

# **Geography A**

Advanced GCE **2683**

Physical and Human Geography

## **Mark Scheme for June 2010**

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## Group A Options

### Coastal Environments

1. (a) Describe processes of marine erosion and transportation. [20]

(b) Explain the formation of swash-aligned and drift-aligned beaches. [25]

(a)

Processes of marine erosion are fundamental to this Option and should be well known and understood by candidates. Care must be exercised regarding terminology as there are a variety of terms used for the same process.	
AO1+ AO2	<ul style="list-style-type: none"> <li>quarrying / hydraulic action</li> <li>abrasion / corrasion</li> <li>solution / corrosion</li> <li>attrition</li> <li>mention of the sea removing material produced by sub-aerial processes and thus maintaining marine attack are relevant</li> <li>traction of larger calibre sediment</li> <li>saltation of sands / gravels + small pebbles</li> <li>suspension of small calibre sediment – a likely Level 3 indicator</li> <li>solution</li> <li>aeolian transport relevant in coastal zone</li> </ul>
AO3	<ul style="list-style-type: none"> <li>Level 1 if only one process mentioned</li> <li>Level 2 for two processes</li> <li>Level 3 for three + processes</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

(b)

Both these types of beaches are explicitly mentioned in the Spec. and so should enjoy secure knowledge and understanding.	
AO1+ AO2	<ul style="list-style-type: none"> <li>swash-aligned – crescent-shaped bay-head beaches on indented coasts where waves are fully refracted. May be some longshore movement of sediment within the bay but limited – main movement is on-shore/off-shore, a point needed for Level 3.</li> <li>drift-aligned – waves not fully refracted and so longshore drift occurs. Often form where coast changes direction e.g. estuaries. Recurved ridges mark phases in growth. Associated with low tidal range &gt;2m – when mentioned a likely indicator of a Level 3 response.</li> </ul>
AO3	<ul style="list-style-type: none"> <li>only one beach type mentioned then bottom of Level 2 maximum</li> <li>a simple catalogue of factors can reach bottom of Level 2 max; attempts to consider 'interaction' are likely to be top of level 2 as a minimum.</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

2. (a) Describe the sub-aerial processes involved in the formation and development of marine cliffs. [20]
- (b) Explain the role of vegetation in the formation and development of salt marsh and sand dunes. [25]

(a)

This topic should be well known to the candidates with cliffs probably being the best known of all coastal landforms. Marks across the AOs could come from diagrams.	
AO1+ AO2	<ul style="list-style-type: none"> <li>• without either of weathering / erosion or mass movement bottom of level 2 max</li> <li>• all the weathering processes relevant</li> <li>• all the mass movement processes relevant</li> <li>• Level 3 indicator might be the degree to which sub-aerial linked with appropriate geology</li> <li>• mention of marine processes have some relevance where the focus is on the basal removal by wave action of sediment produced by sub-aerial processes which maintains or increases the portion of the cliff exposed to sub-aerial – a likely Level 3 indicator</li> </ul>
AO3	<ul style="list-style-type: none"> <li>• Level 1 if no mention of sub-aerial processes</li> <li>• Level 2 + 3 when processes clearly linked with cliff formation + development</li> </ul>
AO4	<ul style="list-style-type: none"> <li>• see generic mark scheme</li> </ul>

(b)

Both sand dunes + salt marshes are explicitly mentioned with the former also a key element of AS Physical Core. It is the quality of the discussion centred on role of vegetation that will exert a strong influence on the final mark.	
AO1+ AO2	<ul style="list-style-type: none"> <li>• both ecosystems at their most extensive where low energy environments exist – exposed coastlines receive too great an energy input especially waves to allow vegetation to become established</li> <li>• larger tidal ranges can aid both – dunes as a larger area of foreshore can be exposed, sediment dries and then blown on-shore; salt marsh as greater area can be subject to lower velocities thus encouraging sedimentation</li> <li>• vegetation reduces water / wind velocities to encourage sediment deposition</li> <li>• both involve process of succession</li> </ul>
AO3	<ul style="list-style-type: none"> <li>• consideration of only one ecosystem restricts to top of Level 1 max.</li> <li>• without role of vegetation, i.e. listing of factors, bottom of Level 2 max. e.g of interaction – relating wave energy to sediment calibre</li> </ul>
AO4	<ul style="list-style-type: none"> <li>• see generic mark scheme</li> </ul>

## Fluvial Environments

3. (a) Describe variations in the efficiency of fluvial channels. [20]

(b) Explain variations in long and cross-profiles of rivers. [25]

(a)

A key element here is that the candidate understands that only a small proportion of the total energy in a fluvial channel is available for the processes of erosion and transportation. The lower the proportion of total energy used in overcoming friction with the bed and banks and of the water itself the more efficient the channel.	
AO1+ AO2	<ul style="list-style-type: none"> <li>hydraulic radius (cross-sectional area/wetted perimeter)</li> <li>width-depth ratios (width i.e. bank to bank/average depth)</li> <li>bed roughness – Manning's equation is explicitly mentioned in the Specification and its absence is likely to indicate a Level 1 response</li> </ul>
AO3	<ul style="list-style-type: none"> <li>Level 1 if no mention of bankfull discharge</li> <li>Level 2 + 3 likely when roughness considered</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

