GCSE
GEOGRAPHY
8035/1

Paper 1 Living With The Physical Environment

Mark scheme

June 2023

Version: 1.0 Final

2 3 6 G 8 0 3 5 / 1 / M S

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

Point marked questions marking instructions

The mark scheme will state the correct answer or a range of possible answers, although these may not be exhaustive. It may indicate how a second mark is awarded for a second point or developed idea. It may give an indication of unacceptable answers. Each mark should be shown by placing a tick where credit is given. The number of ticks must equal the mark awarded. Do not use crosses to indicate answers that are incorrect.

Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor is linked to the assessment objective(s) being addressed. The descriptor for the level shows the average performance for the level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme. You should read the whole answer before awarding marks on levels response questions.

Step 1 Determine a level

Descriptors for the level indicate the different qualities that might be seen in the student's answer for that level. When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly Level 2 with a small amount of Level 3 material it would be placed in Level 2 but be awarded a mark near the top of the level because of the Level 3 content. For instance, in a 9 mark question with three levels of response, an answer may demonstrate thorough knowledge and understanding (AO1 and AO2) but fail to respond to command words such as assess or evaluate (AO3). The script could still access Level 2 marks. Note that the mark scheme is not progressive in the sense that students don't have to fulfil all the requirements of Level 1 in order to access Level 2.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will also help. There will generally be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example. You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

Assessment of spelling, punctuation, grammar and use of specialist terminology (SPaG)

Accuracy of spelling, punctuation, grammar and the use of specialist terminology will be assessed via the indicated 9 mark questions. In each of these questions, three marks are allocated for SPaG as follows:

- **High performance** – 3 marks
- **Intermediate performance** – 2 marks
- **Threshold performance** – 1 mark

Responses with SPaG marks that gain a mark of 0 for the content/skills of the question can still be awarded SPaG marks if the response is judged to be a genuine attempt to answer the question.

General guidance

- Mark schemes should be applied positively. Examiners should look for qualities to reward rather than faults to penalise. They are looking to find credit in each response they mark. Unless the mark scheme specifically states, candidates must never lose marks for incorrect answers.
- The full range of marks should be used. Examiners should always award full marks if deserved, ie if the answer matches the mark scheme.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked unless the candidate has replaced it with an alternative response.
- Do NOT add ticks to level-marked questions – use the highlight tool/brackets to signify what is relevant.
- Sometimes there are specific "triggers" in the mark scheme that enable higher level marks to be awarded. For instance, an example or case study may be required for Level 3 if it is stated within the question.
- Where a source, such as a photograph or map, is provided as a stimulus it should be used if requested in the question, but credit can often be given for inferred as well as direct use of the source.
- Always be consistent – accept the guidelines given in the mark scheme and apply them to every script.
- If necessary make comments to support the level awarded and to help clarify a decision you have made.
- Examiners should revisit standardised script answers as they apply the mark scheme in order to confirm that the level and the mark allocated is appropriate to the response provided.
- Mark all answers written on the examination paper.

Section A

<table>
<tr><th>Qu</th><th>Pt</th><th>Marking guidance</th><th>Total marks</th></tr>
<tr><td>01</td><td>1</td><td>Which one of the following is a natural factor affecting climate change?

D. Volcanic activity

No credit if two or more answers are circled.

AO1 – 1 mark</td><td>1</td></tr>
<tr><td>01</td><td>2</td><td>Using Figure 1, which one of the following statements is true?

B. The sea ice reached its smallest extent in 2012.

No credit if two or more answers are circled.

AO4 – 1 mark</td><td>1</td></tr>
<tr><td>01</td><td>3</td><td>Using Figure 1, by how much did the extent of sea ice change between 1980 and 2016?

3 (million square km)

AO4 – 1 mark</td><td>1</td></tr>
<tr><td>01</td><td>4</td><td>Suggest how climate change may have effects on people.
Use Figure 2 and your own understanding.

