

Cambridge International AS & A Level

GEOGRAPHY

9696/03

Paper 3 Global Environments

For examination from 2027

MARK SCHEME

Maximum Mark: 60

Specimen

This document has **18** pages.

Generic Marking Principles

All examiners must apply these general marking principles when marking candidate responses. Examiners must apply them alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme must also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptions for the question
- the specific skills defined in the mark scheme or in the generic level descriptions for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptions.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however, the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptions in mind.

Guidance on using levels-based mark schemes

Marking of work should be positive, rewarding achievement where possible, but clearly differentiating across the whole range of marks, where appropriate.

The marker should look at the work and then make a judgement about which level statement is the best fit. In practice, work does not always match one level statement precisely so a judgement may need to be made between two or more level statements.

Once a best-fit level statement has been identified, use the following guidance to decide on a specific mark:

- If the candidate's work **convincingly** meets the level statement, award the highest mark.
- If the candidate's work **adequately** meets the level statement, award the most appropriate mark in the middle of the range (where middle marks are available).
- If the candidate's work **just** meets the level statement, award the lowest mark.

Levels of response**Marking grid A**

AO1 Knowledge and understanding

Use this marking grid to give marks for each candidate response for the part (b) (6 or 7 mark) questions.

Level	Description	Marks
3	<ul style="list-style-type: none"> • Relevant detailed knowledge and clear understanding. • Provides developed points focused on the question. • Uses relevant example(s) with development and/or detail. 	5–6 or 6–7
2	<ul style="list-style-type: none"> • Relevant knowledge and mostly secure understanding. • Provides valid points with some development. • Uses some relevant example(s) which may lack development and/or detail. 	3–4 or 3–5
1	<ul style="list-style-type: none"> • Some basic knowledge but understanding may be limited. • Provides mostly simple points with little or no development. • May use example(s) which lack relevance or are in name only. 	1–2
0	<ul style="list-style-type: none"> • No creditable response. 	0

Marking grids for essay questions

Examiners must consider the following guidance when marking the essay questions:

Candidates are free to develop their own approach to the question and responses will vary depending on the approach chosen. Whichever approach is chosen, essays which answer the question and support their argument with relevant examples will be credited. There may be detailed consideration of a detailed specific example/one or more examples, or a broadly conceived response, using several examples to show the factors involved. Evaluation may occur throughout the answer or in one or more evaluative sections such as an overall assessment at the end.

Use marking grids B and C to give marks for each candidate response for Questions 2, 3, 5, 6, 8, 9, 11 and 12.

Marking grid B

AO3 Evaluation

Level	Description	Marks
4	Well developed response and clearly evaluative <ul style="list-style-type: none"> Well-developed and sustained reasoning which assesses a range of ideas clearly answering the question. Valid assessment of the relative importance of factors/viewpoints with an overall conclusion that follows logically from the arguments. Examples and evidence are well integrated into the response and used to support the answer. 	10–12
3	Developed response and broadly evaluative <ul style="list-style-type: none"> Developed reasoning with ideas mostly answering the question. Some valid assessment on the relative importance of factors/viewpoints with an overall decision made. Example(s) and evidence are mostly used to support the answer. 	7–9
2	Explanatory response with limited evaluation <ul style="list-style-type: none"> Limited reasoning with some ideas linked to the question; the answer is largely explanatory. Limited assessment and/or conclusion(s) are often simple comments and/or may just state an opinion. Example(s) and evidence are sometimes used to support the answer. 	4–6
1	Limited response with little or no evaluation <ul style="list-style-type: none"> Little reasoning and discussion; the answer is descriptive around the topic of the question and lacks relevance to the question. Little or no assessment made. Examples may be absent or in name only. 	1–3
0	<ul style="list-style-type: none"> No creditable response. 	0

Marking grid C

AO1 Knowledge and understanding

Level	Description	Marks
4	Accurate and detailed <ul style="list-style-type: none"> Relevant and accurate knowledge with thorough understanding. Appropriate and precise use of geographical language. 	7–8
3	Mostly accurate and detailed <ul style="list-style-type: none"> Mostly relevant and accurate knowledge with generally secure understanding. Appropriate use of geographical language which is mostly accurate. 	5–6
2	Some knowledge but limited in some way <ul style="list-style-type: none"> Some relevant knowledge with partial understanding. Limited use of geographical language which may lack accuracy. 	3–4
1	Limited knowledge on the topic <ul style="list-style-type: none"> Limited knowledge and understanding related to the topic of the question. Geographical language is rarely used and is mostly inaccurate. 	1–2
0	<ul style="list-style-type: none"> No creditable response. 	0

Answer questions from **two** different topics.

