River environments- 1

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 -1

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
	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** • Different types of geology have different effects on the rates of infiltration and run-off into a river following a rainfall event. • Permeable rocks and soils (such as limestone) absorb water/allow water to pass through easily, so surface run-off is rare because a greater amount of infiltration takes place. • Impermeable rock and soils (such as shales) are more closely packed. Rainwater cannot infiltrate so water reaches the river more quickly via surface run-off/overland flow. • In rural areas, land use can affect infiltration rates and, therefore, the hydrograph for a river. • Areas of woodland and forest will have higher interception rates than areas of arable or pastoral farming. This increased interception will increase the time it takes for the rainfall to reach the river, increasing lag times and reducing the steepness of the rising and receding limbs on a hydrograph. • Areas of little vegetation or deforestation will mean that there is less interception and the rain reaches the ground faster. The ground is likely to become saturated and surface run-off will increase.

	AO4 • Figure 1d shows that river Q is located in an area of permeable rock. Also, Figure 1c shows that it has a larger lag time and a low peak discharge of just over 20 cumecs. • Figure 1d shows that rivers P and R are on impermeable rock. This is supported by the steep rising limbs and shorter lag times for these rivers in Figure 1c. • Figure 1d shows that rivers P and R are located in areas of the same geology (impermeable rock), but the two rivers are located in areas of different vegetation. • As river P has the 'flashier' hydrograph (Figure 1c), it is concluded that in this area, geology is having a greater impact on a river's discharge compared to types of vegetation.

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 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
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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)

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 identifying and analysing why it is important to use flood prevention techniques on the river Thames. Candidates will need to be able to identify why it is important and what has been done through interrogation of the resources.

	AO3 • There is a clear link between the impact of flooding and what has been done to reduce and manage the Thames. • By introducing several weirs, the Thames scheme is able to manage the flow of water more effectively reducing the possibility of flooding. • This was clearly a major issue as many people responded to the consultation on the subject, this was potentially to do with the large amounts of homes at risk. • It is likely that the scheme was invested in due to the high cost of flood damage. • The Thames management scheme also had several other benefits although it is unlikely that new wildlife habitats being formed was a high priority for the project.
	AO4 • Fig 1c suggest that £850 million pounds' worth of damage could result from a flood. • Fig 1c 15000 properties at risk from flooding. • Fig 1c flood management results in better recreation facilities and new habitats created. • Fig 1c suggest high level of importance as 800 people responded to consultation. • Fig 1c gives resident views of the scheme.

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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)

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 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

Question number	Answer	
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)

Q5.

Question number	Answer	Mark
	AO1 (1 mark) **D** Marine plants (1) is the correct response A, B, D are all biotic abiotic factors	(1)

Q6.

Question number	Answer	Mark
(i)	**AO1 (1 mark)** **D** an area of land drained by a river is the correct response. A is incorrect as this is about storage. B is incorrect as this is about water levels rather than a land area. C is incorrect as the response is about flooding.	(1)

Question number	Answer	Mark
(ii)	**AO1 (1 mark)** Award 1 mark for any of the following. • Rainfall (1) • Vegetation (1) • Soil type (1) • Depth/width of river (1) • Drainage density/number or tributaries (1) • Channel gradient (1) • Geology (1) • Velocity / river speed (1) Accept any other appropriate response.	**(1)**

Question number	Answer	Mark
(iii)	**AO1 (1 mark)/AO2 (1 mark)** Award 1 mark for the idea of a time difference/delay (AO1) and a mark for further development (AO2) up to a maximum of 2 marks: • The lag time is the delay (1) between the peak rainfall and the peak discharge (1). • Rainwater is delayed in reaching the river (1) due to interception from trees (1). Accept any other appropriate response.	(2)

Q7.

Question number	Answer	Mark
	AO2 (3 marks) Award 1 mark for the initial explanation and 2 marks for further explanation up to a maximum of 3 marks. • Urban land use usually increases the amount of land covered by impermeable surfaces (1) which means increased run-off when it rains (1) which can lead to a river regime with higher chances of floods (1). • Urban land use can lead to deforestation (1) which reduces the amount of interception from vegetation (1) which means the regime can be more flashy (1). Accept any other appropriate response.	(3)

Q8.

Question number	Answer	Mark
	AO2 (2 marks)/AO3 (2 marks) Award 1 mark (AO3) for identification of any idea from Fig 1a and a further mark for explanation of the reason (AO2) up to a maximum of two marks each. • Urbanisation (1) high levels of urbanisation will increase the speed at which water is transferred into stores (1). • Deforestation/removal of woodland (1) will increase run off rates from slopes increasing water transfer speeds (1). Accept any other appropriate response.	**(4)**

Q9.