<table>
<tr><th>Level</th><th>Marks</th><th>Description</th></tr>
<tr><td>2
(Clear)</td><td>3–4</td><td>AO2 Shows a clear understanding of the way(s) that climate change may have effects on people. Explanations are developed.

AO3 Demonstrates reasonable application of knowledge and understanding to Figure 2 in interpreting the effects of climate change on people</td></tr>
<tr><td>1
(Basic)</td><td>1–2</td><td>AO2 Shows a limited understanding of the way(s) that climate change may have effect(s) on people. Explanations are basic.

AO3 Demonstrates limited application of knowledge and understanding to Figure 2 in interpreting the effect(s) of climate change on people.</td></tr>
<tr><td></td><td>0</td><td>No relevant content</td></tr>
</table>

• Level 2 (clear) responses will be clear explanation(s) or linked statements. Some accurate use of geographical terms. Uses Figure 2 with some elaboration and own understanding.</td><td>4</td></tr>
</table>

		• **Level 1 (basic)** responses are likely to be simple statements with little or no development. Limited subject vocabulary used. May largely rely on direct or lifted use of Figure 2 with only limited development. • No credit for effects of climate change on the environment unless linked to effects on people. • No credit for simply lifting exact wording of impacts from the key, unless links are made eg Lower crop yields lead to food shortages • Allow top Level 2 mark for a developed explanation of two effects. • Max Low Level 2 for developed explanation of one effect <u>Indicative content</u> • The command word is 'suggest', so responses should set out the likely impacts of climate change, making use of **Figure 2**. • Application of understanding to **Figure 2** may include: Health problems (in North America, Africa, Europe and Asia). Increased risk of diseases such as skin cancers and heatstroke as temperatures increase. Disease risk such as malaria may extend further away from equator. Winter related deaths may decrease with milder winters. • Flood damage. Buildings may be damaged or destroyed. People could drown. Flood risk increases repair and insurance costs. People may be forced to migrate, causing overcrowding elsewhere. • Lower crop yields (in Central and South America). This will lead to reduced food supplies, increased food insecurity and greater risk of hunger, malnutrition and starvation . • Freshwater shortages. Water shortage can affect health and food security and may trigger refugee movements, and even cause conflicts. Poor water quality increases the risk of diseases such as cholera and diarrhoea. • Wildfires. These can threaten life and property and destroy crops. Large amounts of smoke make it difficult to breathe and cause air pollution. • Coastal erosion (in small islands, Europe and Australasia). Properties may be destroyed and people forced to move. Land may be lost and small islands submerged as sea levels rise, leading to the evacuation of the population. • Loss of species (in the oceans and Australasia). Increasing water temperatures may reduce fish stocks which in turn affects food supply. Reduced numbers of plant and animal species causes a decline in food resources. • Credit other impacts of climate change on people, for example reduced ice in the Arctic increases shipping and extraction of gas and oil. Skiing industry may decline as there is less snow. AO2 – 2 marks AO3 – 2 marks	

01	5	**Using Figure 3, complete the following paragraph.** Air from the Equator rises and moves towards the poles, then cools down and sinks at approximately **30 °** north and south of the Equator. The sinking air creates an area of **high** pressure with very little rainfall. Some of the air moves back to the Equator as surface winds called **trade winds**. Accept 30 for first answer. Accept 28 or 29. Accept trade(s). AO4 – 3 marks	3

01	6	**Using Figure 4, which statement describes where tropical storms form?** **A**. Between the Tropics One mark for correct answer: No credit if two or more answers are circled. AO4 – 1 mark	1

01	7	**Using Figure 4, name the tropical storm which caused the greatest number of deaths after the year 2000.** Nargis Do not accept Myanmar and/or 2008 (date) AO4 – 1 mark	1

01	8	**Calculate the median number of deaths caused by the tropical storms listed in Figure 4.** 8800 AO4 –1 mark	1