(b)

Long and cross-profiles are explicitly stated in the Specification and it is hoped that the students will have looked at these in the context of some map work investigation / mapping computer programme	
AO1+ AO2	<ul style="list-style-type: none"> <li>effects of climate change on equilibrium</li> <li>sea level change linked to base level; river terraces paired and unpaired</li> <li>canyon formation</li> <li>incised and entrenched meanders</li> <li>knick points; rapids; waterfalls</li> <li>aggradation e.g. at end of ice age with high energy flows, high sediment loads + braided channels; also today in regions with glaciers e.g. Alps; Cascades</li> </ul>
AO3	<ul style="list-style-type: none"> <li>there does not need to be equal treatment of both long and cross-profiles but the omission of one leaves the response at bottom of Level 2</li> <li>comments about aggradation likely to indicate a top of Level 2 / Level 3 response</li> <li>responses highlighting paired + unpaired terraces / incised + entrenched meanders likely to indicate top of Level 2 / level 3 response</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

4. (a) Describe the influence of human activities on sediment load. [20]

(b) Explain the pattern of riffles and pools typically found along meandering rivers. [25]

(a)

A variety of human activities can affect discharge and sediment load. Rivers adjust to changes caused by human activities and eventually a new equilibrium is established. Local scale examples just as effective as the macro-scale ones.	
AO1+ AO2	<ul style="list-style-type: none"> <li>land-use – rural to urban increases run-off + discharge – implications for energy and therefore sediment load</li> <li>land-use – urbanisation increases sediment loads through construction of roads, bridges, buildings</li> <li>land-use – pastoral to arable increases discharge + sediment load</li> <li>dams – downstream discharge regulated. Runoff as % of total precipitation falls. Implications for sediment load</li> <li>water abstraction – similar points</li> <li>channel straightening – implications for energy levels + sediment load</li> </ul>
AO3	<ul style="list-style-type: none"> <li>Level 1 max if only discharge / sediment</li> <li>Quality of link between human activity and fluvial factors will help advise the Level; Level 1 max if no link</li> <li>Bottom of level 2 max if no exemplification</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

(b)

Riffle and pool sequences are explicitly mentioned in the Specification and are usually well-known by candidates if not well understood.	
AO1+ AO2	<ul style="list-style-type: none"> <li>bars of coarse sediment and deeper pools</li> <li>sinuous path of thalweg even in relatively straight sections leads to alternating bars of sediment; deposition in lower velocity areas either side of thalweg</li> <li>bars deflect flow giving rise to downstream sequence of fast + slow flow</li> <li>bars increase channel roughness causing further accretion - riffle</li> <li>flow depleted of its load has more energy so scours bed creating pool</li> <li>well developed pools + riffles are typically 5-7 channel widths apart</li> <li>helical flow that is set up partly in response to swinging of thalweg transfers sediment from deepened pool to shallower sections maintaining pool-riffle sequences along a meandering section</li> <li>point bar deposits on inside of meanders relevant</li> </ul>
AO3	<ul style="list-style-type: none"> <li>Level 2 max if no mention of meandering flow</li> <li>Bottom of Level 2 for description only</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

## Glacial and Periglacial Environments

5. (a) Describe the weathering and slope processes typical of periglacial regions. [20]

(b) Explain the role of multiple advances and retreats of glaciers in the development of upland glaciated landforms. [25]

(a)

Periglacial weathering and slope processes are explicitly stated in this Option as a separate heading and so should be well known and understood by the candidates.	
AO1+ AO2	<ul style="list-style-type: none"> <li>• Level 1 max if no mention of frost action</li> <li>• permafrost and the active zone; ground ice</li> <li>• mass movement – solifluction, some idea of scale of movement, 1-10 cms/yr, might indicate a Level 3 response</li> </ul>
AO3	<ul style="list-style-type: none"> <li>• there need not be equal treatment of weathering + slope processes, but omission of one restricts to Level 1</li> <li>• Level 2 max if glacial erosion included</li> </ul>
AO4	<ul style="list-style-type: none"> <li>• see generic mark scheme</li> </ul>

(b)

An appreciation of the advances and retreats of ice and the effects on the landscape are important to an understanding of glacial environments. This particular question limits the discussion to upland landscapes as lowland patterns are much more difficult to discern. Cwm Idwal contains all one would need for a very good response here.	
AO1+ AO2	<ul style="list-style-type: none"> <li>• erosion - without reference to this process and its associated landforms, Level 1 max. Higher level responses will make reference to periglacial erosional processes before and after glaciation to indicate advance + retreat</li> <li>• deposition – inclusion of this process and its associated landforms likely to indicate a top Level 2+ response; Level 3 possible indicator is that earlier deposits reworked by subsequent advances</li> <li>• credit reference to periglacial processes and their contribution to upland landforms + landscapes in upland areas</li> <li>• erosion – pyramidal peaks, arête, corries, troughs, hanging valleys</li> <li>• deposition – moraines, drumlins, kames + kame terraces</li> </ul>
AO3	<ul style="list-style-type: none"> <li>• bottom of Level 2 if no mention of advance / retreat</li> <li>• Level should also reflect degree of focus on upland; no acknowledgement of upland Level 1 max</li> <li>• distinction between landform and landscape not necessary</li> <li>• top of Level 2+ likely when response is clear about ice reworking through previous landscape e.g. reoccupation of corries during Loch Lomond re-advance.</li> </ul>
AO4	<ul style="list-style-type: none"> <li>• see generic mark scheme</li> </ul>

