Cambridge Assessment International Education

Example Candidate Responses – Paper 1

Cambridge International AS & A Level Geography 9696

For examination from 2022

Cambridge Pathway

Contents

Introduction

The main aim of this booklet is to exemplify standards for those teaching Cambridge International AS & A Level Geography 9696 and to show how different levels of candidates' performance (high, middle and low) relate to the subject's curriculum and assessment objectives.

In this booklet, candidate responses have been chosen from the June 2022 series to exemplify a range of answers for all the questions on the question paper.

For each question, the response is annotated with a clear explanation of where and why marks were awarded or omitted. This is followed by examiner comments on how the answer could have been improved. In this way, it is possible for you to understand what candidates have done to gain their marks and what they could do to improve their answers. There is also a list of common mistakes candidates made in their answers for each question.

This document provides illustrative examples of candidate work with examiner commentary. These help teachers to assess the standard required to achieve marks beyond the guidance of the mark scheme. Please also refer to the June 2022 Examiner Reports for further detail and guidance.

The questions and mark schemes used here are available to download from the School Support Hub. These files are:

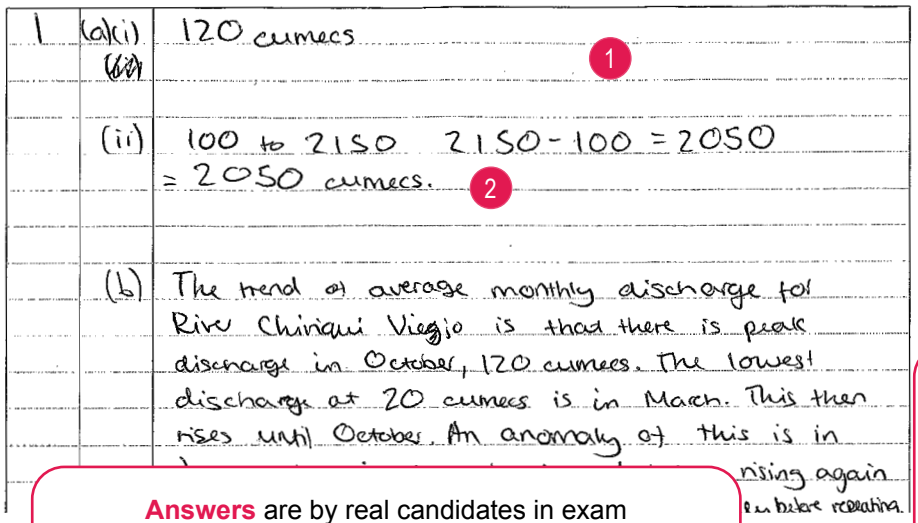
9696 June 2022 Question Paper 11 and Paper 12

9696 June 2022 Mark Scheme 11 and Paper 12

Past exam resources and other teaching and learning resources are available on the School Support Hub.

How to use this booklet

This booklet goes through the paper one question at a time, showing you the high- and middle-level response for each question. The candidate answers are set in a table. In the left-hand column are the candidate answers, and in the right-hand column are the examiner comments.

Example Candidate Response – high	Examiner comments
 1 (a)(i) 120 cumecs 1 (ii) 100 to 2150 2150 - 100 = 2050 = 2050 cumecs. 2 (b) The trend of average monthly discharge for River Chiriqui Viejo is that there is peak discharge in October, 120 cumecs. The lowest discharge at 20 cumecs is in March. This then rises until October. An anomaly of this is in ... rising again ... before reducing.	1 This is a correct answer. Mark for (a)(i) = 1 out of 1 2 The lower value is incorrect, but 1 mark has been awarded for valid calculation. Mark for (a)(ii) = 1 out of 2

Answers are by real candidates in exam conditions. These show you the types of answers for each level. Discuss and analyse the answers with your learners in the classroom to improve their skills.

Examiner comments are alongside the answers. These explain where and why marks were awarded. This helps you to interpret the standard of Cambridge exams so you can help your learners to refine their exam technique.

How the candidate could have improved their answer

- **(b)** The candidate needed to identify a third general trend to be awarded the third mark.
- **(c)** The answer needed to contain more explicit comparisons between the two hydrographs and concentrate on differences that would affect discharge throughout the year and not just on a one-off basis such as in storm hydrographs.

This section explains how the candidate could have improved each answer. This helps you to interpret the standard of Cambridge exams and helps your learners to refine their exam technique.

Common mistakes candidates made in this question

- Paper 11 **(a)(ii)** Some candidates used the incorrect graph for calculation.
- Paper 11 **(c)** Many candidates interpreted the graphs as storm hydrographs, discussing elements such as rising limbs and lag times. Thus, interpreting the question as one-off discharge events rather than discharge variations throughout the year. There was incomplete understanding of what annual hydrographs portrayed.
- Paper 12 **(a)(ii)** The most common error was to take the lowest value as the start of the graph in January, rather than in March.
- Paper 12 **(b)** Many candidates found 'patterns' rather tha
- The same mistake over the nature of the hydrographs w
  11.

Lists the common mistakes candidates made in answering each question. This will help your learners to avoid these mistakes and give them the best chance of achieving the available marks.

Question 1

Paper 12

Example Candidate Response – high

1 (a)(i) 800 cumecs

~~(a)(ii)~~

1

1 (a)(ii) 225 - 25 = 200

1 (b) Between January and April in fig 1.1, there is fluctuation ~~at~~ at around 100 - 200 ~~cumecs~~ cumecs. After April, the monthly discharge increases rapidly to reach a maximum of 800 and then decrease to 50 in July. Low fluctuations occur between July and December. ~~This is the exp~~ Fig 1.2 has a similar trend between January and April, however between April and July, the peak only reaches 275 cumecs. Following July and August, where discharge is low, at around 45 cumecs, average discharge increases again, reaching 175 in October. It then decreases until December.

1 (c) These hydrographs are different sizes. The ~~drainage basin~~ catchment area of the hydrograph in fig 1.1 is ~~is~~ 135,895km² compared to only 3420km² in fig 1.2. This means that there will be many more tributaries and lots more surface runoff that flow into the river Fitzroy in fig 1.1, increasing the annual discharge. The ~~catchment areas~~ hydrographs are also in different parts of the world. The hydrograph in fig 1.1 is located at 23° S, in Australia whereas the hydrograph in fig 1.2 is located at 51° N, in Russia. This means that the climate and precipitation intensity will be different in the catchment areas. Fig 1.1 will recieve ~~less~~ more intense rainfall, but less often, because there ~~will be more seasonal variation, are higher, drier temperatures~~ whereas fig 1.2 will be prone to more constant, ~~often~~ less intense weather, causing it to have the second peak, but an overall lower amount of river discharge.

Examiner comments

1 Correct data identified, although no units indicated in (a)(ii).
Mark for (a)(i) = 1 out of 1
Mark for (a)(ii) = 2 out of 2

2 There are some points of clear comparison, but the answer drifts towards separate statements.
Mark for (b) = 2 out of 3

3 There is good use of data on both size and characteristics of drainage basin in the answer. Contrasts in climatic regimes are also useful, but a little speculative. Speculative comments on the differences in patterns of annual rainfall are relevant but there is little reference to why discharge will vary throughout the year.
Mark for (c) = 3 out of 4

Total mark awarded = 8 out of 10

How the candidate could have improved their answer

- **(b)** More direct comparisons would have improved the answer.
- **(c)** The candidate should have included realistic comments concerning latitude and climate. The discussion needed to be on factors that vary throughout the year and that would affect the variations in runoff and river discharge.