01	9	**Outline one reason why the number of deaths caused by tropical storms varies.** Some storms have much greater wind speeds (1) so people may be killed by debris being blown around. (d) (1) Some storms may cause severe flooding (1) so many people drown. (d) (1) Some storms occur in areas of high population density (1) which means that more people are killed. (d) (1) In some poorer countries there may be a lack of clean water (1), so many people are killed by disease. (d) (1) Some tropical storms produce a storm surge (1), which moves quickly inland and results in 90% of cyclone deaths. (d)(1)	2

		Some storms have severe secondary events such as landslides (1), which can result in many more injuries and deaths (d) (1) Some poorer countries may not have the resources to invest in early warning systems/emergency response (1), so people are more at risk from tropical storm hazards (d) (1) Some storms may not go over land/use up their energy over the sea (1) so they don't affect areas where people live (d) (1) Some countries have greater wealth and ability to manage and/or mitigate (1) Some storms are much more powerful (1) AO1 – 2 marks	

01	10	**To what extent can protection and prediction strategies reduce the effects of tropical storms?** **Use Figure 5 and your own understanding.**	6

Level	Marks	Description
3 (Detailed)	5–6	AO2 Shows thorough geographical understanding of strategies used to reduce the effects of tropical storms. AO3 Demonstrates thorough application of knowledge and understanding in evaluating the extent to which protection and prediction strategies can be used to reduce the effects of tropical storms.
2 (Clear)	3–4	AO2 Shows some geographical understanding of strategy(ies) used to reduce the effects of tropical storms. AO3 Demonstrates reasonable application of knowledge and understanding in evaluating the extent to which protection and/or prediction strategies can be used to reduce the effects of tropical storms.
1 (Basic)	1–2	AO2 Shows limited geographical understanding of strategy(ies) used to reduce the effects of tropical storms. AO3 May include limited application of knowledge and understanding in evaluating the extent to which protection and/or prediction strategies can be used to reduce the effects of tropical storms.
	0	No relevant content

- **Level 3** (detailed) will be developed responses with supporting evidence for answer. Appropriate use of **Figure 5** (direct or inferred) and specific own understanding.
- **Level 2** (clear) responses are likely to be linked statements with some elaboration. Some use of **Figure 5** (direct or inferred) and own understanding.
- **Level 1** (basic) responses will be simple statements with limited understanding or development. May consist of listed points, using information taken largely from **Figure 5**.
- Max Level 2 for explanation of strategies without any evaluative comment.
- Max Level 2 for answer that doesn't make use of Figure 5
- Full marks can be awarded for answers that give developed explanation of the strategies shown in Figure 5, with evaluative comment.

		• Both prediction and protection strategy(ies) are needed to access Level 3 <u>Indicative content</u> • Understanding of prediction strategies Scientists use data from radar, satellites and aircraft to monitor storms. Computer models are then used to calculate a predicted path for the storm. • Predicting where and when a tropical storm is going to happen gives people time to evacuate and protect their homes and businesses, eg by boarding up windows. • Understanding of protection strategies. Buildings can be designed to withstand tropical storms, eg by using reinforced concrete. Buildings can also be put on stilts so they're safe from floodwater. • In many countries schoolchildren are taught about the dangers of tropical storms and given lessons about what to do if a storm hits. Governments produce posters, leaflets and information for the media, and people are encouraged to prepare disaster kits. • In some coastal areas, houses have windproof roofing tiles and stormproof windows. In some lower income countries, storm shelters are common and can ensure the survival of whole villages. • Flood defences can be built along rivers (eg levees) and coasts (eg sea walls). • These all reduce the number of buildings destroyed, so fewer people will be killed, injured, made homeless and made unemployed. • Application of understanding to **Figure 5** (prediction). Satellite images are used to show the approaching storm in the Bay of Bengal. These images along with computer modelling can be used to predict and then track future movement as shown on the map. The forecasts tend to cover a large area known as a cone of uncertainty ie the area most likely to be affected by the tropical storm. • The prediction allows life to carry on as normal in Odisha / Jharkhand without any evacuation / protecting buildings etc as they are well outside the cone of uncertainty. • Application of understanding to **Figure 5** (protection). The storm shelter is elevated above the ground to protect people from flood water. The building appears to be reinforced, so can withstand powerful winds. The area beneath the building at ground level is raised to allow livestock to take cover. The building has a flat roof, perhaps to allow helicopters to land. • Credit references to examples eg Tropical cyclones are tracked by the Bangladesh Meteorological Department. Warnings are issued in several languages by radio, television and via social media. In rural areas, even the most remote communities are reached. • Assessment of extent to which strategies are effective. Supercomputers can now often give five days' warning and a more accurate location. However, despite advances in scientific methods, accurate prediction is not always easy because the strength and path of a tropical storm can change quickly, and the cone of uncertainty is large. Storm shelters have been very effective in reducing the death toll form cyclones in Bangladesh and other countries.	