Tropical environments

Answer the first question and one other question.

Question	Answer	Marks
1(a)	<p>Figure 1.1 shows the average warm episode effects of El Niño on the climate, December–February.</p> <p>Compare the average warm episode effects of El Niño on the climate of different <u>tropical areas</u> shown in Figure 1.1.</p> <p>Award one mark for a simple descriptive point to a maximum of two marks. Award two marks for each comparative statement with some evidence from Figure 1.1.</p> <p>The main points that can be considered are:</p> <ul style="list-style-type: none"> • the whole of Southeast Asia is affected whereas smaller areas of South America and Africa are affected • warmer conditions are the most frequent effect whereas wetter conditions are largely limited to one small area (East Africa) • in the Pacific Ocean on the equator there is an area of wetter and warmer but two drier areas spreading across the Pacific Ocean north and south of the equator • most effects are on landmasses, but two areas of the Pacific Ocean are also affected • credit other appropriate comparative points. 	4

Question	Answer	Marks
1(b)	<p>Describe the main characteristics of the El Niño Southern Oscillation (ENSO).</p> <p>ENSO is a single climate phenomenon which has three phases. The two opposite phases, 'El Niño' and 'La Niña', require certain changes in both the ocean and the atmosphere because ENSO is a coupled climate phenomenon. 'Neutral' is in the middle of the continuum.</p> <p>The three phases are:</p> <p>El Niño: A warming of the ocean surface, or above-average sea surface temperatures (SST), in the central and eastern tropical Pacific Ocean. Over Southeast Asia, rainfall tends to become reduced, while over the tropical Pacific Ocean rainfall increases. The low-level surface winds, which normally blow from east to west along the equator ('easterly winds'), instead weaken or, in some cases, start blowing the other direction from west to east ('westerly winds').</p> <p>La Niña: A cooling of the ocean surface, or below-average SSTs, in the central and eastern tropical Pacific Ocean. Over Southeast Asia rainfall tends to increase, while over the central tropical Pacific Ocean rainfall decreases. The normal easterly winds along the equator become even stronger.</p> <p>Neutral: Neither El Niño or La Niña. Often tropical Pacific Ocean SSTs are generally close to average. However, there are some instances when the ocean can look like it is in an El Niño or La Niña state, but the atmosphere does not follow (or vice versa).</p> <p>Award marks based on the quality of the response using marking grid A.</p>	6

Question	Answer	Marks
2	<p>Assess the role of climate in the development of the vegetation characteristics of savanna ecosystems. Use examples to support your answer.</p> <p>AO1 Knowledge and understanding Savanna ecosystem vegetation characteristics include:</p> <ul style="list-style-type: none"> • varies from woodland to parkland and grassland depending on moisture availability which is influenced by climate, relief, water sources and soil types • it is xerophytic (adapted to drought) • adaptations to drought include deep tap roots, partial or total loss of leaves, sunken stomata or few stomata, succulence • it is pyrophytic (adapted to burning by fire) • adaptations to fire include thick bark and most of the biomass being below the surface. <p>Climate factors that influence the vegetation of savanna ecosystems are:</p> <ul style="list-style-type: none"> • seasonality in temperature • seasonality in precipitation • moisture availability. <p>These climate factors are influenced by:</p> <ul style="list-style-type: none"> • latitude: variations in the type of savanna vegetation (transition from woodland to grassland), with increasing latitude linked to climatic conditions • relief: influence of altitude and aspect causing local differences in climate. <p>Other factors that influence the vegetation characteristics include:</p> <ul style="list-style-type: none"> • human activities: land-use changes, agriculture, overgrazing, clearance and burning • animal activities such as grazing • soils: depth, fertility, water-holding capacity • water sources: streams/rivers, lakes, groundwater and lack of these • natural (lightning) fire regime (seasonality/frequency). <p>AO3 Evaluation This question requires an assessment of the role of climate in the development of the vegetation characteristics of savanna ecosystems.</p> <p>Evaluative comments could consider:</p> <ul style="list-style-type: none"> • the importance of climate, especially seasonality of temperature and precipitation, in the development of the vegetation characteristics discussed • the relative importance of specific climatic parameters such as temperature and precipitation and the variability of these within savanna areas • the importance of climate compared to the other factors discussed. <p>Award marks based on the quality of the response using marking grids B and C.</p>	20