6. (a) Describe the ways in which sediment is transported in glacial environments. [20]
- (b) Explain the role of the advance and retreat of ice in the development of drainage patterns. [25]

(a)

Processes of transport are fundamental knowledge and understanding in this Option. The question invites descriptions about any type of transport in glacial environments. Answer solely on periglacial processes, bottom of Level 2.	
AO1+ AO2	<ul style="list-style-type: none"> <li>glacial – supra- ; en- ; sub- ;</li> <li>glacio-fluvial – supra- ; en- ; sub- ; streams</li> <li>comments about competence levels in streams and seasonal contrasts likely to indicate Level 3 response</li> <li>comments about glacio-fluvial beyond the ice appropriate</li> <li>comments about wind-blown sediment appropriate</li> </ul>
AO3	<ul style="list-style-type: none"> <li>Level 1 max if no reference to glacial / glacio-fluvial</li> <li>Level 3 requires both glacial + glacio-fluvial</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

(b)

Glacial advance and retreat can have a significant effect on the fluvial systems operating before ice moved through a landscape. The term drainage patterns can be given a wide interpretation as indicated below.	
AO1+ AO2	<ul style="list-style-type: none"> <li>river diversion due to a number of causes at different scales e.g. watershed breaching e.g. River Severn at Ironbridge; diversion due to terminal moraine blocking former path e.g. urstromtäler of North European Plain, rivers Oder and Elbe for example</li> <li>glacial overflow / spillway e.g. Lake Pickering</li> <li>river capture often associated with breached watersheds</li> <li>straightening of valleys</li> <li>modification of long profile e.g. corrie lakes; ribbon lakes; rapids</li> <li>lochans</li> <li>kettle holes</li> <li>whole scale (regional) deposition obscuring drainage patterns through infilling of former valleys e.g. East Anglia – a likely Level 3 indicator</li> </ul>
AO3	<ul style="list-style-type: none"> <li>an appreciation that ice moves into an existing landscape is a likely Level 3 indicator</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>



## Hot Arid and Semi-arid Environments

7. (a) Describe weathering processes commonly found in hot arid and semi-arid environments. [20]
- (b) Explain why biomass, biodiversity and productivity are at relatively low levels in hot deserts. [25]

(a)

Within the section on 'processes' the Specification specifies thermal fracture, exfoliation and chemical weathering. The quality of the description of each of these will inform the mark for the AOs.	
AO1+ AO2	<ul style="list-style-type: none"> <li>• thermal fracture – cracking of rocks due to rapid changes in temperature.</li> <li>• exfoliation – breaking, splitting and peeling off of outer rock layers. Essential factor here, and with thermal fracture, is the variation in coefficients of expansion of the materials making up the rock e.g. different minerals. The term insolation weathering is likely to be widely employed</li> <li>• freeze thaw</li> <li>• pressure release</li> <li>• chemical weathering – wherever water is more freely available almost any of the types of chemical weathering can occur. Some types overlap with the mechanical category e.g. salt weathering. Rock surfaces commonly impregnated with soluble salts as evaporation &gt; precipitation. Salts can then disintegrate rocks by the growth of crystals from solutions and the expansion of hygroscopic salts on hydration</li> </ul>
AO3	• without salt weathering max Level 2
AO4	• see generic mark scheme

(b)

The desert ecosystem is the focus here. These three terms are explicitly mentioned in the Specification.	
AO1+ AO2	<ul style="list-style-type: none"> <li>• scarcity of biomass e.g. vegetation cover varying from nothing to open stand</li> <li>• lowest organic productivity levels of any biome; average NPP is 90g/m<sup>2</sup>/yr</li> <li>• most productivity exists underground – a likely Level 2 indicator</li> <li>• although biodiversity relatively low when compared with some other biomes, amongst the deserts there can be significant diversity e.g. American deserts v South African v Saharan/Arabian/West Asia v Australian</li> <li>• water, its availability and loss is a key factor and without reference to this then level 1 is the maximum</li> <li>• soil quality</li> </ul>
AO3	<ul style="list-style-type: none"> <li>• there need not be an equal treatment of the three terms for Levels 2 + 3</li> <li>• no mention of two limits the response to Level 1</li> <li>• contrasts between semi-arid and arid likely to indicate Level 3</li> </ul>
AO4	• see generic mark scheme