		• Allow reference to other management strategies (including preparation) if they are adding their own understanding. Note that protection and preparation can overlap. AO2 – 3 marks AO3 – 3 marks	

01	11	**Suggest how the processes taking place at different types of plate margin can lead to earthquakes and volcanic activity.** **Use Figure 6 and your own understanding.**	9

Level	Marks	Description
3 (Detailed)	7–9	AO1 Demonstrates detailed knowledge of the features of plate margins. AO2 Shows thorough geographical understanding of the processes taking place at different plate margins. AO3 Demonstrates thorough application of knowledge and understanding in analysing how processes taking place at plate margins lead to earthquakes and volcanic activity.
2 (Clear)	4–6	AO1 Demonstrates some knowledge of the features of plate margin(s). AO2 Shows clear geographical understanding of the processes taking place at different plate margin(s). AO3 Demonstrates reasonable application of knowledge and understanding in analysing how processes taking place at plate margin(s) lead to earthquakes and/or volcanic activity.
1 (Basic)	1–3	AO1 Demonstrates limited knowledge of the features of plate margin(s). AO2 Shows basic geographical understanding of the processes taking place at one or more plate margin(s). AO3 Demonstrates limited application of knowledge and understanding in analysing how processes taking place at plate margin(s) lead to earthquakes and/or volcanic activity.
	0	No relevant content.

- **Level 3 (detailed)** responses will be developed. Appropriate use of **Figure 6** (direct or inferred) and specific own understanding, with some assessment. Must cover earthquakes and volcanic activity. Must include at least 2 plate margins. The more complex answers will answer all aspects of the question ie applying understanding thoroughly to the source material. They may explain different forms of vulcanicity at both constructive and destructive plate margins. They may suggest the causes of earthquakes at different margins. Reference to exemplars would be credited.

- **Level 2 (clear)** responses are likely to be linked statements with some elaboration. Some use of **Figure 6** (direct or inferred) and own understanding. Likely to cover both earthquakes and volcanoes.

- **Level 1 (basic)** responses are likely to consist of simple statements, with limited use of subject vocabulary. May only use information derived from **Figure 6** or be restricted to one type.

