Oxford Revise | Geography | Answers

Chapter 19

All exemplar answers given are worth full marks.

1.1 C

1.2 This question is level-marked:

Level	Marks	Description
2 (clear)	3–4	• Sound, organised and relevant throughout, using supporting evidence and examples • Communicates good knowledge and understanding • Communicates using developed statements and ideas (e.g. uses connectives) • Uses geographical terms and vocabulary
1 (basic)	1–2	• Basic throughout with limited supporting evidence and/or examples • Communicates limited knowledge and understanding • Explanations are partial • Little or no use of geographical terms and vocabulary
	0	No relevant content

Example answer: *Geology can affect flood risk because the rock type can be permeable or impermeable. If the geology is impermeable, then water will not soak into the rocks and the soil overlaying the rock will become saturated, increasing surface runoff. If the relief is steep hillsides, then water will flow downhill very quickly into rivers, increasing the risk of flooding.*

1.3 This question is level-marked:

Level	Marks	Description
3 (detailed)	5–6	• Thorough, detailed, organised, and relevant throughout with supporting evidence and examples • Communicates detailed, clear knowledge and understanding • Communicates using developed statements and ideas (e.g. uses connectives to fully explore ideas) • Good use of geographical terms and vocabulary
2 (clear)	3–4	• Sound throughout with some supporting evidence and examples • Communicates some knowledge and understanding • Communicates using linked statements and ideas (e.g. uses connectives, but needs further development) • Some use of geographical terms and vocabulary
1 (basic)	1–2	• Basic throughout with limited supporting evidence and/or examples • Communicates limited knowledge and understanding • Communicates using simple statements that are not developed • Little or no use of geographical terms and vocabulary
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Example answer: *Deforestation as seen in Figure 1 can increase the risk of flooding because there is less interception. This means that when it rains, instead of some water sitting on leaves and evaporating back into the atmosphere, more water reaches the ground. This therefore means that more water reaches rivers through surface runoff, increasing the risk of flooding.*

Other land use changes, such as removing hedgerows or other natural vegetation, will have the same effect. Urban areas increase flood risk because they involve replacing natural vegetation with impermeable surfaces like concrete and tarmac. Water runs off these surfaces very quickly and is carried to rivers through drains which will increase the risk of flooding.

1.4 This question is level-marked:

Level	Marks	Description
3 (detailed)	7–9	• Thorough, detailed, organised, and relevant throughout with supporting evidence and examples • Communicates detailed, clear knowledge and understanding • Communicates using developed statements and ideas (e.g. uses connectives to fully explore ideas) • Good use of geographical terms and vocabulary
2 (clear)	4–6	• Sound throughout with some supporting evidence and examples • Communicates some knowledge and understanding • Communicates using linked statements and ideas (e.g. uses connectives, but needs further development) • Some use of geographical terms and vocabulary
1 (basic)	1–3	• Basic throughout with limited supporting evidence and/or examples • Communicates limited knowledge and understanding • Communicates using simple statements that are not developed • Little or no use of geographical terms and vocabulary
	0	No relevant content

3-marks: SPaG (spelling, punctuation, grammar, and specialist terminology)

Marks	Description
3	• Accurate spelling and punctuation • Rules of grammar followed • Effective control of meaning • Uses wide range of specialist terms
2	• Generally accurate spelling and punctuation • Most rules of grammar followed • General control of meaning • Uses good range of specialist terms
1	• Reasonably accurate spelling and punctuation • Some rules of grammar followed – errors do not hinder meaning • Some control of meaning • Limited use of specialist terms

Marks	Description
0	• Writes nothing • Does not relate to question • Basic grasp of spelling, punctuation, and grammar prevents clear meaning

Example answer: *I partially agree with the statement because without the natural factor of precipitation, then flooding would not happen. In addition to this, other natural factors such as the geology of an area can make flooding more likely. For example an area composed of impermeable rock or with steep relief is more likely to flood. So natural factors have a large impact on whether a flood will take place.*

However, human activity can both make flooding more likely and make flooding a hazard. If humans did not build on flood plains, for example, then most floods would not be hazardous. Furthermore, removing natural vegetation for farming reduces interception meaning surface run of increases and makes flooding more likely. Building urban areas on flood plains means there are many impermeable surfaces and water is transported to rivers much more quickly increasing the likelihood of flooding.

So humans can make floods more likely to be hazardous but without the natural factor of precipitation flooding would not happen, meaning I partially agree with the statement.

Answers disagreeing with the statement should be credited if they are supported with appropriate examples.