8. (a) With the help of labelled diagrams, describe the following landforms: alluvial fan and bahada; wadi; inselberg. [20]
- (b) Explain why hot arid and semi-arid environments are found in a variety of locations at the global scale. [25]

(a)

These landforms are explicitly mentioned in the Specification and so should be well known to candidates.	
AO1+ AO2	<ul style="list-style-type: none"> <li>inclusion of scale a possible Level 3 indicator</li> <li>alluvial fan – fan- or cone-shaped mass of material, usually sand and gravel, deposited by a stream where it emerges from the constriction of a narrow valley at a mountain front, spreading on to a plain or into a wider trunk valley. Most have a radius of &gt; 8 km but can be much larger. Apex points upstream, is the thickest part of the mass and has steepest gradient – likely Level 3 indicator. Sediment calibre graded across fan from larger at apex to finer where fan ends. Mean surface gradient in range <math>1^{\circ}</math> – <math>5^{\circ}</math>. Stream breaks up into number of distributaries as it crosses fan. Adjacent fans may coalesce and extend some distance from mountain front to form a bahada.</li> <li>wadi – valley, often gorge-like but can be broad. Steep valley walls often covered with thick layers of weathered material, incised by gullies or with alluvial fans – a likely Level 3 indicator. May be dry but can contain an intermittent stream after a storm. Braided channels. Many are partly sand-filled</li> <li>inselberg – steep-sided isolated hill of solid rock, rising abruptly from a plain. Can be rectangular in profile or domed – a likely Level 3 indicator</li> </ul>
AO3	<ul style="list-style-type: none"> <li>Level 1 for just one landform; Level 2 for two and Level 3 for three + four</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

(b)

The causes of aridity are where many candidates begin their study in this Option.	
AO1+ AO2	<ul style="list-style-type: none"> <li>global circulation – sub-tropical high pressure being the downward limb of the Hadley cell.</li> <li>rain shadow effect – prevailing winds in sub-tropics are trade winds blowing from NE in northern hemisphere, SE in southern hemisphere. Barriers such as Andes prevent moisture reaching western slopes. Greater extent of desert where relief barrier in east e.g. Australia. This point likely to be an indication of a Level 3 response in AO2</li> <li>linked with trade wind direction is point that where trades blow from sea, their moisture is precipitated on eastern coasts leaving little moisture for mid-continental areas e.g. Gobi desert and Great Basins and Mojave deserts</li> <li>ocean currents and prevailing winds e.g. Namib and Atacama deserts</li> <li>role of human activity in desertification – a likely Level 3 indicator</li> </ul>
AO3	<ul style="list-style-type: none"> <li>Level 2 when response is explicit about variety of locations</li> <li>top of Level 2+ likely when 'interaction' is attempted for at least some of the factors</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

**Applied Climatology**

9. (a) Describe ways in which energy budgets differ between urban areas and their surrounding rural areas. [20]

(b) Explain how urban morphology influences urban climates. [25]

(a)

Variations in energy budgets are explicitly mentioned in the Specification. A systems approach might be the most secure framework for a response but candidates may reasonably use other approaches.	
AO1+ AO2	<ul style="list-style-type: none"> <li>the basic surface energy budget is relevant here i.e. <math>R_n = LE + H + G</math> where <math>R_n</math> is net radiation, LE is latent heat transfer, H is sensible heat transfer and G is ground heat flux. Without some basic idea of the energy budget then Level 1 is the maximum.</li> <li>key point is the heat production resulting from human energy consumption by combustion in urban areas. This can exceed <math>R_n</math> during winter in some cities.</li> <li>heat storage by surfaces is greater leading to greater nocturnal values of H; LE in city centres tends to be much less. The lack of LE means that by day some 70-80% of <math>R_n</math> is transferred to the atmosphere as sensible heat.</li> <li>within urban areas energy is reflected off more surfaces before finally leaving the terrestrial environment and so more absorption occurs c.f. rural areas where outgoing radiation soon escapes into the atmosphere.</li> <li>within urban areas the energy balance varies with altitude and aspect so that there can be striking contrasts even within one street. Such comments are likely to indicate a Level 3 response.</li> </ul>
AO3	<ul style="list-style-type: none"> <li>a response based solely on either urban or rural area will not rise above Level 1</li> <li>either inputs or outputs only restricts the response to level 1</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

(b)

The shape of urban areas can have a significant influence on urban climates.	
AO1+ AO2	<ul style="list-style-type: none"> <li>urban morphology – shape in three dimensions is relevant. Include density of building as an influence.</li> <li>winds and air movement - enhanced friction over urban areas leads to lower wind speeds in general. Within an urban area there will be variations in friction e.g. lower friction over open areas (parks; playing fields; lakes)</li> <li>winds and air movement – funnelling of wind through urban ‘canyons’ e.g. CBD and shopping centres</li> <li>temperature – role of river valleys e.g. cold air sinks within urban heat island</li> <li>temperature – shape in terms of plan will influence pattern of isotherms</li> </ul>
AO3	<ul style="list-style-type: none"> <li>Level 1 max if no reference to morphology</li> <li>Level 2+ once idea of morphology is introduced and discussed</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