		• An answer that lacks consideration of both volcanoes and earthquakes strategies is limited to Level 2. • No credit for consideration of impacts or responses to tectonic hazards <u>Indicative content</u> • The command word is 'suggest' so responses should set out the causes of volcanoes and earthquakes making use of the source provided, showing an understanding of the processes involved at the 3 types of plate margin. • Accept explanations that refer to ridge push and slab pull processes. Ridge push –magma rises as the plates move apart. The magma cools to form new plate material. As it cools It becomes denser and slides down away from the ridge. This causes other plates to move away from each other. Slab pull – The denser plate sinks back into the mantle under the influence of gravity. It pulls the rest of the plate along behind it. • The more likely explanation is movement of plates and subduction caused by convection currents. Heat rising and falling inside the mantle creates convection currents generated by radioactive decay in the core. These currents move the plates. • Understanding of processes causing volcanic activity at constructive margins. Two plates move apart. Magma rises through the crust, and some can erupt producing volcanoes, usually gentle sided basic lava cones. • Credit other forms of volcanic activity found at plate margins such as geysers, fumaroles, hot springs. • Understanding of earthquakes at constructive margins as plates move apart. Faults are formed at the margin and earthquakes can occur here. They are usually of low magnitude. Some may be linked to volcanic activity. Most happen at shallow depths below the surface where the plates are moving apart. • Understanding of processes causing volcanic activity at destructive margins. Two plates move towards each other. The denser plate sinks below the lighter, less dense plate and melts in the subduction zone. Hot magma rises up through the overlying mantle and crust, and some can eventually erupt out at the surface producing volcanoes. Credit the idea that magma becomes increasingly viscous or sticky as it rises to the surface, producing composite volcanoes which are steep sided and have violent eruptions, with ash falls, pyroclastic flows, volcanic bombs • Understanding of earthquakes at destructive margins. As the two plates converge, pressure builds up. The rocks eventually fracture causing an earthquake. Most happen at shallow depths below the surface where the plates collide. They also occur at greater depth, in the lower part of the subduction zone. • Understanding of earthquakes at conservative plate margin. Plates move past each other or side by side moving at different speeds. As the plates move, friction occurs and plates become stuck. Pressure builds up. When pressure is released, it sends out huge amounts of energy, causing an earthquake. Earthquakes can be very destructive as they occur close to the Earth's surface. There are no volcanoes at a conservative plate margin.	

		• Credit reference to named areas where tectonic processes occur eg Iceland constructive margin, California (San Andreas fault) conservative margin, Japan destructive margin. • Assessment of processes at different plate margins may emphasise how destructive plate margins are often associated with violent earthquakes and explosive volcanoes. Constructive margins, often found in mid oceans may produce gently sided volcanoes and less explosive activity. Credit other types of destructive margins-ocean to ocean, collision margins. AO1 – 3 marks AO2 – 3 marks AO3 – 3 marks	
		Spelling, punctuation and grammar (SPaG) **Responses with SPaG marks that gain a mark of 0 for the content/skills of the question can still be awarded SPaG marks if the response is judged to be a genuine attempt to answer the question.** **High performance** • Learners spell and punctuate with consistent accuracy • Learners use rules of grammar with effective control of meaning overall • Learners use a wide range of specialist terms as appropriate. **Intermediate performance** • Learners spell and punctuate with considerable accuracy • Learners use rules of grammar with general control of meaning overall • Learners use a good range of specialist terms as appropriate. **Threshold performance** • Learners spell and punctuate with reasonable accuracy • Learners use rules of grammar with some control of meaning and any errors do not significantly hinder meaning overall • Learners use a limited range of specialist terms as appropriate. **No marks awarded** • The learner writes nothing • The learner's response does not relate to the question • The learner's achievement in SPaG does not reach the threshold performance level, for example errors in spelling, punctuation and grammar severely hinder meaning.	**3** **2** **1** **0**

Section B

Qu	Pt	Marking guidance	Total marks
02	1	**Using Figure 7, identify a producer.** Large water plant AO4 – 1 mark	1
02	2	**What is the difference between a food chain and a food web?** A food web has a number of connected food chains, (whereas a food chain consists of only one straight chain) (1) A food chain is only a branch of the entire web and it fails to show that most of the animals get eaten and eat more than one species. (1) In a food chain, there is a straight line from producers to each consumer. In a food web, each organism eats may be eaten by 2 or more organisms. (1) An (implied) comparison is required. AO1 – 1 mark	1
02	3	**Using Figure 7, state one effect on the food web if disease killed most of the trout.** There might be more aquatic insects or crayfish (1) Human beings would not be able to eat trout (1) AO4 – 1 mark	1
02	4	**For a small-scale ecosystem that you have studied, outline the link between producers and consumers.** The producer, grass, provides the basic source of food (1) which the consumers, rabbits (and then foxes), feed on. (d)(1) Producers such as grass (1) are eaten by a first consumer, grasshoppers (d)(1 Grasshoppers eat grass (1) In a freshwater pond producers such as pond weed (and duckweed) (1) are eaten by consumers such as flatworms (and snails) (d) (1) Allow examples from Figure 7 if the link between producer and consumer is clearly shown. Max 1 mark if the small-scale ecosystem is unclear but general link is developed.eg A producer is an organism that makes its own food. by photosynthesis. The consumer is a living thing that eats other plants and animals.(1) No mark for simply stating that consumers eat producers. If it is clearly a large scale ecosystem such as a hot desert, max 1 mark	2