Paper 11

Example Candidate Response – middle

1 (a)(i) 120 cumecs 1

(ii) 100 to 2150 2150 - 100 = 2050
= 2050 cumecs. 2

(b) The trend of average monthly discharge for Rivi Chiriqui Viejo is that there is peak discharge in October, 120 cumecs. The lowest discharge at 20 cumecs is in March. This then rises until October. An anomaly of this is in June where it starts to descend before rising again in July. After October, it descends rapidly before repeating. 3

(c) One reason for the difference in the annual hydrographs is that River à la Baleine is in Canada meaning that the glacies melt in ~~a~~ Spring, causing discharge to peak in June.* Another reason for the differences is that fig 1.1 is in Panama. This means that there is ~~highest~~ peak discharge ~~when~~ in Autumn due to leaves falling off of trees, reducing evapotranspiration, therefore, the discharge is at its peak in October, at 120 cumecs.
* at 2150 cumecs. 4

Examiner comments

1 This is a correct answer.
Mark for (a)(i) = 1 out of 1

2 The lower value is incorrect, but 1 mark has been awarded for valid calculation.
Mark for (a)(ii) = 1 out of 2

3 The candidate identifies two general trends, but the anomaly is a variation, and short term only. The candidate misses the trend from November to March. The answer is a mixture of pattern and trend.
Mark for (b) = 2 out of 3

4 The explanation of snow melt in Canada is valid, but the reference to Panama and autumn leaves is not correct. The discussion of climatic influences does not attempt to suggest climatic reasons for the discharge pattern for the Panama's river as a contrast to the Canadian river.
Mark for (c) = 1 out of 4

Total mark awarded = 5 out of 10

How the candidate could have improved their answer

- **(b)** The candidate needed to identify a third general trend to be awarded the third mark.
- **(c)** The answer needed to contain more explicit comparisons between the two hydrographs and concentrate on differences that would affect discharge throughout the year and not just on a one-off basis such as in storm hydrographs.

Paper 11

Example Candidate Response – low

1 ai 120 kumecs 1

ii −125 + 188.5 = 63.5 cumecs 2

b The graph has two steep rising limbs. Showing that during the periods of ~~April~~ Mid April to Mid June and Mid July to Mid October the greatest increase in discharge was observed. The graph also shows that during the coldest months towards the end of the year is when discharge is highest. The greatest discharge was in october at a rough average of 121 cumecs. And the least in April at 21 cumecs. 3

c The development of the areas in which the rivers are located could be one reason. Areas in which have more impermeable surfaces will result in higher and faster direct flow of water to rivers thus increasing discharge due to an increase in overland flow. Whereas less developed areas with more vegetation will absorb more water via infiltration ~~which stem absorbs water~~ some of the water is absorbed by the soil ~~and~~ thus not all the water is in through flow rivers not all the water goes to the river. Another reason could be the land use around the river. If the river is located on a farm a lot of it will be used by agricultural farmers for irrigation in ~~drought~~ which would consequently reducing discharge. 4

Examiner comments

1 This is an incorrect answer.
Mark for (a)(i) = 0 out of 1

2 The calculation and answer are not correct.
Mark for (a)(ii) = 0 out of 2

3 The candidate identifies one correct general trend, July to October, but commenting on one specific month does not constitute a trend.
Mark for (b) = 1 out of 3

4 Although generic comments may be valid, in this instance, they are very speculative and not clearly related to the two river basins. The candidate has not noted the figures relate to annual discharge patterns. The variations throughout the year should reflect factors that change systematically through the year. Impermeable surfaces will not vary throughout the year, but might be relevant if discussing total discharges between the two rivers.
Mark for (c) = 0 out of 4

Total mark awarded =
1 out of 10

How the candidate could have improved their answer

In general terms, the candidate needed to use the data provided more effectively, and to read the questions more carefully. There were too many unfounded comments in the answer, especially in answers to part **(c)** and not clearly related to the specific question. There needed to be an attempt to examine factors that reflected annual variation in rates of discharge.

Common mistakes candidates made in this question

- Paper 11 **(a)(ii)** Some candidates used the incorrect graph for calculation.
- Paper 11 **(c)** Many candidates interpreted the graphs as storm hydrographs, discussing elements such as rising limbs and lag times. Thus, interpreting the question as one-off discharge events rather than discharge variations throughout the year. There was incomplete understanding of what annual hydrographs portrayed.
- Paper 12 **(a)(ii)** The most common error was to take the lowest value as the start of the graph in January, rather than in March.
- Paper 12 **(b)** Many candidates found ‘patterns’ rather than ‘trends’. The same mistake over the nature of the hydrographs was repeated in answers to this question as that in Paper 11.

