Coastal systems geomorphological & coastal processes *3.1.3.2* ANSWERS

Q1	***Match the terms with their process description***	
A	Repeated heating & cooling of rock leading to expansion & contraction	**Exfoliation**
B	Tree roots widening fissures at the top of a cliff	**Biological action**
C	Cliff faces being chipped as storm waves fling material at rock faces	**Corrasion/abrasion**
D	Smoothing, rounding & reducing of beach material by swash/backwash	**Attrition**
E	Powerful effervescence of compressed air as waves recede from joints	**Cavitation**
Corrasion/abrasion cavitation attrition exfoliation biological action		

Q2	**Tick whether these involve Erosion or Weathering processes**	**Erosion**	**Weathering**
A	Freeze thaw action		✓
B	Hydraulic action	✓	
C	Dissolving action by acid rain		✓
D	Quarrying	✓	
E	Attrition	✓	
F	Corrasion	✓	
G	Oxidation of ferrous minerals within coastal rocks		✓

Q3	**Tick the 2 factors out of each trio that will be most influential in the following processes**			
A	Freeze-thaw action	**Diurnal temp. range**	**Predominant wave direction**	**Degree of jointing of rock**
		✓		✓
Joints & fractures are required for water to penetrate (day), freeze (night) & expand in to widen				
B	Cliff slumping	**Offshore currents**	**Nature of cliff material**	**Intensity of rainfall**
			✓	✓
Softer cliff material that is made heavier & lubricated by rainfall is more likely to slump				
C	Spit formation	**Change in angle of coastline**	**Longshore drift**	**Concordant coast**
		✓	✓	
L/drift provides the material that is deposited as wave energy declines at changes of coast orientation. It can extend across a discordant coastline irrespective of changes in the rock type.				
D	Longshore drift	**Predominant wave direction**	**Predominant wind direction**	**Tidal range**
		✓	✓	
Predominant wind direction will drive the predominant wave direction at an angle to the beach for swash to be driven up at an angle irrespective of tidal range.				
E	Cliff retreat	**Nature of cliff material**	**High energy coast**	**Length of ocean fetch**
		✓	✓	
Cliffs of softer material will retreat faster at a high energy coast. It's not always the longest fetch that creates high energy conditions; the N. Sea has a shorter fetch than the Atlantic but the Holderness coast is the fastest eroding coast in the country when high energy conditions prevail.				

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Q4	***How would geomorphological & coastal processes be different along the Holderness coast if these variables were changed?***
Development of stacks	***Retreat of the Holderness coast***
If the coastal rock at Flamborough Head was granite….. *Unlikely that stacks would develop. The hardness of granite compared with chalk means it is far more resistant to erosion. The structure of granite lacks the fissures, joints and bedding planes that facilitate the development of caves to erode into arches and stacks. The nature and structure of an igneous rock means far longer is required for caves to develop and the landforms, if they did occur, would take longer, and last longer.*	If the boulder clay cliffs were twice the height…. *Higher cliffs would slump a greater quantity of material onto the beach in mass movement. This needs removing by wave action before a new wave-cut notch can develop in the new cliff position and lead to further cliff slumping. The rate of retreat would slow down considerably, although it would continue.*
Growth of Spurn Point	***The East Yorkshire coastal landscape***
If coastal erosion protection methods were put in place along the full Holderness coast…. *Spurn point requires a continuous provisioning of eroded material from upcoast to be deposited along its length by longshore drift. It this supply was interrupted by coastal protection, the spit would no longer grow southwards and it would begin to erode more rapidly at its vulnerable neck. A breach is more likely and the entire spit could be rapidly eroded as the balance of erosion/deposition is tipped in favour of sediment loss.*	If it was an entirely concordant coastline…. *The Holderness coastal landscape is defined by its discordant nature: a chalk headland at Flamborough and glacial deposits of boulder clay along the majority of the coastline. This gives rise to different processes and sediment inputs into the sub-cell. If the coast was all chalk, or all boulder clay the range of erosion features would be reduced as would the nature of depositional features.*

Q5	***Compare and contrast the roles played by Weathering and Erosion processes at the coast.***
Weathering: *This causes the loss of internal coherence of solid rock and eventual disintegration in situ. The debris from weathering is often removed by agents of erosion. This may present a fresh rock surface for further weathering to take place. Similar to erosion, there are physical (mechanical), chemical and biological forms of weathering. However, t often takes place well above direct wave action, affecting rock that is not directly subject to erosion by marine erosional processes, but may take place all the way down to the sea bed.*	
Erosion: *This causes rock to break down and be removed from its location. Marine erosion is often confined to the intertidal zone between low and high tide, although wave action in storm conditions may affect cliff faces at some height above high tide. Erosion processes can operate on their own, or upon the results of weathering, removing rock debris and acting on weaknesses that weathering has initiated/exploited. Erosion involves transportation of rock debris, unlike weathering.*	