the location of the Grand Renaissance Dam in Ethiopia holding back 74 billion cubic metres of water demonstrating its importance for water supply. • Figure 1c shows how the Grand Renaissance Dam affects a river that flows through several countries (Ethiopia, Sudan, and Egypt for the Blue Nile) and indicates where water can be held back to affect supply. • Figure 1c shows dams have a purpose beyond water supply through the creation of hydroelectricity. • Figure 1c highlights how there is the potential for conflicts to be created by dams and their control over water supplies.

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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 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 investigating the factors that can have an impact on river regimes. Primarily candidates will need to explore a range of different factors and then relate them to the two river regimes. **AO3** • The amount of precipitation will have an impact on the level of discharge. • The amount of precipitation that is stored will have an impact on the level of discharge – in figure 1c discharge is low Jan to March – this could be because Norway would be in the middle of winter and so the water would be stored as ice. • The amount of discharge will increase as temperature is increasing this is why the discharge in high in 1c in May and June. • In fig 1d discharge is higher in Jan to March as in Ireland even though it's still winter not as much water will be stored as ice. So run off into rivers will be higher. • Vegetation will also influence the discharge depending on the amount of trees and type there will be increased interception. In June and July in fig 1d as it will be warmer in Ireland it is likely that there will be a greater uptake of water through vegetation. • Rock type will also impact on the amount of discharge as it has the ability to slow down or speed up run off into rivers. • Steep slopes will also have an impact if slopes are steeper run off into rivers is likely to be higher increasing discharge. This could be why there is a sharp increase in discharge from April to May in Norway.

	AO4 • Fig 1c shows that the discharge in the River Gloma is at its lowest from Jan to March. • Fig 1c shows that the discharge in the River Gloma is at its highest in May and June. • Fig 1c shows a sharp increase between April and May and then a steady decline from July through to December. • Fig 1d shows high rates high rates of discharge from November to February of up to just over 300 m3/sec • Fig 1d shows the least amount of discharge in June July and August • Fig 1d shows a reverse pattern compared to Figure 1c

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Q4.

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 investigating the issue of human impact on water quality, candidates should break down the response into components – in this case the factors identified in Fig. 1c and how they might impact on water quality across Europe. Candidates should relate the factors to the map. To access level 3, both Figures 1c and 1d need to be used.

	AO3 Human intervention can have a negative effect on water quality for example: Agricultural waste products caused by surface run off be washed into streams and rivers causing pollution of the river ecosystem – this can damage plant and animal life Pesticides and fertilizers from farms can get into the ecosystem this can progress through the food chain and damage fish and plant life deformed fish etc. Industrial spillage can pollute beaches and harm wildlife Warm water from power stations can upset the natural balance of the water causing algae etc. Sewage from domestic use can block beaches Humans can also affect water quality in a positive way through treatment plants/clean-up operations or conservation and local pressure groups **AO4** Fig 1c shows that there are a number of factors that can affect water quality both in a positive way and a negative way Fig 1c shows that there are a variety of pollution sources Fig 1c shows water quality can impact on health Fig 1d shows that water quality varies across geographies Fig 1d shows that water quality over much of Europe is variable

	Fig 1d shows that there is wide variation in water quality across the globe Fig 1d shows that countries in Africa have poorer water quality generally

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Q5.

Question number	Answer	Mark
(i)	**AO1 (1 mark)** **A** The amount of living matter in an ecosystem (1) is the correct response. B, C and D are all have elements of non-living elements of the ecosystem.	(1)

Question number	Answer	Mark
(ii)	**AO1 (1 mark)** • Made of blown sand (1) • Range of vegetation/Marram Grass (1) • Undulating shape (1) • Slip face of dune (1) • Fragile / easily eroded (1) NB: Feature can be related to a stage in dune formation. Accept any other appropriate response.	**(1)**

Question number	Answer	Mark
(iii)	**A01 (1 mark)/AO2 (1 mark)** Award 1 mark (AO1) for identifying a factor (AO2) for further explanation up to a maximum of 2 marks. • Need temps of 26-28 degrees (1) so only found in the tropics (1). • Light is needed for coral to grow (1) as hey only grow in areas of shallow water where the light can penetrate (1). • Global warming (1) leading to sea level rise (1). • Human impact (1) for example climate change causing temperature of water to change/coral bleaching (1). • Pollution from tourist activity (1) damages coral (1). Accept any other appropriate response.	**(2)**

Q6.

Question number	Answer	Mark
	AO2 (3 marks) Award 1 mark for identification of an impact and 2 marks for development and further explanation, up to a maximum of 3 marks. • In villages in the developing world, people have many uses for river water (1), e.g. washing bodies/washing pots/disposing of human waste (1). This means that people in the next village will have to drink this polluted water (1). • Smoke from chimneys/cars can contain harmful chemicals (1), such as those which create acid rain (1). These can find their way into the water supply via surface run-off/throughflow/groundwater flow (1). • Farmers spray chemicals onto fields and crops to maximise yields (1), such as pesticides to kill insects (1), which can soak into the soil/get washed into the river when it rains (1). Accept any other appropriate response.	(3)

Q7.

Question number	Answer	Mark
	AO2 (2 marks)/AO3 (2 marks) Award 1 mark (AO3) for the identification of an advantage and a disadvantage and a further mark for explanation (AO2) up to a maximum of two marks each. Advantages: • Flood walls can reduce the level of damage caused by floods (1) which can save lives (1). • Hard engineering strategies such as flood walls can be adapted once in place (1) for example increased height as flood events become more severe (1). Disadvantages: • Building a flood embankment can be very expensive (1) as it often involves large scale building programs (1). • Installing new flood embankments can affect ecosystems (1) for example through tree removal which could also remove habitats for wildlife (1). **No credit for just naming a strategy given in the resource e.g. 'Flood walls will be raised' or 'trees will be removed'.** Accept any other appropriate response.	**(4)**

Q8.

Question number	Answer	Mark
	AO2 (3 marks) Award 1 mark for the identification of a way in which industry can affect water quality and 2 marks for further explanation up to a maximum of 3 marks. Candidates could identify: • Industrial waste can reach water sources (1) causing water pollution (1) and killing aquatic wildlife (1). • Water flowing through old industrial sites (1) could pick up traces of heavy metals (1) affecting oxygen levels in the water (1). • Construction of industrial site (1) and discharge of warm water (1) affects freshwater wildlife (1). • Agricultural run-off from fertilizers (1) leading to eutrophication (1) reducing biodiversity (1). Accept any other appropriate response.	(3)

Q9.

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

Q10.

Question number	Answer	Mark
	AO2 (2 marks)/AO3 (2 marks) Award 1 mark (AO2) for a factor that may have led to this river regime and a further 1 mark (AO3) for its impact on the river regime shown on Figure 1a, up to a maximum of 2 marks each. • Discharge is much lower in the period May/June to October as rainfall is normally lower than at other times of the year (1). This means that there will be less surface run-off into the river (1). • Discharge is much lower in the period May/June to October because there might be higher temperatures (1). This means that more of the water in the river is evaporated (1). • Discharge is higher in the period November to April because there might be less vegetation growing in the area at that time of year (1). This reduces the amount of interception (1). Accept any other appropriate response.	(4)