Question	Answer	Marks
3	<p>Use <u>one</u> detailed specific example to evaluate the strategies used to manage the threats facing <u>either</u> the rainforest ecosystem <u>or</u> the savanna ecosystem.</p> <p>AO1 Knowledge and understanding Threats and strategies will vary depending on the detailed specific example chosen and whether the example is from the rainforest ecosystem or the savanna ecosystem.</p> <p><u>Rainforest ecosystem</u></p> <p>Threats could include:</p> <ul style="list-style-type: none"> • population pressures, such as resettlement of people • logging • large-scale monoculture, including cattle ranching and plantations • pollution from mining • rapid growth of tourism and damage caused by tourist activities • increasing periods of drought as a result of climate change • increasing wildfires as a result of climate change. <p>Strategies could include:</p> <ul style="list-style-type: none"> • National Parks / nature reserves • socially responsible logging, including quotas • sustainable tourism / ecotourism • afforestation / reforestation schemes • education of inhabitants about the sustainable use of land • inclusion of local communities in decision-making considering indigenous knowledge • other strategies that apply to the detailed specific example. <p><u>Savanna ecosystem</u></p> <p>Threats could include:</p> <ul style="list-style-type: none"> • population pressures, such as rapid population growth and migration • commercial agriculture, such as cash crops • illegal hunting of large animals • rapid growth of tourism and damage caused by tourist activities • desertification related to the overuse of land • decreasing rainfall reliability as a result of climate change. <p>Strategies could include:</p> <ul style="list-style-type: none"> • National Parks / nature reserves • sustainable tourism / ecotourism • diversification of income sources for local communities including quotas for resources • education of inhabitants about the sustainable use of land • inclusion of local communities in decision-making considering indigenous knowledge • other strategies that apply to the detailed specific example. 	20

Question	Answer	Marks
3	<p>AO3 Evaluation</p> <p>This question requires evaluation of the strategies used to manage the specific threats discussed for the chosen ecosystem.</p> <p>Evaluative comments could consider:</p> <ul style="list-style-type: none">• the strengths and limitations of strategies in relation to the threats, which could be viewed over time or across the area affected by the threats• that the relative success or failure of a strategy might differ depending on the values and attitudes of different groups of people• that some strategies available to decision makers may be more relevant or appropriate than others• the extent to which strategies address multiple threats, or the range of threats, to the ecosystem. <p>Award marks based on the quality of the response using marking grids B and C.</p>	

Coastal environments

Answer the first question and one other question.

Question	Answer	Marks
4(a)	<p>Figure 4.1 shows a model of a coastal sand dune system.</p> <p>Describe the characteristics of the coastal sand dune system from A to B shown in Figure 4.1.</p> <p>Award one mark for an accurate characteristic, award two marks for an accurate characteristic backed up with data up to the maximum.</p> <p>The main characteristics are:</p> <ul style="list-style-type: none"> • increasing soil depth from A to B with distance from the sea • accurate reference to vegetation change, from grasses to scrub to trees • accurate reference to topography in relation to the water table in terms of height above sea level. 	3
4(b)	<p>Explain the formation and development of coastal sand dune systems.</p> <p>The main points are:</p> <ul style="list-style-type: none"> • a good availability of sand, therefore wide beaches with a high tidal range provide an area where sand can be picked up and transported (entrained) by onshore winds • initial dune formation occurs on the beach and nearshore by the accumulation of sand. Friction from the land surface causes a reduction of wind speed and deposition of sand begins • vegetation causes further friction and deposition • stabilisation by vegetation root systems increases stability away from the shore • in conjunction with these changes, vegetation changes create a more stable environment and dunes become fixed • development of dune slacks when hollows form which reach the water table • development of grey dunes and woodland further inland in deeper soils in more stable land. <p>Human activity, such as planting marram grass, netting and fencing, which aids the development of dunes, can be credited.</p> <p>Award marks based on the quality of the response using marking grid A.</p>	7

