Coastal landform and landscape development *3.1.3.3* ANSWERS

Q1	***Which 1 of these terms associated with coastal landforms is the 'Odd one out' and why?***	
A	Stack	
B	Blow hole	
C	Wave cut platform	
D	Hydraulic action	✓
E	Wave cut notch	
All other ones are coastal 'features'; hydraulic action is a 'process'		

Q2	***Which of these coastal features is a result of Erosion, and which Deposition***		
		Erosion	***Deposition***
A	Stump	✓	
B	Offshore bar		✓
C	Arch	✓	
D	Spit		✓
E	Barrier island		✓
F	Marine platform	✓	
Students thinking from a systems perspective may point out that any features of 'deposition' depend on an earlier stage of 'erosion' to provide the material to be deposited.			

Q3	**Tick which of the alternative formation sequences is most likely**	
A	Arch – Stump – Stack	
	Stack – Stump – Arch	
	Arch – Stack – Stump	✓
Arch roof collapses to leave a stack. Stack is eroded at base & weathered at top to leave a stump		
B	Marine platform – Cliff retreat – Undercutting	
	Undercutting – Cliff retreat – Marine platform	✓
	Cliff retreat – Undercutting – Marine platform	
Wave-cut notch undercuts the cliff face; cliff retreats in mass movement rock fall; & widens m. platform		
C	Offshore island – Spit extension – Tombolo	✓
	Spit extension – Offshore island – Tombolo	
	Spit extension – Tombolo – Offshore island	
Offshore island pre-exists the development of a spit. The combined feature is a tombolo		
D	Longshore drift – Spit extension – Compound recurvature	✓
	Spit extension – Longshore drift – Compound recurvature	
	Longshore drift – Compound recurvature – Spit extension	
L/drift is a precursor to spit development & extension. Compound spit recurvature proceeds as it grows		
E	Spit extension – Lagoon infilling – Bar	
	Bar – Spit extension – Lagoon infilling	
	Spit extension – Bar – Lagoon infilling	✓
As a spit extends across a bay it creates a bar. Then the lagoon is tide-free & calm enough for infilling		

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Q4	***Comparing two distinctive coastal landscapes, how might each of the variables affect the development of the named features***
The development of stacks	Heavily fissured sedimentary cliffs: *Sedimentary means bedding planes as well as vertical fissures that provide weaknesses for marine erosion & subaerial weathering to enlarge to produce caves, that rapidly develop into arches. As arch roof thins and collapses numerous stacks may remain, although if the rock is too highly fissured these may not be long-lasting*
	Igneous granite cliffs: *Very few weaknesses for erosion/weathering processes to exploit in a granite intrusion. Also the minerals of granite are particularly resistant to erosion. Over very long periods caves, arches and stacks may develop, which are long-lasting but few in number along a given length of coast. Likely to be vertical with little weathering.*
The formation of spits	Consistent longshore drift along a discordant coastline of rock of variable resistance: *A few small spits may develop at changes in coastline orientation – downcoast of headlands. Headland/bay alternation likely to develop on discordant coast although much of the eroded less resistant rock is likely to stay stored in bay-beach form rather than be moved downcoast to form spits. More likely on limited indentation with greater proportion of softer rock than harder to generate sediment for spit formation.*
	Consistent longshore drift along a concordant coastline of glacial till: *Along the length of the coast there are unlikely to be spits as there will be few changes of coastline orientation. The exception is at the end of particular stretch of uniform coast where one large spit is likely to develop from the large amount of eroded material being moved along the coast by longshore drift.*
The development of barrier islands	At the mouth of major drainage system with isostatic recovery matching rising sea level: *Large quantities of sediment will be introduced at the coast by the river to add to coastal sediment. The barrier island formation process is not fully understood but prolonged sediment deposition by onshore currents is necessary. Relative sea level will remain unchanged if isostatic rise matches sea level rise, giving more opportunity for sustained deposition and barrier island development.*
	At the mouth of a minor drainage system with no isostatic recovery and rising sea level: *A net rise in relative sea level will lead to deposited sediment being submerged deeper. With little input of drainage basin sediment, the process is more likely to lead to the development of offshore bars rather than barrier islands that rise above the surface of the sea.*
Developing cliff profile	Where the cliffs are 50m high, composed of sandstone, dipping towards the sea: *The angle of dip means mass movement of sandstone eroded from the cliff face is likely to slide forwards as large-sized blocks of sandstone. These will accumulate at the base of the cliff to provide significant protection against further cliff retreat until they are eroded away. The rock fall plus dipping cliff face are likely to provide a convex overall cliff profile.*
	Where the cliffs are 100m high, composed of sandstone, at right angles to the sea: *The higher cliffs mean much more material falls to the foot of the cliff when mass movement occurs. The cliff face is likely to be vertical with a considerable accumulation of rock fall resulting from undercutting. The cliff profile is likely to be concave at the base rising to a vertical cliff face.*

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Q5	***Explain all the ways the last advance and subsequent retreat of ice may still be influencing key features along a contemporary coastal landscape***

Isostatic recovery: apparent fall in relative sea level…..

Relict caves, arches, marine platforms, raised beaches left well above present active coastal zone.

Development of coastal saltmarshes: isostatic recovery in NW Scotland is having a downward tipping effect on SE England, leading to low-lying farmland in Essex (Canvey Island) being more frequently inundated by saltwater.

Rapidly eroding cliffs of glacial till…..

May generate considerable sediment input to form wide, long beaches…..

May lead to significant spit formation downcoast (Orford Ness, Spurn Point)

Fjords: features of over-deepened glacial valley erosion that subsequent sea level rise has inundated.

Rias: features of river valley erosion in areas beyond maximum glaciation that have been submerged as a result of subsequent sea-level rise.

Arguable that the 'subsequent retreat of the ice' is still continuing as anthropogenic factors lead to polar ice to melt. So giving rising sea levels, erosion features occurring higher up cliff faces and the submergence of low-lying depositional features could all be said to be impacts.