Question 2

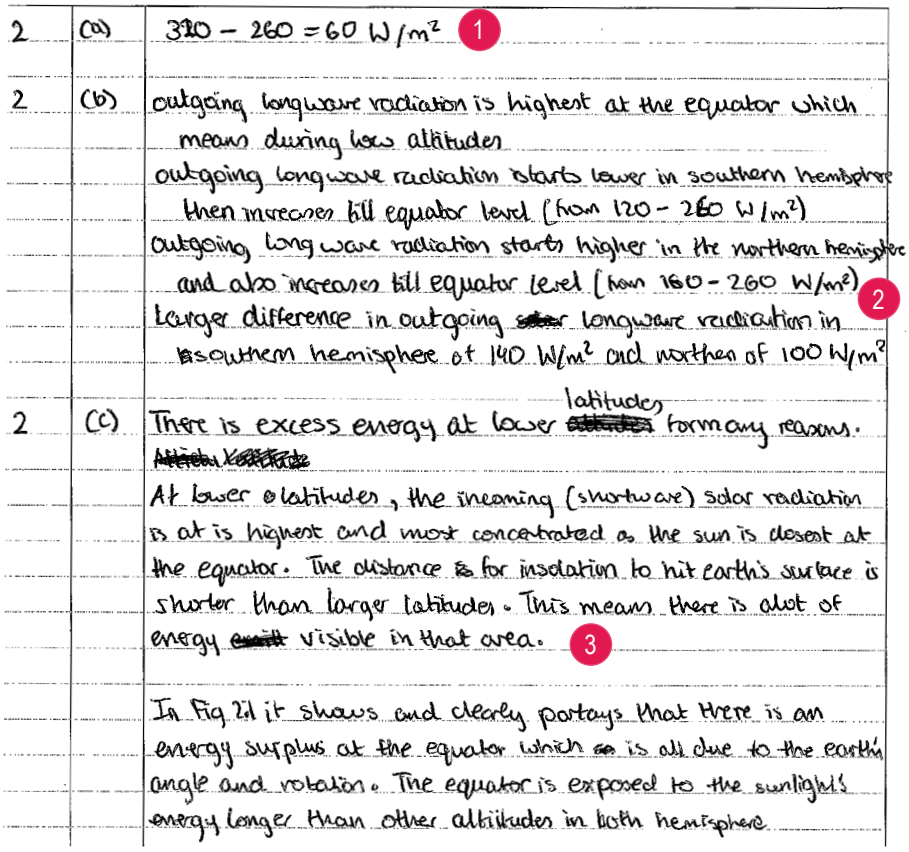
Paper 11

Example Candidate Response – high	Examiner comments
2 a SWR = 2025 outgoing = 120 120 - 25 = 95 difference = 95 W/m² (1) b There is a larger amount of incoming solar radiation at the equator (0°). As latitude both increase and decrease southward and northward the amount of incoming solar radiation decreases as the latitudes move further away from the equator. At 85° S incoming solar radiation is the least at around 25 W/m², lower than 85° N. ~~Poe is a~~ Between around 30° N and S incoming solar radiation exceeds outgoing solar radiation. Whilst 30–85° S and N outgoing LWR exceeds incoming insolation. (2) c A higher latitudes there is an energy deficit for two reasons (where outgoing LWR exceeds incoming radiation). Firstly as you move away from the equator the angle of the overhead sun decreases, meaning area at higher latitudes recive less concentrated insolation. Secondly the thickness of the atmosphere, the insolation has to pass through at higher latitude also increases insolation travelling through thicker atmosphere is more likely to be reflected or absorbed hence why higher latitudes recive less insolation and thus have an energy deficit (3)	(1) Both figure and calculation are correct. Mark for (a) = 2 out of 2 (2) There are a number of valid points in the answer. The candidate covers the three main elements in the mark scheme with appropriate data extracted from the resource. Mark for (b) = 3 out of 3 (3) The candidate's answer clearly explains what an energy deficit is and explains it with respect to the angle of the sun's rays. Reference to the curvature of the earth would have improved the explanation. Mark for (c) = 4 out of 5 **Total mark awarded = 9 out of 10**

How the candidate could have improved their answer

(c) The answer was particularly strong in discussing the angle of the sun's rays, and the distance they travel through the atmosphere. To improve, the answer needed a wider ranging discussion, such as the albedo effect, to be awarded full marks.

Paper 12

Example Candidate Response – middle	Examiner comments
	1 These are the correct workings and figure. Mark for (a) = 2 out of 2 2 The last sentence lacks the clarity needed for full marks. Mark for (b) = 2 out of 3 3 The candidate confuses altitude and latitude, and too much emphasis is given for distance from the sun, rather than the angle of the sun's rays. The reference at the end with respect to the earth's angle and rotation could have been elaborated on and would have provided a partial explanation much stronger than reference to the distance from the sun. Mark for (c) = 1 out of 5 **Total mark awarded =** **5 out of 10**

How the candidate could have improved their answer

(c) The candidate demonstrated some understanding of concentration of energy near the equator, but related it to distance from the sun, which was not a valid argument. They mentioned angle, relating to energy surplus, but without effective explanation. This concept needed development to be awarded more marks.

Paper 11

Example Candidate Response – low	Examiner comments
2 (a) 130 - 25 = 105 W/m² 1 2 (b) The amount/ energy of the incoming (shortwave) radiation increases until it gets to a high peak and then rapidly decreases and curves off. At 85°N it starts to 50 W/m² and then increase to about 250 W/m². The highest peak is about 310 W/m² and then rapidly decreases to 25 W/m², so half of what it started at 2 at 85°s. 2 (c) one reason why there is an energy deficit at higher latitudes is because of the angle of incidence. This is where the sun's rays hits parts of the Earth surface. The sun rays where is hits the poles is an energy deficit, this is because there is a longer distance to travel to reach a larger area where it creates a large area of deficit. Whereas at the Equator to the sun rays travel at a shorter distance creates a smaller area. 3 Another reason why there is an energy deficit at higher latitudes is due to the Earths tilt. This is where the Earth rotates at an angle so at different time the sunr ray it the Earth. Therefore there is an energy deficit at higher latitudes are more energy is required to travel means that the amount of energy that is found at a higher latitude decreases.	1 One figure is inaccurate but 1 mark has been awarded for valid workings. Mark for (a) = 1 out of 2 2 The candidate identifies some pattern, but the focus of the answer is on trend. Mark for (b) = 1 out of 3 3 The angle of the sun's rays is discussed, but the explanation is not convincing. The answer lacks other factors such as albedo and distance through the atmosphere. Mark for (c) = 1 out of 5 **Total mark awarded = 3 out of 10**

How the candidate could have improved their answer

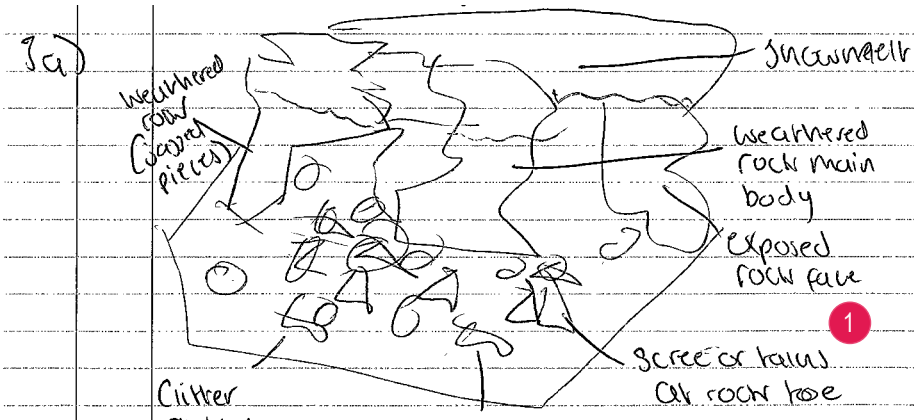
- **(b)** The answer needed to be more focused on pattern rather than trend.
- **(c)** The candidate mentioned the angle of the sun's rays but the explanation was not convincing. Explanation could have been in terms of the greater distance that solar radiation had to pass through the atmosphere because of the curvature of the earth, leading to greater dissipation of the energy. They also needed to mention other factors such as albedo to be awarded more marks.

Common mistakes candidates made in this question

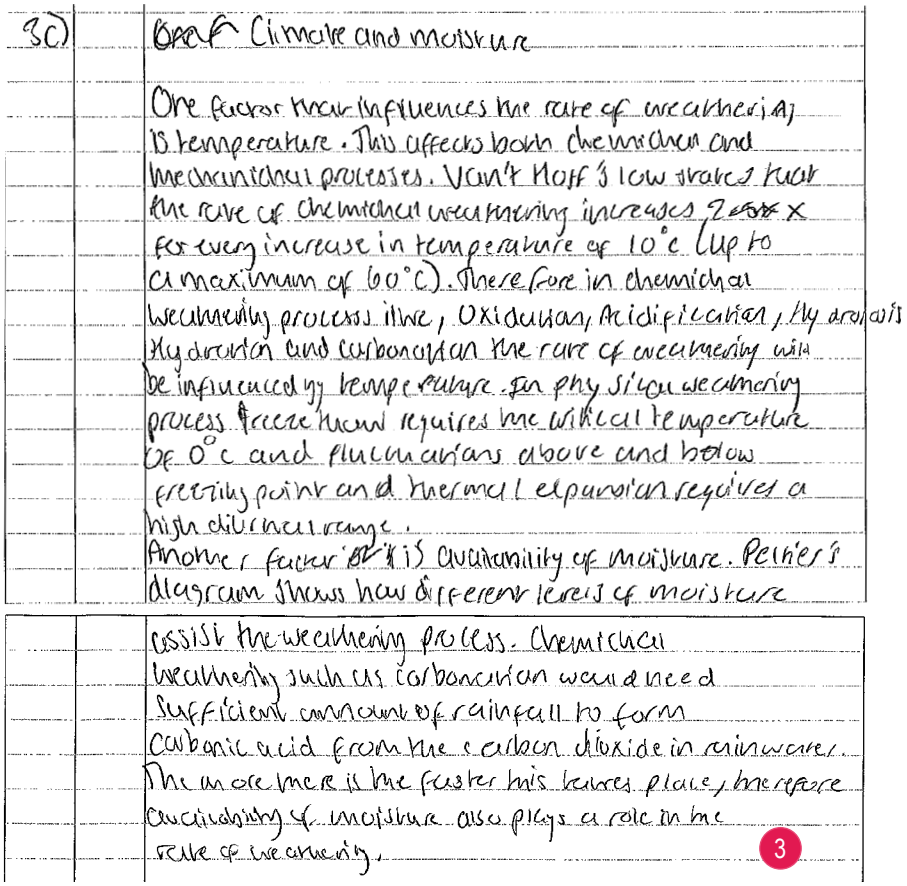
- Papers 11 and 12 **(b)** There was confusion between 'pattern' and 'trend'. Many described the trend and not the pattern.
- Paper 11 **(c)** Some candidates explained the deficit by referring to the distance from the sun but without clarifying what this meant.
- Paper 12 **(c)** Crediting distance from the sun as an important factor in explaining energy deficit in higher latitudes.