Question	Answer	Marks
5	<p>‘Some threats to coral reefs are greater than others.’</p> <p>To what extent do you agree with this statement? Use examples to support your answer.</p> <p>AO1 Knowledge and understanding Knowledge of the conditions for coral growth is necessary to assess the threats to coral reefs. Conditions include:</p> <ul style="list-style-type: none"> • temperature: optimal conditions are 23–25 °C • water depth: usually less than 25 metres • light: photosynthetic algae need light as they contribute 98% of coral food requirements • lack of sediment which blocks feeding structures and reduces light availability for photosynthesis • oxygenation: sufficient water movement to oxygenate the water • salinity: water below 32 psu (practical salinity unit) • not exposed to air: corals die if exposed to air for too long. <p>Threats to coral reefs include those linked to increasing CO₂ in the atmosphere and oceans:</p> <ul style="list-style-type: none"> • marine (sea) temperature rise • marine acidification • physical damage from increased storm activity • changes in salinity • sea-level rise. <p>Other threats to coral reefs include:</p> <ul style="list-style-type: none"> • pollution: marine and land-based (such as sewage discharge, fertiliser runoff, plastic pollution) • physical damage from human activities (such as dredging, destructive fishing practices, boat anchors) • physical damage from coastal processes, tropical cyclones and tsunami • other threats, such as predation, disease, overfishing and coral harvesting. <p>AO3 Evaluation This question requires assessment of the extent to which some threats to coral reefs are greater than others. Candidates should consider the conditions needed for sustained coral growth in order to assess the threats.</p> <p>Evaluative comments could consider:</p> <ul style="list-style-type: none"> • the scale of threats (global versus local) • timescale and permanence/reversibility of threats • changes to the conditions needed for coral growth versus physical damage • the ease of preventing or managing threats • that climate change is linked to multiple changes, therefore the overall impact could be the most important threat. <p>Award marks based on the quality of the response using marking grids B and C.</p>	20

Question	Answer	Marks
6	<p>‘Wave refraction is the most important factor in the formation of coastal landforms.’</p> <p>To what extent do you agree with this statement? Use examples to support your answer.</p> <p>AO1 Knowledge and understanding Wave refraction:</p> <ul style="list-style-type: none"> • occurs on irregular shaped coastlines • is caused by the slowing down of waves as they reach shallow water • wave energy is concentrated at some locations and dispersed at others • waves tend to be concentrated at headlands and refracted around the headland to hit its sides • waves tend to be dispersed in bays. <p>The role of wave refraction on the formation and development of erosional and depositional landforms:</p> <ul style="list-style-type: none"> • wave refraction causes caves (and ultimately stacks) to be eroded on two sides of the headland • wave refraction can lead to swash-aligned beaches • wave refraction can lead to drift-aligned beaches and indirectly to landforms created by longshore drift • wave refraction can also occur around offshore islands leading to the deposition of a tombolo on the landward side. <p>Other factors which can influence the formation and development of erosional and depositional landforms include:</p> <ul style="list-style-type: none"> • wave characteristics such as strength (energy), direction, fetch • rock type and structure • climate • sub-aerial processes (weathering and mass movement) • human activities. <p>AO3 Evaluation This question requires assessment of the extent to which wave refraction is the most important factor in the formation of coastal landforms.</p> <p>Evaluative comments may consider:</p> <ul style="list-style-type: none"> • landforms which are affected by wave refraction versus those which are not • the significance of wave refraction compared to other factors in the formation of specific landforms • the factors that affect the operation of coastal processes such as longshore drift, and how much wave refraction plays a part in these. <p>Award marks based on the quality of the response using marking grids B and C.</p>	20

Hazardous environments

Answer the first question and one other question.