10. (a) Describe how energy budgets differ between forests and their surrounding areas. [20]

(b) Explain how shelter belts and wind breaks modify local physical conditions. [25]

(a)

The key requirement here is to describe the contrasts between forests and their surroundings in terms of energy budget. A systems approach would, perhaps, be the most secure route.	
AO1+ AO2	<ul style="list-style-type: none"> <li>forests have relatively low albedo, c. 10% c.f. c. 25% for grassland</li> <li>during day, shaded forest areas receive less insolation than open areas</li> <li>at night, forest canopy reduces long-wave radiation loss c.f. open areas</li> <li>generally increased water vapour content of forest air also traps more long-wave energy</li> <li>seasonality effect in terms of leaf cover a likely Level 3 indicator</li> </ul>
AO3	<ul style="list-style-type: none"> <li>focus must be forests for Level 2 + 3</li> <li>either inputs or outputs only restricts the response to level 1</li> <li>mention of different types of forest a likely level 3 indicator</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

(b)

The Specification refers to both direct and indirect effects of shelter-belts and wind-breaks. And so we can expect comments about wind speed and turbulence and air and soil temperature, evaporation and the water balance.	
AO1+ AO2	<ul style="list-style-type: none"> <li>direct – reduction in wind speeds; Level 2 indicator might be acknowledgement of the complexity of the pattern depending on the nature of the barrier</li> <li>direct – turbulence – calming effect but also can set up turbulence in lee of barrier; idea of turbulence a possible Level 2 indicator</li> <li>direct – use of barrier to trap snow to increase soil moisture in summer e.g. Canadian prairies – a likely Level 3 indicator</li> <li>indirect – increase in air + soil temperatures in lee; effect can extend up to 10x height of belt</li> <li>indirect – evaporation reduced in lee of barrier</li> </ul>
AO3	<ul style="list-style-type: none"> <li>there need not be an equal treatment of direct / indirect but the omission of one limits assessment to bottom of Level 2</li> <li>top of Level 1 if no reference to effect on wind speed</li> <li>comments about the direct effects of different types e.g. density of barriers likely to indicate Level 3</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

## Group B Options

### Agriculture and Food

11. (a) Describe the rate and spatial spread of agricultural innovations. [20]

(b) Explain why the pattern of diffusion of agricultural innovation varies. [25]

(a)

Agricultural innovations and their spatial diffusion are highlighted in the Specification. The two elements required are stated in the question.	
AO1+ AO2	<ul style="list-style-type: none"> <li>rate of diffusion – the model has a classic S shaped cumulative form with a slow rate of adoption at first, then an accelerated period followed by a slowing up in the rate of adoption. The graph also indicates spatial contrasts in the rate of adoption, a point that when described convincingly might indicate a Level 3 response</li> <li>spatial spread – distance from the point of origin is important. Without this a response is unlikely to be more than bottom of Level 2 in AOs 1 and 2. Descriptions should point out the ripple effect</li> <li>higher Level responses might include references to the acceleration both temporally and spatially of innovation when farmers migrate e.g. 19th century European migrations to North and South America</li> </ul>
AO3	<ul style="list-style-type: none"> <li>Level 1 max if either rate / spread omitted</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

(b)

A key element in the study of agricultural systems is the influence of human and cultural factors. This is evident in contrasts in the pattern of diffusion of agricultural innovation, the focus of this sub-part.	
AO1+ AO2	<ul style="list-style-type: none"> <li>physical factors – where environmental conditions favour the use of an enterprise it is more likely that there will be innovation concerning that particular type of farming e.g. spread of hybrid maize in USA i.e. Corn Belt outwards; physical barriers e.g. mt. ranges</li> <li>farm size – generally the larger the size of farm the more open the farmer is to new ideas. This is related to other factors such as capital availability and education</li> <li>specialist enterprise - the more specialist the farm, the more likely to take up an innovation</li> <li>government influence – where this is available then innovation more likely</li> <li>communications – availability of TV and radio and most recently ICT, enhance the spread of new ideas. A Level 3 point in AO2 might be that ICT can diminish the role of linear distance</li> <li>MEDC / LEDC contrast – innovation more rapid in former than latter</li> </ul>
AO3	<ul style="list-style-type: none"> <li>a clear factor-led discussion is likely to reach top of Level 2+</li> <li>absence of variations holds response at bottom of Level 2</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

12. (a) Describe the influence of population density on agricultural systems. [20]

(b) Explain the role climate can have on farmers' choices of agricultural system. [25]

(a)

This factor appears under the heading of 'The influence of human and cultural factors on agricultural systems'. Variations in people per unit area can influence farming in a number of ways and candidates are likely to be inventive as to the links; be prepared to credit any possible influences in AO3 as well as the knowledge and understanding in AOs 1 + 2. There is also effective material of a historical nature such as farming around major metropolitan areas in late 18 <sup>th</sup> and 19 <sup>th</sup> centuries.	
AO1+ AO2	<ul style="list-style-type: none"> <li>countries with low population densities often have large average farm sizes; those with high densities can have small average farm sizes – probably a Level 3 point under A02</li> <li>link between agricultural land values and population density as outlined by Ricardo: where pop. density is high there is keen competition for land, which forces up land prices and so influences agricultural systems.</li> <li>high pop. density in areas such as Bangladesh / Java contribute to intensive agriculture.</li> </ul>
AO3	<ul style="list-style-type: none"> <li>where the link between population density and agricultural systems is not made Level 1 max</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

