Oxford Revise | Geography | Answers

Chapter 20 Coastal change and processes

All exemplar answers given are worth full marks.

1.

a)

i) The Purbeck and Portland limestones are likely to erode further, which will widen and deepen Stair Hole. Eventually it could reach the less resistant chalk and create another cove.

ii) A concordant coast has the rock strata parallel to the coast. This results in a fairly straight coast. On a discordant coast, the rock strata are at an angle to the coast. This allows the less resistant rock to be eroded to form bays leaving the more resistant rock sticking out as headlands.

b) 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 down both the cliffs and the sediment.
Accept suitable alternative answers.

c) 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.

d) Bars and spits are both accumulations of sediment extending out from the coast.
Accept suitable alternative answers.

e) This question is level-marked:

Level	Marks	Description
3	6–8	• Accurate understanding of concepts and the interrelationship of places, environments and processes. • Applies understanding to deconstruct information and make logical connections throughout. • A balanced, well-developed argument. Judgements are supported with evidence throughout. • Uses geographical skills to obtain accurate information that supports arguments.

Level	Marks	Description
2	3–5	• Some understanding of concepts and the interrelationship of places, environments and processes. • Applies understanding to deconstruct information and make some logical connections. • Imbalanced argument with mostly relevant information. Judgements are occasionally supported with evidence. • 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. • Attempts to apply understanding to deconstruct information but this is flawed. • Unbalanced or incomplete argument with limited understanding. Judgements are supported with limited evidence. • Uses some geographical skills to obtain information with limited relevance and accuracy.
	0	No acceptable response

Example answer: *A coastline is ever changing due to the processes of erosion and deposition, the type of wave reaching the coast and the weather conditions which may differ from season to season. A constructive wave with a strong swash and a weak backwash will result in the build-up of sediment. This will result in the formation of a beach as well as depositional landforms such as spits, bars, and tombolos. Sand may block a bay which had acted as a natural harbour. Storm conditions tend to occur more frequently in the winter. The stronger wind will cause the waves to have a stronger backwash then swash and so the coastline will be worn away by erosion. Variations in the resistance of the different rocks along the coast will result in the more resistant rocks forming headlands. The waves will bend around the headland and concentrate on attacking any weaknesses. Over time the weakness will be enlarged by marine processes to form caves, arches and, eventually, stacks and stumps. In this way the headland is worn away, at the same time as the bays are filled in with deposits. Over geological time, a coastline will be worn away by cliff retreat as a wave-cut platform is created at their base. If the local geology is made up of unconsolidated glacial drift, then the rate of erosion can be very rapid. Parts of the east coast of England are being eroded by several metres a year. All these changes, whether they occur over a short or longer period, mean the coast is a particularly dynamic zone.*

2.

a)

i) B

ii) Hydraulic action; abrasion
Accept suitable alternative answers.

iii) Rock type describes the geology of the coast, but rock structure represents the way the different rock types are arranged relative to one another.

iv) 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. 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.

b)

i) A constructive; B destructive.

ii) Climate change is leading to more frequent and more severe storms. The stronger winds associated with these storms result in the waves becoming more destructive.

iii) If the waves are constructive then more deposits are carried up the beach and so they get larger. This may occur seasonally, being more common in the summer months when the wave heights are shorter, and they are further apart. Constructive waves also occur when there is a gentle slope offshore. Sand can be washed away when strong winds or a steep gradient offshore create destructive waves. If the prevailing winds approach the coast at an angle, it can cause longshore drift. This moves sand along the coast so that one part of the coast may be losing sand, while another part further along the coast receives the sand, making the beach bigger.

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 from the sea forming a spit. 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) The waves will attack the coast at the base of a cliff. Over time this will create a wave-cut notch. The notch gradually gets larger, and the cliffs collapse because it is unsupported. The process is repeated over a long period of time leading to the cliff retreating backwards. This leaves a gently sloping wave-cut platform which is exposed at low tide. Wave refraction concentrates its energy onto a headland, eroding it from either side. The marine processes of hydraulic action, abrasion, and attrition work away at any weakness in the headland such as joints, cracks, or areas of less resistant rock. To begin with, a cave is formed which gets enlarged and the sea breaks through to the other side creating an arch. The roof of the arch will eventually collapse leaving a stack and eventually a stump.
Accept suitable alternative answers.

3.

a) Sub-aerial processes are when the processes of erosion, weathering and mass movement occur on the surface of the land rather than underground or in water.

b) The type of climate will affect the type of weathering or erosion taking place. The height of the land will affect the climate and the sub-aerial processes taking place.