Question	Answer	Marks
7(a)	<p>Figure 7.1 shows the global distribution of volcanoes.</p> <p>Describe the global distribution of volcanoes shown in Figure 7.1.</p> <p>Award one mark for a simple descriptive point to the maximum.</p> <p>Candidates should interpret Figure 7.1 to identify the pattern of volcanoes across the globe.</p> <p>Candidates may identify:</p> <ul style="list-style-type: none"> • volcanoes are mainly linear in their distribution • uneven global distribution • widespread global distribution. <p>More specific points:</p> <ul style="list-style-type: none"> • Pacific Ring of Fire • many are along the edges of continental landmasses, e.g. western edge of South America • others are mid-oceanic e.g. mid-Atlantic • a few are in continental interiors e.g. central Asia • a few are more clustered e.g. Iceland • East Africa (Rift Valley) – linear • continental interiors where volcanoes do not occur e.g. Australia, South America. 	4
7(b)	<p>Explain why volcanoes are not found at all types of tectonic plate boundary.</p> <p>Reasons include:</p> <ul style="list-style-type: none"> • volcanoes are formed by rising magma • this may be due to the rising limbs of convection currents (divergent boundaries) • or the melting of subducted plate edge material (convergent boundaries) • neither of these situations arise at collision boundaries • or conservative (transform) boundaries. <p>Award marks based on the quality of the response using marking grid A.</p>	6

Question	Answer	Marks
8	<p>‘Flooding is the most significant hazard from tropical cyclones (cyclones, hurricanes, typhoons).’</p> <p>To what extent do you agree with this statement? Use examples to support your answer.</p> <p>Tropical cyclones include cyclones, hurricanes and typhoons.</p> <p>AO1 Knowledge and understanding The main hazards from tropical cyclones include:</p> <ul style="list-style-type: none"> • high winds • storm surges • coastal flooding (causing saltwater intrusion) • intense rainfall • river floods • mass movements. <p>These should be described with reference to examples to show how they become hazards to people and infrastructure.</p> <p>AO3 Evaluation This question requires assessment of the extent to which flooding is the most significant hazard from tropical cyclones. Flooding may refer to flooding caused by intense rainfall, storm surges or both.</p> <p>Evaluative comments could consider:</p> <ul style="list-style-type: none"> • the frequency, intensity and characteristics of the tropical cyclone, such as wind strength, extent, amount and duration of rainfall • the shape of the coastline and offshore water depth will influence the effect of storm surges • coastal and/or river management will influence the extent of flooding, such as the use of seawalls or levées • river flooding will depend on not only rainfall amounts but also drainage basin characteristics such as size and number of rivers and the state of the ground surface, permeable or impermeable • mass movements will be affected by rainfall amounts, as well as by topography and nature of slope materials • human factors (such as level of economic development and population density) will influence vulnerability to different hazards. <p>Award marks based on the quality of the response using marking grids B and C.</p>	20

Question	Answer	Marks
9	<p>‘Climatic factors are the main influence on the location and spread of wildfires.’</p> <p>To what extent do you agree with this statement? Use examples to support your answer.</p> <p>AO1 Knowledge and understanding Climatic factors influencing the location and/or spread of wildfires include:</p> <ul style="list-style-type: none"> • high temperatures • drought / lack of precipitation (causing desiccation of vegetation) • wind strength and direction • local weather conditions such as lightning can be a cause of wildfires. <p>Other factors influencing the location and/or spread of wildfires include:</p> <ul style="list-style-type: none"> • human causes, both accidental and deliberate • other physical causes such as sparks from falling rocks • the type, density and flammability of vegetation, e.g. conifers and eucalyptus are more flammable • the shape of the land (topography) – slope and aspect • local land use • management strategies, such as firebreaks. <p>AO3 Evaluation This question requires assessment of the extent to which climatic factors are the main influence on the location and spread of wildfires.</p> <p>Evaluative comments could consider:</p> <ul style="list-style-type: none"> • the significance of climatic factors compared to other factors in the causes of wildfires • the significance of climatic factors compared to others in the spread of wildfires • how climate and other factors interlink, for example topography drives local wind patterns or can form a barrier to spread, extreme heat can lead to spontaneous combustion • how population density and levels of education may influence human causes and management • the potential impact of climate change on the location and spread of wildfires. However, answers focused solely on climate change are not answering the question set. <p>Award marks based on the quality of the response using marking grids B and C.</p>	20

Arid environments

Answer the first question and one other question.