(b)

There are various approaches farmers can use but the emphasis throughout is on coping with the physical environment. This sub-part is open to any climatic conditions.	
AO1+ AO2	<ul style="list-style-type: none"> <li>basic points about the fundamental needs of the key farming types (arable / pastoral)</li> <li>comments about latitude differences appropriate</li> <li>greenhouses; poly-tunnels; plastic sheeting used for raising temperatures (air + soil) and extending the growing season</li> <li>irrigation and drainage</li> <li>planting of wind breaks and shelter belts; a Level 3 indicator for both AOs might be the mention of these to trap snow which, when it melts, raises soil moisture e.g. Canadian prairies; also in relation to protection of livestock might be a Level 3 indicator</li> </ul>
AO3	<ul style="list-style-type: none"> <li>the degree to which the climate is linked with agricultural systems will advise the Level here.</li> <li>comments about both restriction and possibilities likely to indicate a Level 3 response.</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

### Manufacturing Industry: Location, Change and Environmental Impact

13. (a) Describe the influence of the internal organisation of transnational companies (TNCs) on their spatial pattern at the global scale. [20]

(b) Explain how markets can influence the location of manufacturing industry. [25]

(a)

As an industrial location factor the internal organisation of firms is now recognised as having significant role. The increase in both the numbers and scale of the larger manufacturing enterprises has given much interesting exemplar material.	
AO1+ AO2	<ul style="list-style-type: none"> <li>TNCs are multi-plant with different elements of their organisation in different locations</li> <li>TNCs serving global markets tend to decentralise organisation with control devolved to regional headquarters but with HQ still in overall control e.g. General Motors; BP</li> <li>TNCs tend to have three key elements in their organisation, HQ for overall decision making located in MEDCs/NICs core regions; R&amp;D also in MEDCS/NICS core regions; branch plants for manufacturing more footloose, NICs + LEDCs; traditional manufacturing locations in MEDCs + NICs; peripheral locations in MEDCs; new industrial locations in MEDCs</li> <li>New Industrial Division of Labour is appropriate here</li> </ul>
AO3	<ul style="list-style-type: none"> <li>a general account of industrial location factors will not exceed Level 1</li> <li>without bullet point 3 above, bottom of Level 2 is the maximum</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

(b)

Industrial location factors is a major heading within this Option and the influence of markets is explicitly stated.	
AO1+ AO2	<ul style="list-style-type: none"> <li>Weberian analysis identifies weight gaining industries as being pulled strongly to the market e.g. brewing</li> <li>Löschian analysis identifies the role of maximum demand and profit at the market as a locational pull – a likely Level 3 indicator</li> <li>industries where the finished product is more fragile / perishable than the raw materials e.g. pastries / bread</li> <li>just-in-time delivery systems encourage spatial concentrations of component suppliers around their market</li> <li>any industry where transport costs of the finished product vary most in spatial terms is likely to be attracted to the market</li> </ul>
AO3	<ul style="list-style-type: none"> <li>Level 1 max if the conditions are not clearly linked to the market</li> <li>different scales of market – global / national / local – likely to indicate a Level 3 response</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

14. (a) Describe the measures governments, planners and other agencies use to regenerate industry in peripheral regions. [20]
- (b) Explain how both internal and external economies of scale can influence the location of manufacturing industry. [25]

(a)

The locational influence of governments and governmental agencies should be well-known and understood by candidates. This particular question sets it in the context of peripheral regions.	
AO1+ AO2	<ul style="list-style-type: none"> <li>establishment of development boards + agencies; grants + low-interest loans; advanced built factory units promotion through advertising; re-training schemes; advisory services;</li> <li>improvement in regional infrastructure e.g. road + rail access</li> <li>credit reference to shift into service sector</li> </ul>
AO3	<ul style="list-style-type: none"> <li>Level 2 max if no clear reference to peripheral regions</li> <li>distinction amongst scales of government e.g. supra-national / national / local, likely to indicate Level 3 response</li> <li>a detailed case study that exemplifies the measures adopted can reach Level 3</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

(b)

Economies of scale are explicitly mentioned under the heading of Industrial location factors in the Specification.	
AO1+ AO2	<ul style="list-style-type: none"> <li>internal – increase in capacity of production processes often increases land demands therefore space becomes an important locational factor e.g. modern integrated steelworks; modern car plants. Mostly factory buildings are now single storey so land demands higher than they used to be.</li> <li>internal – achieving these often part of the rationalisation process, i.e. fewer but larger factories e.g. brewing + baking</li> <li>external – role of linkage and agglomeration economies e.g. chemical plants on Tees-side or Merseyside</li> <li>external – benefits accruing from developed infrastructure attracts industries to certain regions especially in LEDCs + NICs e.g. South-East Brazil; Shanghai</li> </ul>
AO3	<ul style="list-style-type: none"> <li>there need not be an equal treatment of internal / external for Level 3 but mention of only one limits the response to bottom of Level 2</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>