2.1 Discharge is the volume of water in a river passing a specific point. It is measured in m^3 per second (cumecs).

2.2 The river's discharge rose rapidly from 28 cumecs to a peak of 140 cumecs. This took a total of 27 hours. From its peak, it then decreased to about 8 cumecs over the next 43 hours.

2.3 B

2.4 48 cumecs

Accept answers between 46–50 cumecs.

2.5 52 hours

Accept answers between 50–54 hours.

2.6 C

2.7 This question is level-marked:

Level	Marks	Description
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Level	Marks	Description
2 (clear)	4–6	• Sound throughout with some supporting evidence and examples • Communicates some knowledge and understanding • Communicates using linked statements and ideas (e.g. uses connectives, but needs further development) • Some use of geographical terms and vocabulary
1 (basic)	1–3	• Basic throughout with limited supporting evidence and/or examples • Communicates limited knowledge and understanding • Communicates using simple statements that are not developed • Little or no use of geographical terms and vocabulary
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3-marks: SPaG (spelling, punctuation, grammar, and specialist terminology)

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Example answer: *The hydrograph for drainage basin A is much 'flashier' than drainage basin B. This means that the water levels rose and fell much more quickly and also peak discharge was much higher. However, both storms had similar amounts of rainfall.*

One reason for the different shapes could be that drainage basin A is for a river in a heavily urbanised area. This would mean that there are many impermeable surfaces like tarmac, concrete and tiled roofs that would mean that water cannot soak slowly into the soil. It would also mean that water enters human-made drains that carry water quickly into rivers, thus decreasing the lag time and meaning a lot of water is carried to the river very quickly. Drainage basin B might have a lot of natural vegetation that intercepts rainwater or lets it soak into soils meaning it arrives at the river slowly as through flow rather than surface runoff.

Finally, some other physical factors explaining the difference is that drainage basin A might have impermeable rocks and steep slopes and drainage basin B permeable rocks and gentle slopes. These factors would also explain the differences in lag time and peak discharge.

3.1 Hard engineering involves building physical structures to try and stop flooding taking place.

3.2 Dams and reservoirs stop flooding because the dam is a physical barrier build across the river that holds the water in the reservoir behind. Flooding is stopped because the flow of water downstream can be controlled by opening or closing gates in the dam.

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Example answer: *Channel straightening is an expensive process that also has ongoing maintenance costs as the river erodes the artificial channel. Straightening the river with concrete also destroys natural ecosystems and therefore reduces biodiversity. A benefit is that water is moved more quickly through flood prone areas, meaning that water does not build up which reduces the chances of flooding. However, a cost of doing this is that flood risk is increased downstream because water is arriving more quickly.*

3.4 This question is level-marked:

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Example answer: *The benefits of flood relief channels are that they divert water from areas that are prone to flooding. For example, a flood relief channel could move water away from an urban area where the cost of flooding would be high. A cost is that they are expensive to build and there can be ongoing maintenance costs. Another cost is that when the relief channel re-joins the main river channel then the volume of water is increased, which can increase the risk of flooding downstream.*

3.5 This question is level-marked:

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Example answer: *Some people might oppose restoration because they might be worried that their land or property will suffer from flood damage. River restoration involves removing flood defences like artificial embankments. These embankments would have been built to protect land from flooding, so when they are removed, that land would be prone to flooding, which would damage the property and bring an economic cost to the people who live there. In addition, river restoration is expensive, and people might be opposed to the cost of using these schemes.*

3.6 This question is level-marked:

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Example answer: *Flood plain zoning has many benefits but does have drawbacks. Flood plain zoning involves letting the land flood and zoning how the land either side of the river is used so that economically valuable land or land with houses and industry is zoned furthest from the river. This is effective at reducing the economic cost of flooding and has the added benefit of not interfering with natural processes. This*

means that places further downstream do not suffer from increased flooding. This is the biggest benefit because it makes this a sustainable approach.

However, land use zoning does not stop the flood, so it might be the case that some land (such as parkland) will be closed as it will be flooded. It is also difficult to do after developments have taken place over many years, so it is not suitable for every location. Overall, flood plain zoning is highly effective in places that are suitable because the cost of flooding is minimal and natural processes are not interfered with.

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Example answer: *Hard engineering strategies like flood embankments or relief channels are very effective at reducing flooding in the place where they are used. Flood embankments increase the channel capacity meaning that more water can be held in the river channel. Their effectiveness is the main benefit, but they also provide reassurance to people and certainty to property owners and businesses. The flood barriers in Figure 3 are demountable, so they are only put up when there is a high flood risk. This means they do not affect the natural beauty of an area as much as permanent flood embankments do.*

However, hard engineering is very expensive and normally involves ongoing maintenance costs, making them even more expensive over a long period of time. The biggest cost is that they interfere with natural processes and increase the risk of flooding where the defences stop. How much of a drawback this is depends on the specific location of the defences and how the land at an increased risk of flooding is used.