Question 3

Paper 11

Example Candidate Response – high	Examiner comments
3a)  3b) Plan: Freeze thaw: 0°C 9%. Pressure One weathering process the rock has been weathered by is a mechanical process called ~~Freeze thaw this could also be~~ Freeze thaw. This could have occured cause by snowmelt leaving water in cracks and joints in rock. At the critical temperature of 0°C the water freezes and expands by 9% exerting pressure within the rock. After repeated frost shattering on piece and freezing and melting, the pressure may cause pieces of rock to be detatched from the main body and fall to the ground as scree or talus.	1 The candidate is awarded 2 marks for a basic diagram plus one piece of labelling relating to weathering. Mark for (a) = 2 out of 4 2 The candidate makes clear reference to a valid weathering process (freeze-thaw) with a thorough explanation of the process. Mark for (b) = 2 out of 2

Example Candidate Response – high, continued



Examiner comments

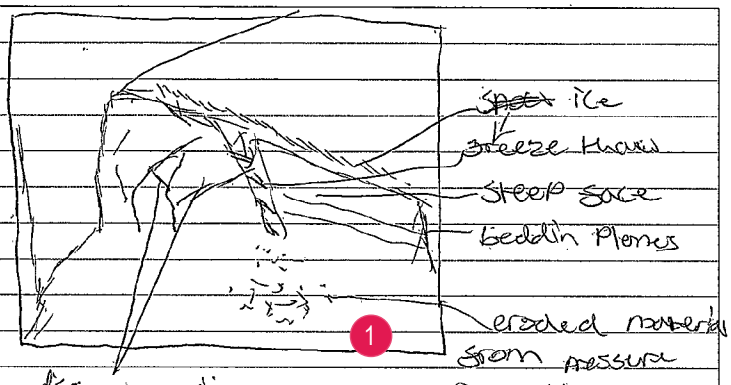
3 The candidate's answer focuses on temperature and precipitation with good details on both, and there is a good discussion of the rate of weathering. There is extensive coverage of the main physical and chemical weathering processes.
Mark for (c) = 4 out of 4

Total mark awarded = 8 out of 10

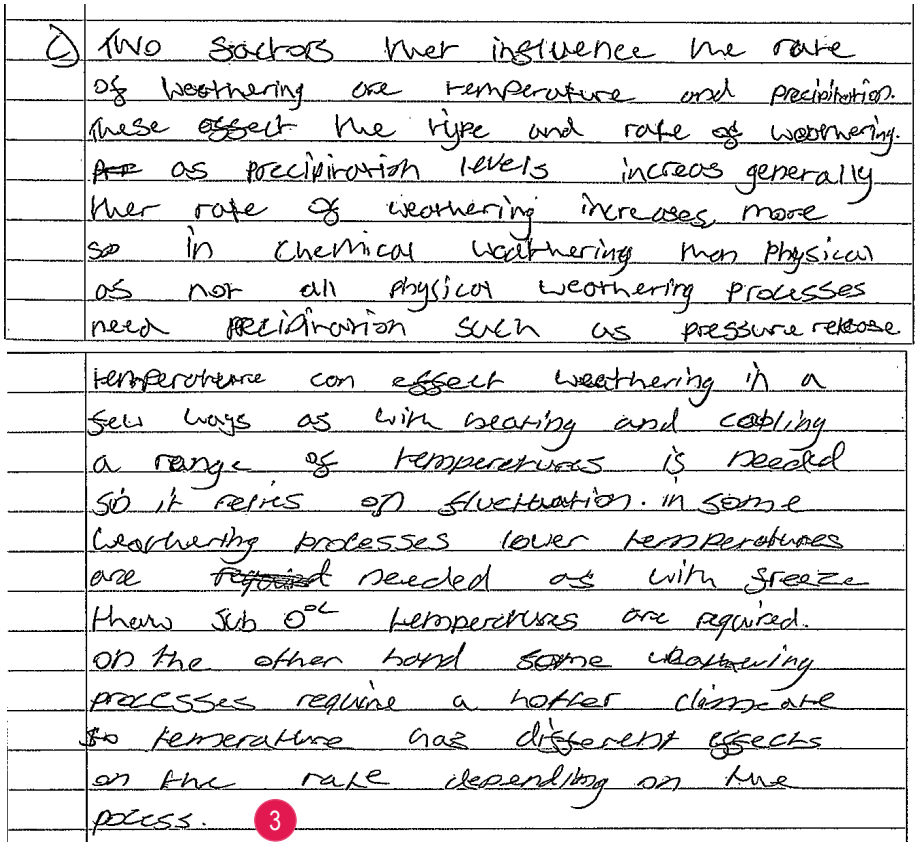
How the candidate could have improved their answer

(a) Both the diagram and labelling needed to be more detailed.

Paper 11

Example Candidate Response – middle	Examiner comments
3 a)  1 different gradients from physical weathering. b) due to the ice on the top of the cliffs it suggests the rock may have been weathered by freeze thaw, as the water ~~to~~ water penetrates the rock and temperatures fall causing the water to freeze and expand causing the rock to break apart. 2	1 The diagram displays exposed rock face, but labelling of weathering features lacks clarity. Mark for (a) = 1 out of 4 2 The start of the answer is not clear, but at the end, the candidate gives a good explanation. The answer covers the main elements of the process but could have been more specific as to how and why the rock is fractured. Mark for (b) = 2 out of 2

Example Candidate Response – middle, continued



2) Two factors that influence the rate of weathering are temperature and precipitation. These effect the type and rate of weathering. As precipitation levels increase generally the rate of weathering increases more so in chemical weathering than physical as not all physical weathering processes need precipitation such as pressure release.

temperature can effect weathering in a few ways as with heating and cooling a range of temperatures is needed so it relies on fluctuation. In some weathering processes lower temperatures are ~~required~~ needed as with freeze thaw sub 0°C temperatures are required. On the other hand some weathering processes require a hotter climate so temperature has different effects on the rate depending on the process. 3

Examiner comments

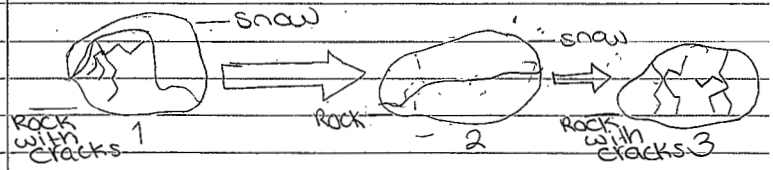
3 The candidate shows some general understanding of the role of temperature and precipitation in influencing the rate of weathering, but there is little specific detail beyond freeze-thaw.
Mark for (c) = 2 out of 4

Total mark awarded = 5 out of 10

How the candidate could have improved their answer

- **(a)** The diagram could have been drawn more accurately, and labelling should have been more specific to weathering.
- **(c)** The candidate displayed general understanding of the roles of temperature and precipitation but dealt only with freeze-thaw in more specific terms. They needed to include more detail and discussion of a wider range of weathering processes.