		A named area is not required. AO2 – 2 marks	

02	5	**Using Figure 8, describe the distribution of tropical rainforests.** Tropical forests are found between the Tropics of Cancer and Capricorn. (1) They occur in South America and Africa. (1) They are found close to/along/on/near the Equator (1) but in places extend as far as the Tropics of Cancer and Capricorn. (d)(1) The largest area is in South America (1) but they also occur in parts of central Africa and South East Asia. (d)(1) Allow distribution up to 15-25 degrees N and S of Equator Max 1 for a list of continents AO4 – 2 marks	2

02	6	**Using Figure 9, what percentage of the biomass is stored in the roots?** **B**. 12.5% (1) No credit if two or more answers are circled. AO4 – 1 mark	1

02	7	**Outline one reason why nutrient cycling is very rapid in tropical rainforests.** The hot, damp conditions allow for the rapid decomposition of dead plant material. (1) The high temperatures and high rainfall cause rapid cycling of nutrients. (1) Tall, dense and fast growth of vegetation. (1) High rainfall (1) High temperatures (1) Warm conditions.(1) Moist conditions(1) High humidity(1) There are large numbers of decomposers (on the forest floor)(1) AO2 – 1 mark	1

02	8	**Suggest one example of a human activity that might interfere with the nutrient cycle shown in Figure 9.** Deforestation (1) Mining (1) Farming (1) Ranching (1) Logging (1) Mineral extraction (1) Road building (1) Credit other human activities that take place in the rainforest. AO3 – 1 mark	1

<table>
<tr>
<td>02</td>
<td>9</td>
<td>
‘Tropical rainforest deforestation has major economic and environmental impacts.’
Do you agree?
Use Figure 10 and your own understanding to explain your answer.
<table>
<tr><th>Level</th><th>Marks</th><th>Description</th></tr>
<tr><td>3 (Detailed)</td><td>5–6</td><td>AO2 Shows thorough geographical understanding of the economic and environmental impacts of deforestation.

AO3 Demonstrates thorough application of knowledge and understanding in assessing the view that tropical forest deforestation has major economic and environmental impacts.</td></tr>
<tr><td>2 (Clear)</td><td>3–4</td><td>AO2 Shows some geographical understanding of the economic and/or environmental impacts of deforestation.

AO3 Demonstrates reasonable application of knowledge and understanding in assessing the view that tropical forest deforestation has major economic and/or environmental impacts.</td></tr>
<tr><td>1 (Basic)</td><td>1–2</td><td>AO2 Shows limited geographical understanding of the economic and/or environmental impacts of deforestation.

AO3 Demonstrates limited application of knowledge and understanding in assessing the view that tropical forest deforestation has major economic and/or environmental impacts.</td></tr>
<tr><td></td><td>0</td><td>No relevant content</td></tr>
</table>
Level 3 (detailed) responses will be developed with accurate use of geographical terms. Reasoned examination of the extent of economic and environmental impacts caused by deforestation. There should be some (direct or inferred) application of understanding to Figure 10

Level 2 (clear) responses will have linked or elaborated statements and some accurate use of geographical terms. May outline some economic and/or environmental impacts of deforestation. May start to assess the severity of impacts. Likely to be some (direct or inferred) application of understanding to Figure 10

Level 1 (basic) responses are likely to consist of simple statements, with limited use of subject vocabulary. Might be limited to generic statements. May be limited to a single economic and/or environmental impact of deforestation. Answer likely to be reliant on Figure 10.

