3.2 Option: Oceans and coastal margins

Name: _____ Class: _____ Date: _____ **Total: 30 marks**

KEY WORDS hydraulic action • abrasion • longshore drift • groyne • beach nourishment • managed realignment • exclusive economic zone

Objective

Build the skills to answer Paper 1 questions on the **oceans and coastal margins** option: wave erosion and deposition, coastal landforms, **longshore drift** , coastal management, mangroves and coral reefs, and who controls and uses the oceans.

You must be able to:

- explain hydraulic action and abrasion, and how headlands, bays, caves, arches and stacks form
- explain longshore drift and its effect on coastal defences
- evaluate sea walls, groynes, beach nourishment, mangroves and managed realignment
- calculate a rate of cliff retreat and its effect on a place
- explain the value of mangroves and coral reefs and the threats to them
- explain exclusive economic zones

1 Key knowledge and worked examples

Processes and landforms

- **Hydraulic action** : water and air forced into cracks. **Abrasion** : rocks thrown against the cliff. Where waves lose energy they **deposit** sand and shingle: beaches and **spits** .
- Where hard and soft rocks meet the sea, soft rock erodes into **bays**; hard rock is left as **headlands**, where cracks become caves → arches → stacks.
- **Longshore drift**: waves move sand along the coast in the direction of the main wind and waves (swash up the beach at an angle, backwash straight down). So defences in one place affect the next place.

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strategy	how it works	problem
sea wall	reflects waves	expensive; beach in front is eroded
groyne	traps drifting sand	coast further along gets less sand
beach nourishment	sand added	repeated every few years
mangrove planting	roots hold mud, slow waves	needs warm, sheltered coasts and time
managed realignment	old defences removed; sea floods low land → salt marsh	farmland and some homes lost

Case study: Holderness, England. Soft clay cliffs lose about **2 m a year** on average. Groynes at Mappleton (1991) protected the village, but cliffs to the south then eroded faster. At **Medmerry** (2013) defences were moved inland; the new salt marsh protects homes and is a bird habitat.

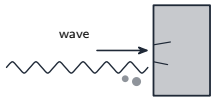
Ocean ecosystems and ownership

Mangroves and coral reefs protect coasts from waves, are nurseries for fish and store carbon. Threats: clearing for shrimp farms and tourism, pollution, warmer and more acidic water (coral bleaching). Under the UN Convention on the Law of the Sea, a country controls fishing, oil and gas in its **exclusive economic zone** (EEZ) , up to 200 nautical miles from its coast.

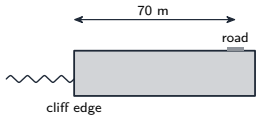
Worked example. A cliff retreats 2 m a year. A house is 46 m from the edge. Time until the edge reaches it $\approx 46 \div 2 = 23$ years (sooner if storms or sea-level rise speed up erosion).

2 Practice

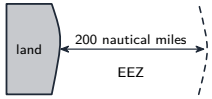
2.1 Distinguish between **hydraulic action** and **abrasion**. [2]



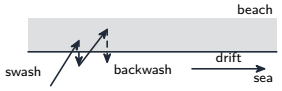
2.2 A cliff on the Holderness coast retreats about 2 m a year. A road is 70 m from the cliff edge. Calculate how many years it will take for the edge to reach the road, and give **one** reason why it could be sooner. [3]



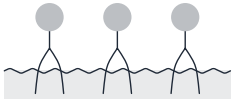
2.3 Define an **exclusive economic zone** (EEZ). [2]



2.4 Explain how **longshore drift** moves sand along a beach. [3]



2.5 Explain **two** ways in which mangrove forests are valuable to people. [4]



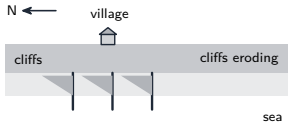
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3 Exam-style questions

3.1 *(Paper 1 style.)* The diagram shows a coast where groynes were built to protect a village.

(a) Using the diagram, identify the direction of longshore drift and give **one** piece of evidence. [2]

(b) Explain why the cliffs south of the groynes are eroding faster than before. [4]



3.2 "Managed realignment is the best way to manage coasts in the future." Discuss this statement. [10]