Paper 12

Example Candidate Response – low	Examiner comments
3 a Freeze thaw 1 3 b  In diagram 1, snow gets on to the ~~snow~~ rock that is filled wit cracks. In diagram 2, the snow covers the cracks and freezes. In diagram ~~the~~ 3, more cracks appear due to freezing during freeze thaw. 2 3 c Climate is important in determining the rate of weathering for multiple reasons. To begin, due to climate in an area, certain rocks can be weathered. For example, in cold climates, certain rocks are weathered and in hot climates certain rocks are weathered. To add to that, many rocks could be strong and need certain type of weathering to break them and to change their shapes. Moreover, climate may change over time and rocks that couldn't be weathered during the cold climates get weathered when it's humid in that area. 3	1 This is a correct answer. Mark for (a) = 1 out of 1 2 The diagram and labels do not have enough detail. The candidate does not mention that the frozen water inside cracks expands and the pressure weakened rock splits. Mark for (b) = 1 out of 4 3 The candidate does not explain the rate of weathering, fluctuations in temperatures or presence of water. Mark for (c) = 0 out of 5 **Total mark awarded = 2 out of 10**

How the candidate could have improved their answer

- **(b)** This diagram needed more detail in both sequential development and labelling.
- **(c)** The answer needed to be more specific and discuss the rate of weathering as stipulated in the question.

Common mistakes candidates made in this question

- **(a)**,**(b)** Diagrams often lacked detail and proper labelling.
- **(b)** There was often a failure to explain the free-thaw process in detail such as how the pressure created by freezing was strong enough to fracture the rock.
- **(c)** Discussion of a limited range of weathering processes and limited discussion of rate of weathering rather than just weathering.

Question 4

Paper 11

Example Candidate Response – low	Examiner comments

4 i) evaporation: evaporation is when water in state of a liquid turns int a gas (vapour) because of the heat.

Percolation: is when water in hillbrakes into the rocks. 1

4 ii) flood recurrence interval is the highest point a flood has reach 2

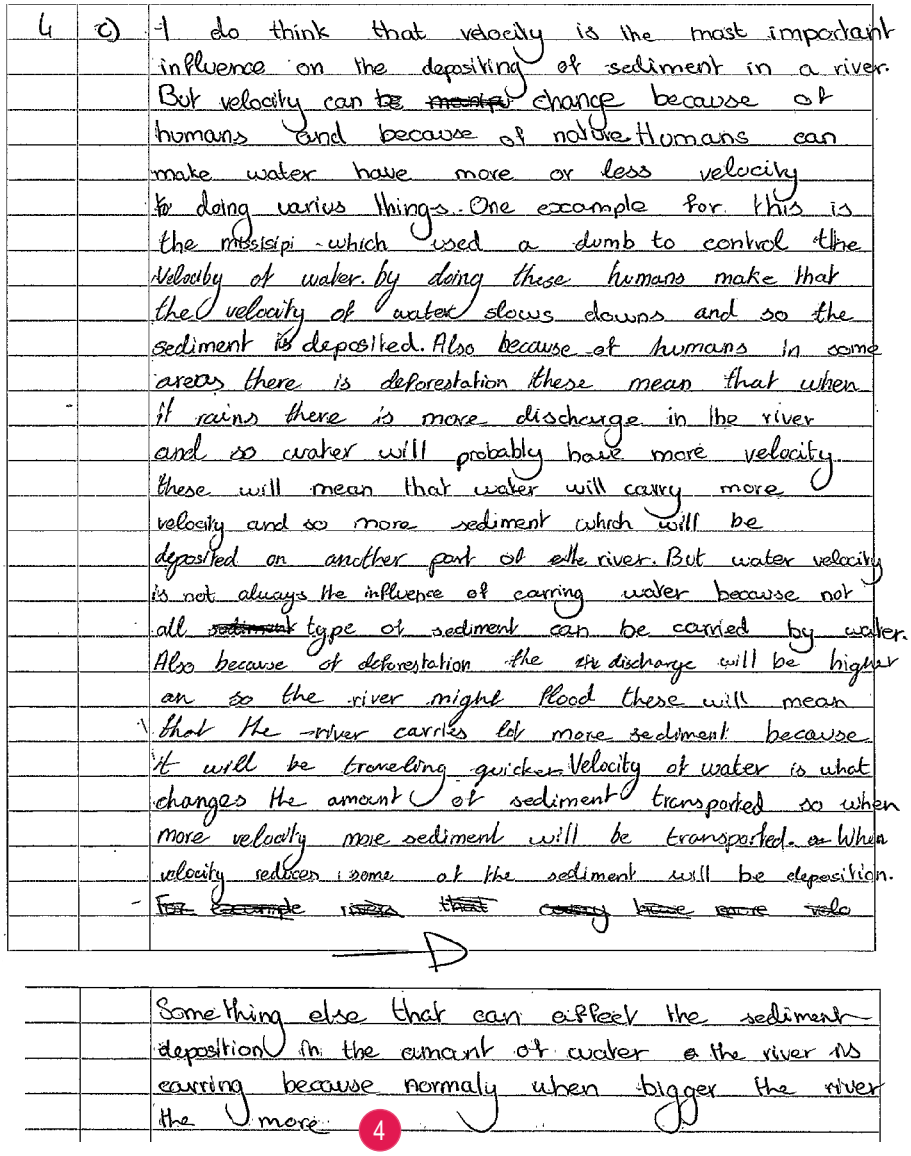
4 b) Deltas are form when rivers and seas or ocean's are met. ~~The~~ Deltas are the end of the river ~~and~~ reaching the sea were sediment ~~have~~ has been deposited. This happens because the the river carries sediment. The sediment in the river is carried because the water has velocity and so withe that velocity it pushes the sediment. When higher the velocity the higher. the amou of sediment that can be transported. Whe the rive ~~make~~ meets the sea the velocity of water decreases and so the river water can't transport the sediment. This means that the sediment that was transporting falls down to the ground. This sediment falling to the bottom is how Deltas are form. One example of a delta is El Ebro. 3

1 The definition of percolation is incomplete and marks cannot be awarded. The definition of evaporation contains the two main elements but the definition of percolation is really a definition of infiltration. Percolation commences after the water has infiltrated.
Mark for (a)(i) = 2 out of 4

2 The candidate displays little understanding of time in terms of the recurrence interval. Lack of understanding of the term interval which implies different floods rather than a single one.
Mark for (a)(ii) = 0 out of 3

3 The candidate displays a limited understanding of relevant deposition, but the answer lacks information on the types and structures of deltas. This is a Level 1 answer.
Mark for (b) = 2 out of 8

