**Q1 [PEQ 1931]**

**(c) Using named examples, explain recent changes in the type of strategies used to manage coastal erosion. *(10 marks)***

**What to put in your answer**

* The key words are recent coastal defence strategies.
* There is increasing use of **sustainable strategies**, which could include soft as well as hard engineering strategies, as they are more environmentally friendly.
* Recently shoreline management plans have classified all stretches of coast into four classes.
* Advance the line, hold the line, do nothing, managed natural retreat and making space for water are all management strategies. With rising sea levels, management must be economically sustainable as it is only possible/affordable to defend high-value coastal areas.
* Another approach which might be considered is integrated coastal zone management.
* It is important to use real examples to support your answers.

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| **Level 3** | 8–10 marks | Structured explanation of a range of recent coastal defence strategies. Well exemplified. Uses appropriate geographical terminology. Written language errors are rare. |
| **Level 2** | 5–7 marks | Some structure. Begins to look at one or two recent strategies. Occasionally exemplified. Uses some geographical terminology. There are some written language errors. |
| **Level 1** | 1–4 marks | Little structure. One or two coastal defences described. Not likely to be recent. Geographical terminology rarely used. There are frequent written language errors. |

**STUDENT A**

All around the world there is a move towards more sustainable and integrated approaches to coastal management. Integrated coastal zone management deals with both onshore and offshore zones.  
  
For example in St Lucia’s tourism enclave much of the coral reef damage results from land based activities which lead to both siltation and pollution. Therefore all coastal planning looks at a range of issues including transport, business and fishing as well as the coastal features themselves. The aim is to conserve the coastal environment, but at the same time allowing people to make a living from it.   
  
In the UK, DEFRA is responsible for the production of shoreline management plans (SMPs). All stretches of coast are classified into one of four strategy decisions. Advance the line, i.e. building new coastal defences, is only economic where high value installations such as Easington Gas Terminal, have to be protected because of rising risks.  
  
Cost–benefit analysis would suggest that all heavily built-up areas such as the towns of Hornsea, Skipsea and Kilnsea along the Holderness coast need to be protected i.e. hold the line, where existing seawalls are protected by supplementary defences such as rip-rap revetments or beach nourishment.  
  
In low density areas it is not sustainable to defend the coasts so a do nothing strategy is economically very sustainable, especially with rising risks from global warming. However for those few people with houses which are ‘doomed’ by this strategy as in Burling Gap in Sussex or parts of the Norfolk coast as at Happisburgh, it is socially and culturally unsustainable. Red lining is a technique used by planners preventing future coastal building in erosion risk zones.  
  
Managed natural retreat or coastal realignment is a measure which ‘makes space for water’ by allowing the sea to flood previously reclaimed land, as is happening along the Essex coast at Blackwater estuary. Salt marshes are formed which trap sediment and gradually create new coastal wetlands and wildlife habitats. This strategy is environmentally extremely friendly and also economically sustainable because it saves expenditure on failing seawalls.  
  
In conclusion, new ways of managing coasts have moved away from the wholesale use of concrete hard engineering structures, which have proved expensive and visually intrusive leading to a more cost effective, selective approach.

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**STUDENT B**

Recent changes in coastal defence methods have been traditional hard defences being replaced by soft and sustainable approaches.  
  
Hard defences, like seawalls and even groynes, were built at important places such as holiday resorts to protect them from erosion. These absorb the power of the waves. The problem is that if you protect one part of the coast another gets eroded or flooded. Resorts like Hastings with its pier, harbour and groynes is causing problems further east. Rock armour is now used and a shingle embankment and floodwall protect the low land from flooding. These hard defences are getting old and costly to repair.  
  
The new government policy, supported by Natural England and DEFRA, is for places where few people live or there is only farmland should be allowed to flood. This is to save money and let nature take its course. With no more maintenance and rising sea levels, places like Pett Level will soon be covered by the sea. This strategy of managed retreat may not be popular with some residents but it does free money to protect more populated and important places like resorts and harbours. New houses are still being built but further inland away from the cliffs. You cannot spend more on defences than the value of what you are trying to protect.