3.8 This question is level-marked:

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Example answer: *A range of strategies is needed to manage rivers because different strategies might be appropriate for different places along the river. In places with large populations and economic activity, it is often more appropriate to build hard engineering schemes like those in Figure 3. Flood embankments can be used successfully to protect places from flooding, but they are expensive to build and maintain so are only used where land has a lot of economic value. They also make flooding worse further downstream so they should not be used if other strategies are available.*

Strategies like flood plain zoning (Figure 4) are more sustainable but can only be used in some locations because they require the land to be available that flooding can be allowed to take place on. It is possible to use a range of strategies, like at Banbury, where storage reservoirs were built alongside extra flood embankments on land used for industry and housing. I therefore agree with the statement.

Answers disagreeing with the statement should be credited if they are supported with appropriate examples.

4.1 Natural habitats would be destroyed.

Accept other suitable answers that refer to Figure 5.

4.2 People might be temporarily homeless because their houses have flooded.

Accept other suitable answers that refer to Figure 5.

4.3 This question is level-marked:

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	0	No relevant content

Example answer: *Shops and businesses would lose money through being flood damaged. For example, stock might be ruined and need to be replaced. There would be costs to redecorate the business and finally they would lose money through being closed to customers.*

4.4 This question is level-marked:

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	0	No relevant content

Example answer: *Flood management was needed in Banbury because the town had a long history of flooding. In 1998, flooding caused £12.5m of damage with further flooding in 2007 meaning management was needed to reduce the impact of future floods.*

Answers will vary depending on flood management schemes studied.

4.5 This question is level-marked:

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Example answer: *The Banbury flood management scheme was completed in 2012 at a cost of £18.5m. It used a number of methods to reduce flood risk in the future.*

Firstly, a 2.9 km flood embankment was built to create a storage reservoir for water before the river reaches Banbury. This means that the quantity of water reaching the town could be reduced and controlled, which would reduce the risk of flooding. Secondly, further embankments were built at the Wildmere and Prodrive industrial estates. This means that at these locations of high economic value the river is less likely to burst its banks because the land is protected by embankments, thus reducing the risk of flooding.

Answers will vary depending on flood management schemes studied.

4.6 This question is level-marked:

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Example answer: *The Banbury flood management scheme, which opened in 2012, created a number of positive social effects. By raising the A361 and ensuring that it could remain open in times of flood, people were still able to travel to work or into the town for shopping or recreation. Economically, the scheme was*

expensive: it cost £18.5m. However, the value of the houses and businesses protected by the scheme was £100m, which made the scheme very good value for money.

Answers will vary depending on flood management schemes studied.

4.7 This question is level-marked:

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Example answer: *Flood management in Banbury has caused some positive environmental issues. Firstly, the flood control structures are passive and operate automatically without electricity or staff. This means that they are entirely responsive to natural conditions ensuring that they operate automatically whenever the local environment requires. Secondly, a large reservoir was dug to store flood water. This has been converted into a country park with new trees, hedgerows, and ponds. This supports local biodiversity and is an important part of Banbury's Biodiversity Action Plan.*

Answers will vary depending on flood management schemes studied.

4.8 This question is level-marked:

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Example answer: *The flood management scheme at Banbury, which opened in 2012, has been very successful. The scheme has been successful because the benefits of the scheme vastly outweigh the costs. The scheme cost £18.5m but the value of the properties and businesses protected is over £100m. Flooding in 1998 had caused £12.5m worth of damage, so this new scheme is comprehensive in ensuring that Banbury businesses and residents will not suffer from flood damage in the future.*

Along with the flood embankments and storage reservoir, the scheme also led to the creation of a new recreational space. The Borrow Pit that provided earth for the embankments was turned into a country park. This makes the scheme even more successful because as well as Banbury being protected from flooding, the environment was improved by increasing biodiversity in the area.

Answers will vary depending on flood management schemes studied.

5.1 Abrasion is when stones carried by the river scrape away at the riverbed and banks.

5.2 This question is level-marked:

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Example answer: *Waterfalls form when a river flowing over resistant rock meets a band of less resistant rock. The less resistant rock erodes more quickly, creating a small step in the river. Over time, a larger drop develops, creating a waterfall. At the base of the drop, erosion (through hydraulic action and abrasion) creates a deep plunge pool and undercutting of the more resistant rock also takes place. Geology is crucial in explaining waterfall formation because they only form when resistant rock is overlaying less resistant rock, allowing different rates of erosion to take place.*