Example Candidate Response – low, continued



4 c) I do think that velocity is the most important influence on the depositing of sediment in a river. But velocity can be ~~mostly~~ change because of humans and because of nature. Humans can make water have more or less velocity by doing various things. One example for this is the ~~mississipi~~ which used a dumb to control the velocity of water. by doing these humans make that the velocity of water slows downs and so the sediment is deposited. Also because of humans in some areas there is deforestation these mean that when it rains there is more discharge in the river and so water will probably have more velocity. These will mean that water will carry more velocity and so more sediment which will be deposited on another part of the river. But water velocity is not always the influence of carring water because not all ~~sediment~~ type of sediment can be carried by water. Also because of deforestation the ~~the~~ discharge will be higher an so the river might flood these will mean that the river carries lot more sediment because it will be traveling quicker. Velocity of water is what changes the amount of sediment transported so when more velocity more sediment will be transported. or When velocity reduces some of the sediment will be deposition. ~~For example there carry have more velo~~

Something else that can effect the sediment deposition in the amount of water a the river is carring because normaly when bigger the river the more

4

Examiner comments

4 There is some limited reference to velocity and deposition, but some comments are contradictory, e.g. higher velocity leading to greater deposition. there is no reference to the Hjulström curve, and the answer drifts into discussion of transport rather than deposition.
Mark for (c) = 2 out of 15

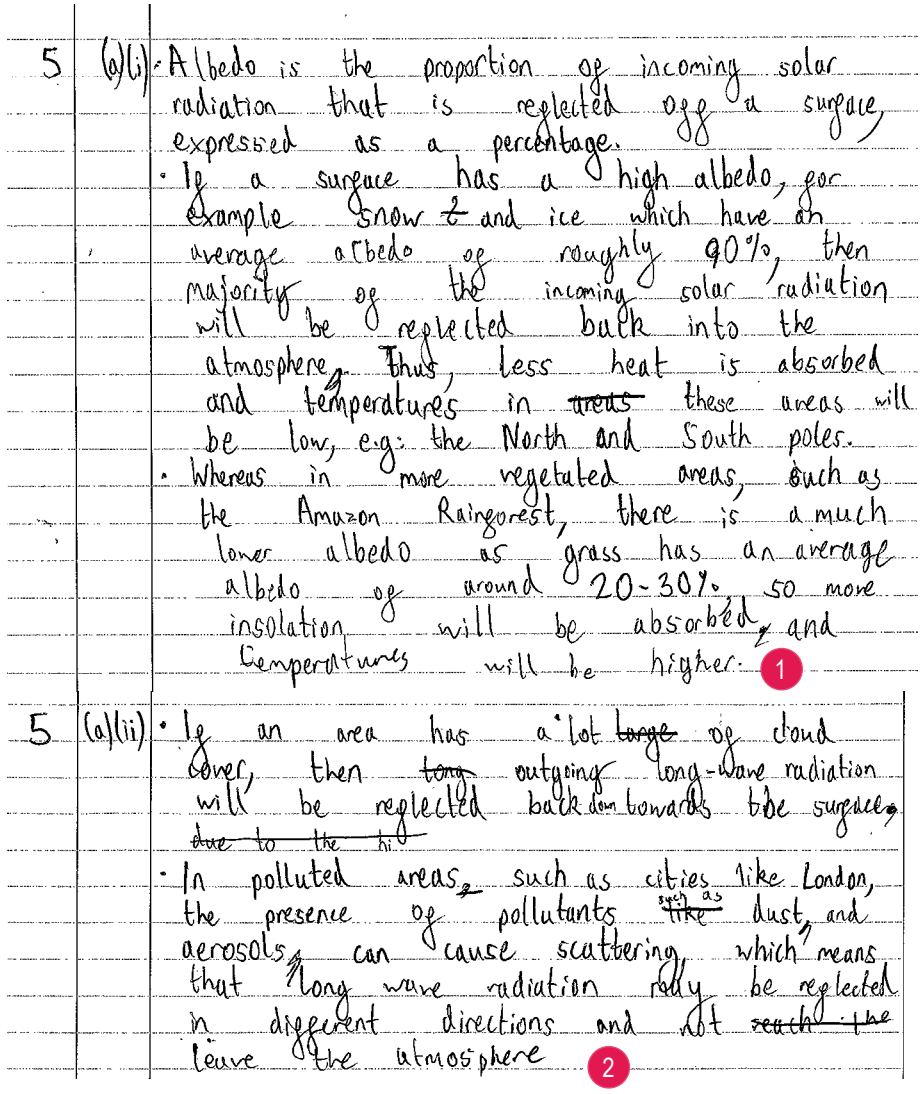
Total mark awarded = 6 out of 30

How the candidate could have improved their answer

- **(a)(i)** Better understanding was needed of the process after water infiltration has occurred for percolation.
- **(a)(ii)** The candidate showed no understanding of flood recurrence intervals. The mention of 'intervals' should have indicated that more than one flood event needed to be considered.
- **(b)** The candidate needed to give more detail of deltas in terms of their origin, and their structure including variation in sediment sizes and where deposition occurs (foreset, topset, bottomset) as well as form and types of deltas. The interaction of river and marine processes could have been discussed.
- **(c)** The candidate needed to focus on deposition. Much of the answer was about transport. Reference to the Hjulström curve would have also improved the answer.

Question 5

Paper 11

Example Candidate Response – middle	Examiner comments
	1 The candidate clearly describes the albedo effects. The description is followed by discussion of surfaces with different albedo values to add to the basic description. Mark for (a)(i) = 3 out of 3 2 The candidate shows understanding, but needs to include details of the gases absorbing longwave radiation. Mark for (a)(ii) = 2 out of 4

5 (a)(i) · Albedo is the proportion of incoming solar radiation that is reflected off a surface, expressed as a percentage.
· If a surface has a high albedo, for example snow & and ice which have an average albedo of roughly 90%, then majority of the incoming solar radiation will be reflected back into the atmosphere. Thus, less heat is absorbed and temperatures in ~~areas~~ these areas will be low, e.g: the North and South poles.
· Whereas in more vegetated areas, such as the Amazon Rainforest, there is a much lower albedo as grass has an average albedo of around 20-30%. So more insolation will be absorbed, and temperatures will be higher. 1

5 (a)(ii) · If an area has a lot ~~large~~ of cloud cover, then ~~long~~ outgoing long-wave radiation will be reflected back down towards the surface, ~~due to the hi~~
· In polluted areas, such as cities like London, the presence of pollutants ~~like~~ such as dust, and aerosols, can cause scattering, which means that long wave radiation fully be reflected in different directions and not ~~reach the~~ leave the atmosphere 2

Example Candidate Response – middle, continued

Examiner comments

5 (b) One way by which the distribution of land and sea influences seasonal variations in temperature is by winds. During the Summer, areas of land surrounded by sea such as North America will heat up much faster than the surrounding ~~the~~ sea. This is because land has a lower specific heat capacity than water. As a result air will rise above land faster than the air above the sea. This means that a zone of low pressure is created above land relative to the higher pressure above the sea. This causes winds to move from higher pressure over sea to the lower pressure inland. Thus, moist and cooler wind from the sea travels towards the centre of the land, cooling down the land as it does. However, it does not have enough energy to travel the whole distance, resulting in a range of temperatures across the land, with high ranges of temperatures and highest temperatures concentrated nearer the centre & cooler temperatures at the coast in ~~winter~~ summer.