No credit for simply copying from Figure 10 without comment

Indicative content
</td>
<td>6</td>
</tr>
</table>

		• Application of understanding to **Figure 10**. Answers should distinguish between economic and environmental impacts and may classify impacts into local and global. • **Cattle ranching** (Brazil). Large areas of the Amazon rainforest have been cleared to make way for livestock rearing. This contributes to food supply. Much is exported abroad, bringing in valuable revenue (economic impact). However, quality of the pasture quickly declines. Cattle farmers then have to move on and destroy more rainforest to create new pastures. Methane emissions also increase problems of climate change (environmental impact). • **Palm oil plantations** (Indonesia). Large areas of rainforest are cut down for commercial plantations, which provides employment, raw materials for processing, company profits and tax revenue for the government (economic impacts). However the land can only sustain crops for a relatively short period of time. After a few years, the farmers have to cut down more rainforest for new plantations. Deforestation for plantations can also contribute to soil erosion because there are no ground cover crops to protect the soil. Chemical fertilisers can leach into the ground and pollute land and water (environmental impact). • **Mineral extraction.** Minerals such as bauxite, gold and iron ore are mined and sold to make money (economic). The rainforest is clear-felled for mining which leads to soil erosion (environmental). • **Loss of biodiversity**. Clearing tropical rainforests means that biodiversity will be reduced, and individual species will become endangered and then possibly extinct (environmental). Plants that could bring huge medical benefits and high profits may be lost (economic). • **Soil erosion**. With no trees to hold the soil together, heavy rain washes away the soil and leaches away nutrients. (environmental). • **Climate change**. Trees remove CO_2 from the atmosphere. Also, burning vegetation to clear forest produces CO_2. So deforestation means more CO_2 in the atmosphere, which adds to the greenhouse effect (environmental). • **Flooding**. Increased flooding as faster surface run-off with more soil content adds to river levels in a shorter lag-time.(environmental) Other impacts of deforestation which might be discussed include: • **River pollution**. Gold mining involves the use of mercury to separate the gold from the ground, which is allowed to enter the rivers. Fish are poisoned, as well as people living nearby. (environmental and economic) • **Fires** can cause harmful pollution. They can burn out of control, destroying vast areas of valuable forest. (environmental and economic) • **Decline of indigenous tribes**. The livelihoods of some local people are destroyed — deforestation can cause the loss of the animals and plants that they rely on to make a living. (environmental and economic) • **Building of HEP dams**. HEP dams have caused huge environmental devastation in some areas of tropical rainforest. Often they have a short lifespan and they may become blocked with soil washed down deforested slopes. (environmental). However the electricity can be beneficial to industry and to local settlements, and can boost economic actrivity (economic)	

		• **Logging**. Trees are felled for timber and paper. Deforestation of tropical hardwoods such as ebony and mahogany can be sold for a good price abroad. (economic) Road building for logging requires more tree clearance. • Credit examples of economic and environmental impacts, eg In Indonesia where rainforests are removed to make way for industrial palm oil plantations, deforestation is responsible for 80% of the whole country's CO_2 emissions. This makes Indonesia the third largest emitter of greenhouse gases. • Assessment. Most will agree with the idea that deforestation has significant economic and environmental consequences. There are economic positives of developing rainforests. Improving transportation through the forest means easier access to raw materials like minerals and timber. Forest resources can then be transported away and sold, especially when roads are paved. Despite economic benefits, clearing rainforest threatens the survival of many plant and animal species and can lead to serious environmental degradation. Widespread deforestation damages the whole biosphere with severe long-term impacts. AO2 – 3 marks AO3 – 3 marks	

02	10	**Choose either a hot desert environment or a cold environment.** **Discuss the opportunities for economic development in your chosen environment.** **Use a case study and your own understanding.**	9

Level	Marks	Description
3 (Detailed)	7–9	AO1 Demonstrates detailed knowledge of the opportunities for development in a named hot desert or cold environment. AO2 Shows thorough geographical understanding of the opportunities for development in either a hot desert or a cold environment. AO3 Demonstrates thorough application of knowledge and understanding in discussing the opportunities for development in either a hot desert or a cold environment, using a case study.
2 (Clear)	4–6	AO1 Demonstrates clear knowledge of opportunities for development in either a hot desert or cold environment. AO2 Shows some geographical understanding of the opportunities for development in either a hot desert or a cold environment. AO3 Demonstrates reasonable application of knowledge and understanding in discussing the opportunities for development in either a hot desert or a cold environment.

