# Oxford Revise | Geography | Answers

## Chapter 23 River flooding and flood management

**All exemplar answers given are worth full marks.**

**1.**

**a)**

**i)** C

**ii)** D

**iii)** A

**iv)** When there are steep slopes, the surface water gets into the river quickly, increasing the discharge very rapidly. If the rock and the surface are permeable, the surface water will infiltrate slowing the rate of run-off. This delays the time rainwater takes to enter the river and so the rising limb will be at a gentler angle.

**v)** If there is deforestation then less rain will be intercepted, which leads to increased surface run-off. Water will get into the river more quickly leading to a steep rise in the discharge and a shortened time lag. If the surface is covered with natural vegetation or agricultural crops, the rainfall will be intercepted and so the surface run-off slows down. Evapotranspiration by the vegetation will mean less water gets into the river. The storm hydrograph will have a less dramatic rising limb and the time lag will lengthen. When building takes place, the surface is often covered with impermeable tarmac and concrete. This reduces infiltration and so there is a corresponding increase in the surface run-off. The hydrograph will have a shortened time lag and a steeper rising limb, increasing the danger of flooding.

**b)** Heavy rain increases the risk of flooding.
Steep slopes encourage more rapid run-off, increasing the rate of flooding.
*Accept suitable alternative answers.*

**c)** Climate change brings more extreme weather, including heavy rainstorms.
Urban land use, such as car parks and built-up areas, increases efficiency of drainage into rivers, leading to flash floods.
*Accept suitable alternative answers.*

**d)** 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 downstream because the water must go somewhere. Soft engineering can be much cheaper than a major capital-intensive scheme.


ISBN 9781382039864

**e)**

**i)** Flood plain zoning means that different land uses are restricted to certain locations on the flood plain keeping more valuable uses further from the river and the danger of flooding.
Reafforestation (planting trees) increases the interception of surface water, which reduces surface run-off. This means the run-off reaches the river more slowly and reduces the risk of flooding.
*Accept suitable alternative answers.*

**ii)** Reafforestation is relatively inexpensive but it does have the disadvantage of a loss of potential farmland.

**f)** This question is level-marked:

| Level | Marks | Description |
|---|---|---|
| 3 | 6–8 | • Accurate understanding of concepts and the interrelationship of places, environments and processes.<br>• Applies understanding to deconstruct information and make logical connections throughout.<br>• A balanced, well-developed argument. Judgements are supported with evidence throughout.<br>• Uses geographical skills to obtain accurate information that supports arguments. |
| 2 | 3–5 | • Some understanding of concepts and the interrelationship of places, environments and processes.<br>• Applies understanding to deconstruct information and make some logical connections.<br>• Imbalanced argument with mostly relevant information. Judgements are occasionally supported with evidence.<br>• Uses geographical skills to obtain accurate information that occasionally supports arguments. |
| 1 | 1–2 | • Isolated elements of understanding of concepts and the interrelationship of places, environments and processes.<br>• Attempts to apply understanding to deconstruct information but this is flawed.<br>• Unbalanced or incomplete argument with limited understanding. Judgements are supported with limited evidence.<br>• Uses some geographical skills to obtain information with limited relevance and accuracy. |
| | 0 | No acceptable response |

Example answer: *Soft rather than hard engineering river flood management schemes are increasingly being adopted. They tend to be less expensive and 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 flood plain 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 flood*

*plain tends to be of low agricultural value and other developments would always have a high flood risk. Reafforestation 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 and hence the flood risk. River channel restoration involves the expensive clearance of existing flood walls, embankments and there is an increase 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.*

**2.**

**a)**

**i)** 46 hours

**ii)** 38 hours

**iii)** Heavy rainfall; steep sides to the valley

**iv)** 32 hours

**v)** There will be increased interception and evapotranspiration which will reduce the speed and amount of surface run-off. This will mean that the river's discharge would not increase as rapidly, so future storm hydrographs will have less steep rising limbs.

**3.**

**a)** The river load is the material that the river is transporting. The heaviest material will be carried by traction, the stones and pebbles will move by saltation, and the finest materials are suspended in the water. Some material may have been dissolved and so is carried in solution.

**b)** The lower courses of rivers represent increasing flood risk because of physical and human factors. There has been an increasing use of the flood land for urban development because of the low relief and the rich alluvial soils encouraging farming. The gentle gradient of this part of the river means any increase in the volume of water after a storm means that the bank full capacity is exceeded. The water then overflows the banks resulting in flood conditions.