In winter, the opposite occurs, and due to the lower Specific Heat Capacity of the land, it cools faster than the sea - causing air in land to ~~sp~~ sink faster than air over the sea. This means that a zone of higher pressure over land is created relative to the lower pressure over the sea. As a result air moves from high pressure over land to lower pressure over sea, causing ~~with~~ warmer winds to move from land towards sea. ~~As it does not have enough energy to travel the whole distance, it~~ As it does, it warms the areas closer to the sea. This leads to the lowest temperatures being the centre of land during winter and warmer temperatures near the coast. 3

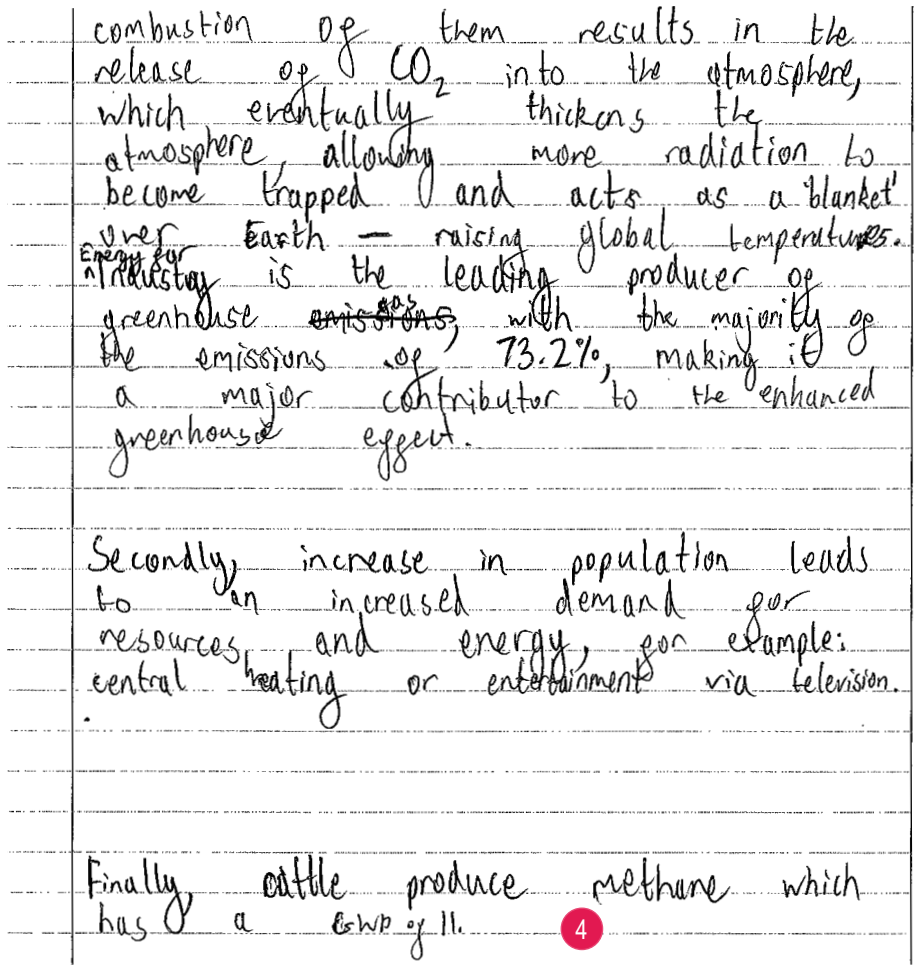
3 The answer is very competent in terms of generic explanation. However, it lacks specific wind and temperature details for Level 3 marks. The basic explanation in terms of differing specific heat capacity of land and sea is well explained. The answer does also concentrate on seasonal aspects which are often ignored. Trade winds and ocean currents could have been discussed.
Mark for (b) = 5 out of 8

Example Candidate Response – middle, continued

Examiner comments

5 (c) The enhanced greenhouse effect is the greenhouse effect, accelerated via human activity; for example: ~~industry~~ combustion of fossil fuels ~~or~~ or cattle farming. The greenhouse effect is the effect by which greenhouse gases such as CO_2 or methane trap outgoing longwave radiation in the atmosphere, keeping the planet warm, and hospitable, ~~where in this essay I will evaluate~~, whereas the addition of excess greenhouse gases by humans activity further accelerates it ~~&~~ and thickens the atmosphere, leading to ~~the~~ more heat trapped and thus global warming. In this essay I will examine the causes of the enhanced greenhouse effect and determine which is most significant.

Firstly, industry is ~~a~~ a major contributor to the enhanced greenhouse effect. This is because many factories across the world rely upon non-renewable sources for energy to power machinery to further produce goods. The main source of energy comes from the combustion of fossil fuels such as oil, natural gas ~~&~~ and coal. ~~The combus~~ These are the decomposed remains of ancient organic life from millions of years ago which ~~act~~ contain carbon. The

Example Candidate Response – middle, continued	Examiner comments
	4 The answer is incomplete. it lacks details of agriculture and deforestation, and discussion of relevant gases is limited. The candidate mentions of methane as an afterthought, but provides no detail as to its nature and effect. This is a Level 2 answer. Mark for (c) = 6 out of 15 **Total mark awarded = 16 out of 30**

How the candidate could have improved their answer

- **(a)(ii)** The answer needed detail of gases absorbing longwave radiation.
- **(b)** The candidate needed to include specific wind details, such as the role of trade winds, and discussion of other factors such as ocean currents to be awarded more marks.
- **(c)** The candidate needed to include details of deforestation and agriculture and discussion of a greater range of relevant gases.

Common mistakes candidates made in this question

- **(a)(ii)** Some candidates did not recognise the importance of atmospheric dust particles.

Question 6

Paper 11

Example Candidate Response – high

6 (a)(i) Subduction is when a denser plate (typically a 3 g/cm^3 oceanic plate) is forced underneath another plate, either another oceanic plate, or a less dense (2.6 g/cm^3) continental plate, at an angle of 30 – 70°, pushed by the convection cells in the asthenosphere and slab pull. A conservative plate boundary involves two plates moving in either opposite directions, or the same direction at different velocities, which move parallel to each other, such as the San Andreas Fault, USA. No new landforms are created. 1

6 (a)(ii) Fold mountains are formed either when an oceanic plate subducts underneath a continental plate (e.g. the Andes), or when one continental plate subducts under another (e.g. the Himalayas, where the Indian plate subducts beneath the Eurasian Plate). The immense pressure exerted on rock at this meeting point causes it to buckle and contort, and thus crustal thickening occurs, which creates uplift, and the formation of fold mountains. 2

Examiner comments

1 Both 'subduction' and 'conservative plate boundary' are effectively defined.
Mark for (a)(i) = 4 out of 4

2 A clear and effective answer.
Mark for (a)(ii) = 3 out of 3

Example Candidate Response – high, continued

6 (b.) Water plays a key role in the surface movement of sediment on slopes. A first form of movement is rainsplash: raindrops fall onto soil on a slope, and compact the first few millimetres of soil, whilst simultaneously dislodging material, moving it downslope slightly.

A second way in which water leads to the surface movement of sediment is through rills and gullies. Rills are small streams / channels on the surface of a slope, that are formed through water flowing down a slope, and eroding a small channel. When these rills expand in size and are further eroded, they become gullies, larger channels. Rills and gullies thus become an important part in the movement of sediment downslope. Rills and gullies are frequent features of desert landscapes (such as Badlands as the Sahara), created during pluvial periods.