**Service Activities: Location, Change and Environmental Impact**

15. (a) Describe the principles of bid-rent theory and trade area analysis. [20]

(b) Explain the effects of new retail centres on traditional urban retailing hierarchies. [25]

(a)

Theories and models are a major sub-heading within this Option. Bid-rent theory and trade area analysis are explicitly mentioned under this sub-heading.	
AO1+ AO2	<ul style="list-style-type: none"> <li>• Bid-rent theory – the rent people are prepared to pay against distance from some point, usually the city centre. Rent bids generally decrease with increasing distance from a city centre. This K and U needed for Level 1. Comments about the contrasting gradients for different land-uses would suggest a Level 2 response; Level 3 will be indicated in responses suggesting that subsidiary peaks of bidding exist at various locations throughout an urban area e.g. neighbourhood service centres. Level 3 might also be indicated in responses suggesting that the recent trend of out-of-town locations for some services reverses the traditional gradient.</li> <li>• Trade area analysis – classical central place theory often gives the impression of a deterministic rigid structure of spheres of influence. A response that suggests the change from a zone of dominance immediately around a centre through a zone of competition to a zone of marginal influence is likely to be at Level 3. Various schemes suggested for assessing trade areas; analysis of public transport services; local delivery areas; catchment areas of schools/police; newspaper circulation</li> </ul>
AO3	<ul style="list-style-type: none"> <li>• Level 2 max if response focused solely on central place theory</li> <li>• Level 2 max if either bid-rent or trade area analysis solely are the focus</li> <li>• Level 1 max if no reference to patterns</li> </ul>
AO4	<ul style="list-style-type: none"> <li>• see generic mark scheme</li> </ul>

(b)

The effect of these relatively recent retail developments on traditional urban retailing hierarchies is explicitly stated in the Specification.	
AO1+ AO2	<ul style="list-style-type: none"> <li>• traditional hierarchy has CBD dominated by higher order goods, with a succession of neighbourhood and local centres offering progressively lower order goods</li> <li>• effect on CBD – can lead to decline especially in space extensive retailers e.g. furniture / carpets / white goods</li> <li>• effect on suburban shopping centres – can lead to decline of smaller retailers especially independents in almost any retailing sector</li> <li>• can lead to decline in smaller shopping parades in suburban locations if they are accessible to the new development</li> <li>• can have little or no impact on inner city shopping parades as population in these locations tend to have below average car ownership</li> <li>• can lead to rise of speciality independents in some suburban locations as relatively affluent use disposable income to purchase high quality food</li> </ul>
AO3	<ul style="list-style-type: none"> <li>• Level 1 max if focus is on rural retailing</li> <li>• Level 3 likely for a response identifying a positive effect</li> </ul>
AO4	<ul style="list-style-type: none"> <li>• see generic mark scheme</li> </ul>

16 (a) Describe measures taken to address the issue of changing demand for rural services. [20]

(b) Explain how retirement migration and the increase in the number of second and holiday homes have affected rural services. [25]

(a)

It is important that 'different regions' is picked up and the link between the measure and changing demand for rural services needs to be explicit for Level 3. We can expect most responses to focus on decline but the additional inclusion of an increasing demand for certain types of services when rural population changes in total and type might be an indication of Level 3 in the AOs.	
AO1+ AO2	<ul style="list-style-type: none"> <li>• rationalisation of public services in the face of falling threshold</li> <li>• use of key settlement policy to try to ensure the presence of services</li> <li>• different planning responses to include approaches to house purchase</li> <li>• approach of supra-national bodies such as EU</li> </ul>
AO3	<ul style="list-style-type: none"> <li>• Level 1 if only one region</li> <li>• Level 2 if measures not linked with changing demand</li> </ul>
AO4	<ul style="list-style-type: none"> <li>• see generic mark scheme</li> </ul>

(b)

Within the section of this Option dealing with changing service provision in rural areas, retirement migration and second and holiday homes are explicitly mentioned.	
AO1+ AO2	<ul style="list-style-type: none"> <li>• retirement migration – alters population structure so changing demand for services – decline in threshold for schools, increase in services such as health care. Can alter economic structure with wealthy retirees increasing threshold for some services.</li> <li>• second and holiday homes – alters thresholds of both retail and public services such as schools / libraries; until very recently such accommodation attracted reduced council tax therefore local authorities had lowered income to spend on services; can increase provision of some services aimed for tourist trade e.g. more services aimed at wealthy second home owners</li> </ul>
AO3	<ul style="list-style-type: none"> <li>• there does not need to be equal treatment of retirement migration and second and holiday homes but the omission of one restricts response to bottom of Level 2</li> <li>• the link between service change and retirement migration and second and holiday homes must be explicit for top of Level 2+</li> </ul>
AO4	<ul style="list-style-type: none"> <li>• see generic mark scheme</li> </ul>