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**(b) Describe and explain a programme of fieldwork and research you would use to investigate the threat from coastal erosion or coastal flooding. *(15 marks)***

**What to put in your answer**

* Identify which specification alternative you should base your answer on, i.e. coastal erosion **or** coastal flooding.
* Note the question is about threats not impacts.
* Be **precise** about fieldwork and research equipment and techniques, where you carried out your research and why.
* Rates of erosion/flooding can be measured using **secondary data**, such as old photos, OS maps, records or newspapers. The Environment Agency and DEFRA measure and record information regularly, as do local councils. A fieldwork snapshot of erosion/wave processes may help establish likely causes and surveys of presence/state of repair of sea defences/protection may indicate rates/threats, etc.
* In discussing threats, you should consider land use and values, amount of development and population density. This may require land use surveys and research into rateable values to establish the degree and likelihood of risks, and perhaps hazard assessment. Questionnaires to test the perceptions and concerns of local groups may be useful.
* Think about what a **programme** means; give detail about three primary activities and also **evidence** (websites, etc.) of secondary research.

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| **Level 4** | 13–15 marks | Structured account which refers to details of candidate’s own fieldwork and use of research sources. Explores a range of threats using appropriate terms and exemplification to show understanding. Written language errors are rare. |
| **Level 3** | 9–12 marks | Structured explanation of fieldwork plans, methodology and use of research sources showing the impacts of coastal flooding or erosion. Uses terms and examples/details. Written language errors are minor. |
| **Level 2** | 5–8 marks | Some structure. Describes some fieldwork and identifies some research sources about the impacts of coastal erosion or flooding. Some geographical terminology is used. There are some written language errors. |
| **Level 1** | 1–4 marks | Little structure. One or two basic ideas about fieldwork or research ideas on coastal erosion or flooding. There are frequent written language errors. |

**STUDENT A**

Research into the boulder clay Holderness coast reveals that this is one of the fastest eroding coastlines in Europe. Old maps refer to 29 villages disappearing. The East Yorkshire Coastal Observatory website run by Hull University is a good place to start research. It uses archives of old OS maps and satellite images to plot the pattern of coastal retreat along the Holderness coast. The detailed rate of erosion along the coastline (on average 2 m per year and increasing) is monitored by East Riding Council, using a series of mileposts set in the beaches. Particular storm events and places eroding fastest are often written about in local newspapers such as the Holderness Gazette. Old photographs and OS maps are especially useful in showing where houses have been lost to the sea and just how quickly the beaches and cliffs along this coast have retreated.   
  
We carried out fieldwork at Mappleton and Kilnsea and Cowden, having located them on Google Earth. Even though defences have been built at Mappleton to protect the village and main road, evidence of recent erosion can be found. We measured and photographed the small bay that is forming beyond the rock groyne. Waves have undercut the cliffs and longshore drift is scouring material from the narrow beach. Slumping has already caused the fence and part of the car park to collapse. Three km further down the coast at Cowden erosion has destroyed two farmhouses. There are very few residents in the village of Mappleton, so trying to survey local views about the erosion could be difficult — we arranged interviews at the local school which was better than a random questionnaire.  
  
At New Kilnsea is the Bluebell Visitor Centre. Between here and the coast are the remains of old groynes, seawalls and embankments, all unable to protect the area from erosion by winter storms. Driving onto the spit, you have to take detours to avoid places where the old road has been destroyed by the waves. Further south, the line of the old railway is at an odd angle, showing how the spit is migrating as it erodes on the east and grows on the west. These features could be plotted on a copy of an old map to see the pattern and rate of erosion.

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**Student response B**

Evidence of secondary research.

Holderness coastline is one of the fastest-eroding coastlines in Europe. The coast is found between Flamborough Head and Spurn Head and is made from boulder clay. As a result of increased storm events combined with rising sea level in recent years the coastline has receded by up to 10 m. We saw this rapid erosion at Barmston Bungalows. One of the owners bought one as a holiday cottage hoping it would last for 30 years. Sue Earle actually lost her farm at Cowden.  
  
Clearly when cost–benefit ratios are favourable this coast has to be defended, for example when we looked at the Shoreline Management Plan we found that they had to build new coastal defences to defend the Easington Gas Terminal — called advance the line. At Hornsea and Kilnsea and Mappleton they ‘hold the line’ as there are high value buildings and a road to defend. Unfortunately downdrift erosion from Mappleton results from sediment starvation caused by the new rock groyne, so some places are experiencing accelerated erosion. At Spurn Head there has been so much erosion that they have had to build the lighthouse several times.

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