Question number	Answer	Mark
(i)	**AO1 (1 mark)** B (Infiltration) (1) The answer cannot be A (store), C (store), D (store)	**(1)**

Question number	Answer	Mark
(ii)	**AO1 (1 mark)** A (Loss of water from ground water stores and plants) (1). The answer cannot be B, C or D as these are incorrect or transfers.	**(1)**

Q10.

Question number	Answer	Mark
(i)	**AO1 (1 mark)** A boundary of a drainage basin (1) The answer cannot be B (source), C (mouth) or D (confluence)	**(1)**

Question number	Answer	Mark
(ii)	**AO1 (1 mark)** Award 1 mark for any of the following. • Evaporation (1) • Transpiration (1) • Evapotranspiration (1) • Condensation (1) • Precipitation (1) • Overland flow / surface runoff (1) • Throughflow (1) • Groundwater flow (1) • Stream flow (1) / river flow (1) / river (1) Accept any other appropriate response.	**(1)**

Q11.

Question number	Answer	Mark
	AO3 (1 mark) Award 1 mark for the following: • Peak rainfall (1).	**(1)**

Q12.

Question number	Answer	Mark
	AO1 (1 mark) C Movement of water through the rocks below the soil	**(1)**

Q13.

Question number	Answer	Mark
	AO3 (1 mark) Award 1 mark for the following. **Waterfall (1)**	(1)

Q14.

Question number	Answer	Mark
	AO3 (1 mark) Award 1 mark for the following: Spur/Interlocking Spur	**(1)**

Q15.

Question number	Answer	Mark
	AO2 (3 marks) Award 1 mark for the identification of a cause of pollution and 2 marks for further explanation up to a maximum of 3 marks. Candidates could identify: • Wastewater from agriculture (1) can cause increased eutrophication of the water (1) because of the high concentration of chemicals (1). • Plastics dumped in rivers (1) can cause a decrease in water quality (1) damaging river ecosystems / affects the food chain (1). • Discharge of sewage (1) lowers water quality/making water dirty (1) threatening human health (1). • Chemicals have been added to the water (1) downstream impact on wildlife (1) which could disrupt food chains (1). Accept any other appropriate response.	**(3)**

Q16.

Question number	Answer	Mark
(i)	**AO1 (1 mark)** B the correct answer is abrasion as this is the only erosional process. A is not correct as it is a depositional landform C is not correct as it is a process of transportation D is not correct as it is to do with the amount of water past a given point at a given time	(1)

Question number	Answer	Mark
(ii)	**AO1 (1 mark)** Award 1 mark for any of the following. • saltation • suspension • traction • solution Accept any other appropriate response.	(1)

Question number	Answer	Mark
(iii)	**AO1 (1 mark)/AO2 (1 mark)** Award 1mark (AO1) for a point about how the water is stored and 1 mark (AO2) for further explanation **Ideas from glaciers, oceans, clouds, aquifer, groundwater, surface store, vegetation, ponds** Water is stored in a pond (1) because the water doesn't drain away because of the underlying non-porous rock (1) Water is stored in the soil (1) because it cannot not percolate through the bedrock (1) Do not accept 'ice' or 'water vapour', unless reference to a store e.g. 'cloud' or 'glacier'. Accept any other appropriate response.	(2)

Q17.

Question number	Answer	Mark
	AO2 (2 marks)/AO3 (2 marks) Award 1 mark (AO3) for identification of any factor from Fig 1a and a further mark for explanation of the reason (AO2) up to a maximum of two marks each. • Steep slopes (1) creating rapid run off and a short lag time (1). • Rock type (1) with permeable rocks allowing infiltration increasing lag time (1). • Size of drainage basin (1) with larger drainage basin leading to increasing lag time (1). • Vegetation (1) will increase the time it takes water to reach the river (1). • Saturated soil (1) increasing run off shortening lag time (1). Accept any other appropriate response.	(4)

Q18.

Question number	Answer	Mark
	AO2 (2 marks)/AO3 (2 marks) Award 1 mark (AO2) for a way in which people manage water and a further 1 mark (AO3) for how this helps respond to different levels of water needed/supply, up to a maximum of 2 marks each. • Humans build reservoirs/dam to store water (1) the water is fed into the water supply as and when it is need through careful management (1) • Dirty or used water is taken into the treatment plant either through water collection or directly from sewage (1) where it is treated and cleaned before being ready for use again (1) • Desalination plants take water from the ocean (1) where it is treated and salt removed (1) Accept any other appropriate response.	**(4)**