## Tourism and Recreation and their Environmental Impacts

17. (a) Describe the changing spatial pattern of domestic tourism within MEDCs since 1800. [20]

(b) Explain the role natural resources can play in attracting tourists to particular locations. [25]

(a)

Domestic tourism patterns are a key aspect contained within a number of sub-headings in the Option. The timescale is broad to allow the description to include the origins and growth of seaside resorts and spas right the way through to urban tourism today.	
AO1+ AO2	<ul style="list-style-type: none"> <li>• rise of spas and seaside resorts in early 19<sup>th</sup> century for local demand e.g. Exmouth</li> <li>• spread of seaside resorts throughout 19<sup>th</sup> and early 20<sup>th</sup> century e.g. Ilfracombe / Sidmouth</li> <li>• comments about different 'class' of resorts likely to indicate a level 3 response e.g. Scarborough / Blackpool / Torquay</li> <li>• zenith of seaside tourism reached in latter 1950s and early 1960s</li> <li>• decline from later 1960s onwards e.g. Margate / Skegness</li> <li>• growth of urban tourism in late 20<sup>th</sup> / early 21<sup>st</sup> centuries e.g. Exeter</li> <li>• revival of some seaside resorts in late 20<sup>th</sup> / early 21<sup>st</sup> centuries e.g. Llandudno / Kingsbridge</li> </ul>
AO3	<ul style="list-style-type: none"> <li>• Level 1 max if the response is focused on inter-national tourism</li> <li>• Level 1 max if 'spatial pattern' not clear</li> </ul>
AO4	<ul style="list-style-type: none"> <li>• see generic mark scheme</li> </ul>

(b)

Tourism is a resource based industry and candidates ought to have plenty of material from which they can select appropriate material to generate effective responses here.	
AO1+ AO2	<ul style="list-style-type: none"> <li>• natural resources e.g. climate; relief; coasts; rivers and lakes; ecosystems</li> <li>• the question is clear in its expectation of reference to particular locations and the level of detail will be assessed under AO1</li> </ul>
AO3	<ul style="list-style-type: none"> <li>• the degree to which the resource is linked with tourism developments will also help inform the Level here; a simple outline of the resources will not reach above bottom of Level 2</li> <li>• a response could adopt either a broad approach or deal with one location in depth, either of which is capable of reaching level 3</li> </ul>
AO4	<ul style="list-style-type: none"> <li>• see generic mark scheme</li> </ul>

18. (a) Describe the main features of mass tourism and urban tourism. [20]
- (b) Explain the issues associated with the development of tourism in LEDCs. [25]

(a)

Both mass and urban tourism are explicitly mentioned in the Specification. Allow reference to mass tourism in resorts such as Blackpool	
AO1+ AO2	<ul style="list-style-type: none"> <li>mass tourism – concentration of large numbers of tourists in relatively small areas e.g. resorts; product offered under mass production conditions; relatively accessible locations; significant physical, social + cultural impact on locality; economically dominated by large firms, some TNCs; can be highly seasonal</li> <li>urban tourism – tourism exploiting some resource, usually cultural or heritage located in an urban area. Could be at a variety of urban scales e.g. Hay-on-Wye Book festival or Edinburgh festival. Recent growth in industrial heritage in urban areas e.g. Saltaire; Albert Docks, Liverpool</li> </ul>
AO3	<ul style="list-style-type: none"> <li>Level 1 max if only one of the two mentioned</li> <li>Level 2 if two are mentioned but a very unbalanced response</li> <li>Level 3 if both are dealt with convincingly</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

(b)

The issues can be organised under three headings as given in the Specification. The concept of sustainability is likely to be feature of responses, especially for Levels 2 + 3. Most students will have looked at mass and ecotourism in LEDCs and these highlight the issues well, both positive and negative but the response does not have to use these two types as a framework.	
AO1+ AO2	<ul style="list-style-type: none"> <li>environmental / physical – mass – much impact mainly seen as negative whereas eco-has minimal effect. Comments about energy + water consumption might be a useful Level 3 indicator. Visual intrusion, noise and light as well as comments about building impacts. Extension to include infrastructure e.g. airports and ports to handle large scale cruise liners appropriate.</li> <li>economic – mass – leakage likely to feature for Level 2. Ecotourism includes much local benefit. Low volume, high cost / return / value is the phrase often used. Issues of dependency appropriate here for mass. But also mass generates substantial wealth for a location – link with tax revenues and individual wealth, a likely Level 3 indicator – eco does not to same scale.</li> <li>social / cultural – mass - much impact mainly seen as negative whereas eco- has minimal effect.</li> </ul>
AO3	<ul style="list-style-type: none"> <li>top of Level 1 if MEDC context only</li> <li>Level 2 likely when two of the three headings are included</li> <li>Level 3 indicator might be comments about positive aspects of mass and negative of eco.</li> </ul>
AO4	<ul style="list-style-type: none"> <li>see generic mark scheme</li> </ul>

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