Question	Answer	Marks
10(a)	<p>Figure 10.1 is a photograph which shows landforms in Death Valley, USA.</p> <p>Describe the main landforms shown in Figure 10.1.</p> <p>Award one mark for each accurate description of a landform in Figure 10.1. Award up to two marks for development of the description.</p> <p>Landforms from Figure 10.1 may include:</p> <ul style="list-style-type: none"> • large alluvial fan with a variety of distributary channels extending into the salt lake • smaller alluvial fan to the left of the main fan • channel (wadi) emerging from the upland area • gullies on the hillsides • salt lake in the lowland area shown by pale colour • there may be other landforms that could be considered. 	4
10(b)	<p>Explain the role of water in the formation of <u>two</u> of the landforms you described in 10(a).</p> <p>The detail will depend on which two of the landforms described in 10(a) are chosen. As examples:</p> <p>Alluvial fan</p> <ul style="list-style-type: none"> • episodic water flow forms mountain water systems • abundant supply of sediment • sudden drop in gradient on leaving the mountain front causes deposition with the coarser, heavier material dropped first • ability to spread laterally. <p>Wadi</p> <ul style="list-style-type: none"> • steep valleys in the mountains • high velocity, episodic flows of water • supply of sediment to assist rates of abrasion • erodible banks. <p>For most of the landforms water action has been crucial.</p> <p>Award marks based on the quality of the response using marking grid A.</p>	6

Question	Answer	Marks
11	<p>Assess the extent to which desertification is caused by physical factors. Use examples to support your answer.</p> <p>AO1 Knowledge and understanding The question requires knowledge of desertification (general land degradation) and the causes. This should be discussed with reference to examples.</p> <p>Evidence for desertification includes:</p> <ul style="list-style-type: none"> • soil erosion (both wind and water) • reduction of vegetation and changes in composition of vegetation • loss of biodiversity • loss of soil nutrients • salinisation of soils • reduction of land available for cropping or pasture • increased sedimentation in streams and reservoirs. <p>Physical factors causing desertification include:</p> <ul style="list-style-type: none"> • longer and more frequent periods of drought • long-term climate change • increased windstorms. <p>Human factors causing desertification are related to population pressure (a result of population growth and migration) and poverty. Human causes include:</p> <ul style="list-style-type: none"> • deforestation • overgrazing • overcultivation • poor irrigation practices • overuse of water supplies. <p>AO3 Evaluation This question requires an assessment of the extent to which desertification is caused by physical factors.</p> <p>Evaluative comments could consider:</p> <ul style="list-style-type: none"> • the roles of physical processes and human activities in relation to the evidence for desertification • how the factors link to the processes of desertification and may link together e.g. overuse of water supplies due to longer periods of drought • the overarching causes of human factors i.e. population pressure and poverty • spatial variations, e.g. between different countries or regions • variation over time – the extent that increased population pressures have led to increased rates of degradation. <p>Award marks based on the quality of the response using marking grids B and C.</p>	20

Question	Answer	Marks
12	<p>‘Salt crystal growth is the most important weathering process in hot arid and hot semi-arid environments.’</p> <p>To what extent do you agree with this statement? Use examples to support your answer.</p> <p>AO1 Knowledge and understanding Salt crystal growth is a major weathering process in these environments because of:</p> <ul style="list-style-type: none"> • abundance of salt (sodium sulfate, sodium carbonate) in the wind from eroding saline topsoils (solonetz, solonchaks) • salt blown from salt lakes (playas). <p>Salt crystal growth can occur in two main ways:</p> <ul style="list-style-type: none"> • in areas where temperatures fluctuate around 26–28 °C, sodium sulfate and sodium carbonate expand by about 300% putting pressure on cracks and joints in the rock • when water with a high salt content evaporates, salt crystals may be left, leading to growth and expansion that puts pressure on the rock. <p>Other weathering processes are:</p> <ul style="list-style-type: none"> • thermal fracture and exfoliation • freeze–thaw in upland environments • some chemical weathering (hydrolysis and carbonation) from dew and infrequent rainfall (possibly of greater importance in hot semi-arid environments) • possible vegetation root action in hot semi-arid environments. <p>AO3 Evaluation This question requires an assessment of the extent to which salt crystal growth (SCG) is the most important weathering process in hot arid and hot semi-arid environments.</p> <p>Evaluative comments could consider:</p> <ul style="list-style-type: none"> • the importance of SCG in comparison to other weathering processes • where SCG and other weathering processes occur – candidates may separate hot arid from hot semi-arid environments • when SCG and other weathering processes occur (past or present processes) • the relative role of SCG and other weathering processes in the formation or shaping of different landforms (both erosional and depositional) • the importance of SCG and other weathering processes in producing material for transport and erosion processes. <p>Award marks based on the quality of the response using marking grids B and C.</p>	20