A third way in which water leads to the surface movement of sediment is sheetwash: sheetwash occurs when there is a large amount of surface runoff flowing over a slope, so much that it travels in a sheet-like manner, and then carries away the top level of sediment / soil with it. Despite infrequent rain, sheetwash is found in arid and semi-arid environments, due to the ground or slope having an extremely low infiltration capacity. 3

Examiner comments

3 Some excellent specific detail on water based movements.
The candidate covers three main processes, rainsplash, rill and sheetwash, but the mechanism of the splash process could have been more precise in terms of role of raindrop size and rainfall intensity. The answer lacks general discussion of weight and lubrication for a higher Level 3 mark.
Mark for (b) = 6 out of 8

Example Candidate Response – high, continued

Examiner comments

6 (c.) Hong Kong (HK) is a densely populated state, with ~~a~~ more than 7 million people living on a ~~mostly~~ ~~mountainous~~ collection of islands in the East Pearl River Delta in South China, totalling 1106 km² in area. ~~Due to its subtropical mon~~ It has an inverse problem of mass movement: 63% of its area is at an angle of 15° or more; slopes are often unstable due to its subtropical humid climate, ~~coupled~~ with hot, rainy summers; and it states as the most expensive property market in the world has led to developers building on slopes, often using cut-and-fill techniques, to alleviate the market. Since 1977, the GEO (Geotechnical Engineering Office) has conducted its Landslip Preventive Measures (LPM) to reduce mass movement.

from 1977-1994

At the LPM's beginning, the majority of the slopes ~~upgraded~~ upgraded were soil cut slopes, where, in order to reduce the slope of land and also for construction of ~~it~~, soil was cut for one part of the slope, and placed on ~~and~~ the other side, ~~to~~ for

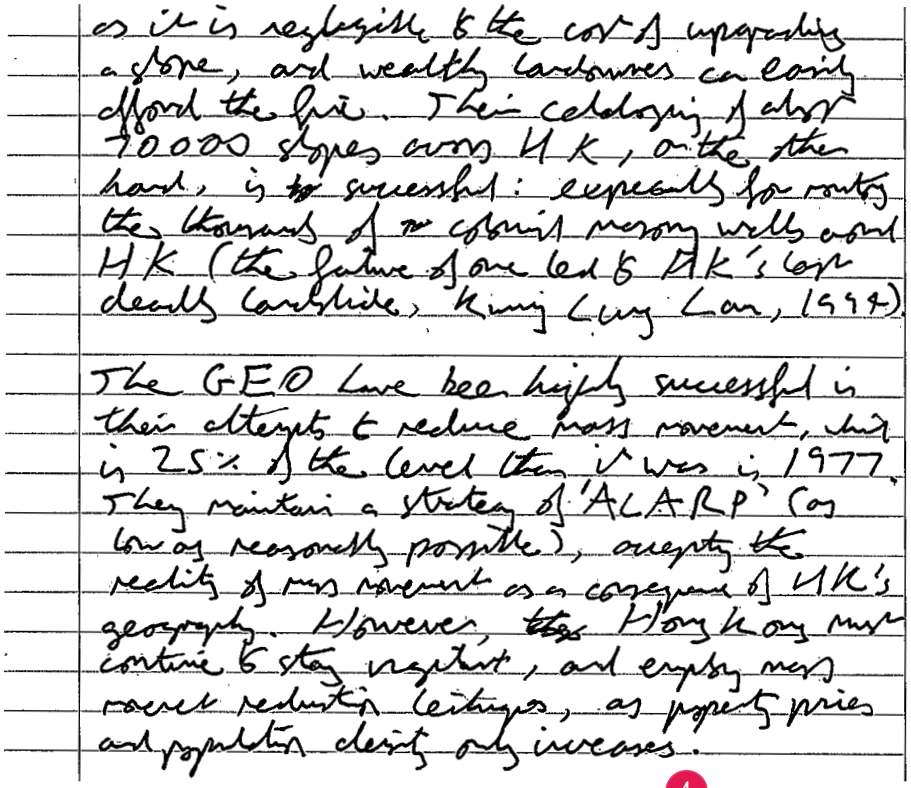
Example Candidate Response – high, continued

Examiner comments

steeper gradient than earlier. This however, when rainfall occurs, this means that the steep slope created is susceptible to ~~[illegible]~~ ~~[illegible]~~ ~~[illegible]~~ ~~[illegible]~~ liquefaction, but result in the Sau Mau Ping landslide, 1966. The GEO therefore used the technique of compacting the ~~slope~~ top 3 meters of the soil cut slope, to achieve 95% compaction, protecting against liquefaction. This program was successful, as it is simple, cheap, effective, and achievable by using compactors, rudimentary construction vehicles to compact the soil. Often, these slopes are covered with vegetation for aesthetic purposes.

Greening techniques, involving the planting of vegetation on a slope, have been another successful technique. There are several different ways in which this occurs. Firstly, the GEO favours planting long rooted grass on slopes; the long roots of the grass reduce mass movement in 2 ways: by the uptake of water ~~[illegible]~~ by their roots, increasing the soils infiltration capacity, and by the roots binding soil ~~[illegible]~~ together, increasing the slope's shear resistance. It is an ecologically sound method (especially as local species are used), and is very cheap. However, the growth of vegetation takes a considerable amount of time, and so for urgently unstable slopes, the technique is too slow. Netting systems are used in HK & and the growth of vegetation: a net is placed on a slope to provide a

Example Candidate Response – high, continued	Examiner comments
base for young, fragile ~~slopes~~ forms of ~~sealed~~ vegetation to grow. It is effective, and when done well, can be ~~[illegible]~~ very natural looking. Lastly, in recent years the GEO has implemented adding 'fibre reinforced soil' to sandy soils, increasing their cohesion and shear resistance. However, the technique is comparatively expensive, and so has selectively been utilised on high value slopes, such as those near HK's airport. Arguably, the most effective and drastic ~~[illegible]~~ attempt to reduce mass movement has been the placing of an impermeable surface cover, alongside a drain, on slopes. Though it is highly effective at stopping ~~[illegible]~~ mass movement, it is also frequently avoided as an option by the GEO. If the drain is blocked, ~~[illegible]~~ or improperly maintained, there could actually be an increased rate of mass movement. Secondly, it is extremely expensive, and ~~[illegible]~~ impermeable covers must be replaced every 15 years. ~~[illegible]~~ Covers are also extremely unsightly, and undesirable. Outside of ~~the~~ engineering efforts (netting to prevent rockfalls, grading slopes, etc.) the GEO has pursued non-engineering ~~[illegible]~~ techniques to varying success. Currently, they issue a HK$ £50 000 fine to those who refuse to comply with slope safety regulations, or 1 year in jail. The fine is mostly ineffective,	

Example Candidate Response – high, continued	Examiner comments
	4 Excellent answer with comprehensive and accurate detail of the problems faced by Hong Kong with respect to mass movement and the attempts to reduce the effect of those movements. The answer includes a very convincing evaluation. Mark for (c) = 14 out of 15 **Total mark awarded = 27 out of 30**

How the candidate could have improved their answer

- **(a)(ii)** There was enough detail for 3 marks, but reference could also have been made to the scraping of sediments off the ocean floor (accretionary wedge) with subsequent folding, buckling and uplift.
- **(b)** The candidate provided specific details of a variety of relevant processes, but there could have been more detail on the specific process of rainsplash such as the amount and intensity of rainfall, raindrop size and the need for bare soil surfaces. The answer could have had a more general discussion of the role of water in terms of the increase of weight and lubrication of the topsoil, perhaps leading to surface mudflows, to be awarded full marks.
- **(c)** The case study of Hong Kong was very detailed and convincing.

Common mistakes candidates made in this question

- **(a)(i)** Conservative plate boundary sometimes was confused with constructive plate boundary.
- **(c)** Some candidates gave general answers without reference to any specific example.

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