

Oxford Revise | Geography | Answers

Chapter 9 Coastal and river landforms

All exemplar answers given are worth full marks.

1

- (a) Hydraulic action occurs when waves compress the air in joints and faults in the rock. This widens them, and when the pressure is released as the wave retreats the weakened rock breaks up. Abrasion is when loose sediment is thrown against a cliff wearing them down
- (b) When the prevailing winds approach the coast at an angle, the swash of the waves run diagonally up the beach. The backwash runs straight down the beach under the influence of gravity. Sediment is therefore carried along the coast in a zig-zag fashion
- (c) Where there is a strong longshore drift, sand and other marine deposits are carried in a zig-zag pattern along the coast. If there is a marked change of direction of the coast, then the materials are carried out into the sea. This will result in the accumulation of sand protruding out from the sea, forming a spit. Out in the deeper water, the end of the spit will be bent back towards the coast by the stronger winds due to there being less shelter. This occurs at the mouth of a river estuary.
- (d) This question is level-marked:

Level	Marks	Description
3	5–6	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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: *Waves will be refracted around the headland, concentrating the energy on both sides. Erosion will be concentrated on the weakest points where the caves have been formed. The erosion will be the result of the marine processes of hydraulic action, abrasion, and attrition. The caves will be enlarged until the sea breaks through to the other side of the headland, creating an arch. Eventually, the marine processes will result in the roof of the arch collapsing, leaving an isolated stack or stump. In time, the whole of the headland will be eroded away by the sea.*

2

(a) A

(b)

- (i) flood plain
- (ii) point bar
- (iii) river meander
- (iv) abrasion and hydraulic action
- (v) sheep farming

(c) Attrition is where rocks and stones wear each other away as they rub and roll together and so are worn smaller, rounder, and smoother. Abrasion is where sand and pebbles are dragged along the river bed, wearing it down.

(d) River transports involves the movement of eroded sediment from one place to another. It is either rolled and dragged along in the current by a process called traction, or bounced along by saltation. The current can carry the finest sediments in suspension. Finally, some sediment can be dissolved and so transported in solution.

(e)

- (i) Levees are the natural embankments found along the banks of a river in its lower course.
- (ii) When a river floods it overflows its banks. The largest, heaviest material is deposited first, building the levees.

(f) In the lower course of a river, the fastest current swings out to undercut the outside banks of the meanders, depositing sediment on the inside bend. Over time, the shape of the meanders is exaggerated, and the neck between meander loops narrow. When the current breaks through, an ox-bow lake is formed, with deposition in the slowest moving water sealing off the old meander.

(g) This question is level-marked:

Level	Marks	Description
3	6–8	<ul style="list-style-type: none"> • 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	3–5	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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: *Waterfalls tend to occur in the upper course of a river. The gradient of a river here is steep, so it is fast flowing and has high energy. The river, however, has relatively little water in it at this stage, and much of the energy is lost through friction. The main erosive force is downward, giving the valley a characteristic V shape. If the river comes across a band of more resistant rock, despite the main erosive processes of hydraulic action, abrasion, and attrition, the downward erosion will not be as effective*

compared any less resistant rock in the river's path. The more rapid erosion of this less resistant rock will lead to the formation of a step, which eventually is marked by a waterfall. The more resistant rock will be undercut and eventually collapse. A plunge pool will be formed at the base of the waterfall because of abrasion and hydraulic action. The repeating sequence of undercutting and collapse will cause the waterfall to recede, which may leave a steep-sided gorge downstream. It is therefore the processes of erosion, especially abrasion and hydraulic action, that are most important in the formation of the waterfalls, although weathering and mass movement will also play a part.

3

(a)

(i) 35 10 / 36 10

(ii) farming

(iii) 350 081

(iv) meander

(v) Over time, the meander is likely to exaggerate as the river's flow erodes the outer bank and deposits material on the inner bank. Eventually, it may break through to the east of Quarry Plantation, cutting off the meander to form an ox-bow lake.

(vi) The relief is undulating rather than flat with the lowest land about 3 m. above sea level at 429 146 and the highest around 26 m in the southwest corner of the extract. The steepest slopes are found along the River Tees near Barwick 431 145 on the outer bank of the river's meander. The far north-west of the area is very flat. The settlement of Barwick is built on very gentle slopes.

(b) In the lower course of a river, lateral erosion is dominant, widening the river valley and the river's channels. This results in a cross-section with gentle valley sides and a wide, flat floodplain. In the upper course, the river energy is high and flow can drag boulders and pebbles along the river bed. The channel is therefore eroded vertically by the processes of abrasion and traction, resulting in a V-shaped cross-section and a narrow bottom.

(c) This question is level-marked:

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	0	No response or no response worth of credit.

Example answer: Erosion, weathering, and mass movement are all important at different stages of the river's course. In the upper course, steep gradients give the river high energy so it cuts down vertically by a

process of potholing. This is where rocks are drilled into the river bed when they are trapped in swirling eddies. The sides of the valley are affected by weathering, especially freeze-thaw if the river is high in the mountains. This breaks up the rock, and the mass movement processes of soil creep and rockfalls result in the debris falling into the river, increasing abrasion. As the river moves into its middle and lower courses, lateral erosion becomes dominant because more water has joined the main river from tributaries, and so the river can carry a larger load. The fastest current starts to swing from side to side, undercutting the outside banks of meanders, depositing sediment on the inside bed. The meanders get larger and wider and widen the valley further. In the lower course of the river, deposition is the dominant process. The gradient is almost flat. The main effect of the river on the landscape is when it is flood. The river will overflow its banks, dropping the heaviest materials first, forming levees and the finer silt is deposited over the floodplain, forming layers of alluvium.

Questions referring to previous content

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- (a) A broad term for all the physical processes taking place on the Earth's surface, such as weathering, mass movement, and erosion.
- (b) The UK's landscape is affected by it (e.g. relief rainfall) but also helps create it through weathering processes.