Oxford Revise | Geography | Answers

Chapter 11 River landscapes

All exemplar answers given are worth full marks.

1

(a) the amount and the intensity of the rainfall; impermeable rocks reduces infiltration and more surface run-off

(b) more extreme weather events associated with climate change; more building has taken place on floodplains

(c) It is essential any river management projects are evaluated because there could be social, economic, and environmental impacts. Allowing a river to flow along its natural rather than a straightened course may increase the danger of flooding. Hard engineering schemes may have a negative visual impact which may be detrimental if the area attracts tourists. Hard engineering often has knock-on effects further down the river because the water must go somewhere. Soft engineering can be much cheaper than a major capital-intensive scheme. However, all management schemes will be expensive and so the benefits must be strong to ensure value for money.

(d)

(i) Floodplain zoning means that different land uses are restricted to certain locations on the floodplain, keeping more valuable uses further from the river and the danger of flooding. Planting trees increases the interception of surface water, which reduces surface run-off. This means the run-off gets into the river more slowly and decreases the danger of flooding.

(ii) Reforestation is relatively inexpensive, but it does have the disadvantage of a loss of potential farmland.

(e) This question is level-marked:

Level	Marks	Description
3	5–6	• Thorough knowledge, understanding or analysis of the issue, process or concept. • Uses well-developed ideas and line of reasoning is clear and logically structured. • Information presented is relevant and substantiated.
2	3–4	• Reasonable knowledge, understanding or analysis of the issue, process or concept. • Uses developed ideas and line of reasoning with some structure. • Information presented is mostly relevant and supported by some evidence.
1	1–2	• Basic knowledge, understanding or analysis of the issue, process or concept. • Uses simple ideas with no developed points made. • Information is basic, unstructured, and supported by limited evidence.
	0	No response or no response worth of credit.

Example answer: **The River Wye**

The River Wye flows from central Wales to join the River Severn at Chepstow. It crosses several different types of rock, creating different river landforms. In the upper course, there are impermeable shales and gritstones where steep-sided V-shaped valleys are actively weathered and affected by mass movements, and waterfalls and rapids are eroded. Alternating bands of hard and soft rock near Rhayader have resulted in a series of 'white water' rapids which are popular for kayaking. Weak mudstones and sandstones south of Hereford have been easily eroded into an extensive flat valley where sweeping meanders are common. In the south, carboniferous limestone between Goodrich and Chepstow has been eroded into the steep-sided Wye Valley gorge.

2

(a)

(i) The lack of contours indicates the area is flat. The spot height (356 337) of 4 m indicates that the area is close to sea level.

(ii) The drainage ditches enable the land in between the ditches to be drained so that the land can be used for farming. The ditches form the field boundaries.

(iii) There are several named farms on the extract, e.g. Coombe Farm 332 326.

(iv) pumping station

(v) north-west

(vi) Dyers farm

(vii) An embankment has been built around the farm.

(viii) The flooding is extensive, covering the entire area. The roads are completely inundated. All gardens are flooded, suggesting that the houses are flooded, too. Water is up to the ground-floor windows in some houses.

(ix) Social impacts would be the effect on people's physical and mental health, with the possibility of drowning or being caught in the floodwater and suffering from hypothermia. Economic impacts will be the damage to infrastructure, property, and the costs of repair if not fully insured. Farmers will lose money when their crops are ruined, and they may have higher insurance premiums in the future. Environmental impacts include soil saturation and the collapse of drainage ditches. Some vegetation might not recover.

(b) Deforestation means that the surface run-off is more rapid.; Urban development adds impermeable concrete and tarmac surfaces reduce infiltration, and so there is increased surface run-off.

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(c) This question is level-marked:

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2	3–5	• Reasonable knowledge, understanding or analysis of the issue, process or concept. • Uses developed ideas and line of reasoning with some structure. • Information presented is mostly relevant and supported by some evidence.
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	0	No response or no response worth of credit.

Soft rather than hard engineering river flood management schemes are increasingly being adopted. They tend to be less expensive and are more sustainable. They tend to be more natural and fit in with the landscape, causing less visual impact. An example is floodplain retention, where the floodplain is lowered, cleared of most development, and restored with grassland and shrubs. This increases the capacity to store water and may create new wetland habitats. The clearing of existing developments may be controversial, especially by farmers and others who make use of the land economically. Much of floodplain land tends to be of low agricultural value and other developments would always have a high flood risk. Afforestation is the most effective form of soft engineering flood management. The trees which are planted increase interception and evaporation, and so reduce throughflow and surface run-off, hence the flood risk. River channel restoration involves the expensive clearance of existing flood walls and embankments, and there is an increased danger of flooding. To counter this, returning a river to its natural state and restoring meanders along with newly planted trees is far more natural-looking than the former hard engineering strategies employed. This increases the amenity value of the area, and it benefits from diverse wildlife habitats. This may result in the development of a tourist industry, creating a new source of income to the local inhabitants.

3

(a) The lower courses of rivers are at risk from flooding because of their high discharges, and wide, flat valley cross-profiles. The flat land is easy to build on, leading to urban development. Whenever less profitable grazing has been replaced by crops, or there has been deforestation of woodland, flood risks are increased simply because built-up areas are covered by impermeable surfaces, such as tarmac and concrete ,reducing infiltration, and so water gets to the river more quickly and it is more likely to overflow its banks.

(b) Soft engineering approaches, such as floodplain retention, floodplain zoning, river restoration, and afforestation, are increasingly preferred to hard engineering when managing river flood risk because they are invariably far cheaper and, crucially, sustainable. Soft engineering approaches work in harmony with the natural environment, look natural, and create attractive green open spaces. This results in a variety of plant and wildlife habitats.

(c) This question is level-marked:

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	0	No response or no response worth of credit.

Soft engineering approaches to river flood management, such as river restoration, are seen to be suitable approaches simply because they are so much more affordable than traditional hard engineering and are sustainable. For example, river channel restoration, where rivers are returned to their natural state by removing past hard engineering 'solutions', restoring meanders, and planting trees, look more natural. There is photo evidence of attractive green open space and footpaths, which would support wildlife habitats. Floodplain retention, where the floodplain is lowered and cleared of most development and restored with grassland and shrubs, increases the capacity to store floodwater and also looks natural. Floodplain zoning, where different land uses are restricted to certain locations on the floodplain, also conserves natural habitats. Planting trees to establish a woodland or a forest is very effective. Reforestation increases interception and evapotranspiration and reduces throughflow and surface run-off, and so lowers the risk of flooding. These schemes do have disadvantages. River channel restoration involves expensive clearance of existing flood walls and embankments, and because it slows river flow, floods will occur. Flood zone planning may affect the economic development of the area and planting of trees mean that farmers lose farmland, which may reduce their income.

Questions referring to previous content

4 **(a) t**he downward movement of weathered material under the force of gravity

(b) landslides; soil creep