1 (Basic)	1–3	AO1 Demonstrates limited knowledge of one or more opportunities for development in a hot desert or cold environment. AO2 Shows slight geographical understanding of one or more opportunities for development in either a hot desert or a cold environment. AO3 Demonstrates basic application of knowledge and understanding in discussing the opportunity(ies) for development in either a hot desert or a cold environment.		
	0	No relevant content		

Level 3 (detailed) responses will be well developed with accurate use of geographical terms. Reasoned discussion of several opportunities for development in either a hot desert or cold environment with some developed case study support.

Level 2 (clear) **responses** will have linked or elaborated statements and some use of geographical terms. May outline some opportunities for development in either a hot desert or cold environment. Likely to include some case study support.

Level 1 (basic) responses are likely to consist of simple statements, with limited use of subject vocabulary. Might be limited to generic statements. May be limited to a single opportunity in either a hot desert or cold environment.

- A purely generic answer without exemplification is limited to Level 2.
- A developed discussion of two of the economic activities in the context of a named case study allows access to Level 3.

<u>Indicative content for hot deserts</u>

- The question requires discussion of ways in which a hot desert area provides specific opportunities for development.
- Answers may focus on the nature of economic opportunities, the scale of development and extent to which opportunities can be developed.
- Opportunities include resource exploitation relating to energy, mining agriculture and tourism. Economic benefits include employment, spending in the local economy, multiplier effect, and improved infrastructure. Many hot desert environments are increasingly important economically. Credit challenges to development where relevant.
- Support for answers may be based in poorer or richer parts of the world. In HICs, south west USA may be used. Economic activity may provision for commercial farming including irrigation, mining activity, possible provision of a power source to facilitate development, and development of tourism on a large scale,
- In LICs, areas such as the Thar Desert may be cited. Economic activities include subsistence farming, including nomadic pastoralism, and hunter-gathering. Commercial farming supported by irrigation may be emphasised. Resources such as limestone and gypsum are found in this desert, valuable for the building industry. Hydroelectric power is supplied. Tourism is a growing industry. Credit challenges to development where

		relevant. These include environmental constraints, costs/remoteness. Rainfall is unpredictable and most rivers are intermittent. Providing enough water for industry or irrigation is difficult. • Discussion may consider the extent to which opportunities for development can take place. Degree of development may be determined by availability of water, physical terrain, extremes of temperature, technology, population size and migration, money available, access and transport, and value of resources. As the desert ecosystem is fragile, development may not be sustainable. • Although there is much economic potential, the extent of development is partial, limited by physical factors, environmental issues, technology and other factors. <u>Indicative content for cold environments</u> • The question requires discussion of ways in which a cold environment provides specific opportunities for development. • Answers may focus on the nature of economic opportunities, the scale of development and the extent to which development is possible. • Opportunities include resource exploitation, including agriculture, fishing, mining, recreation and tourism. Economic benefits include employment, spending in the local economy, multiplier effect, and improved infrastructure. Many cold environments are increasingly important economically. • Credit answers that focus on Arctic or Antarctic regions. Allow reference to tundra as well as polar areas. • Support for answers may be based on Northern Canada and/or Alaska. Drilling and mining activities occur, there is considerable hydroelectric power potential, large parts of the coastline offer wind and geothermal energy potential and the region has a large seafood fishing industry. Providing buildings and infrastructure that can cope with the ground and weather conditions is difficult and expensive. The value of some resources means that people find ways to overcome the challenges, eg some parts of the Trans-Alaska oil pipeline are raised on stilts, to prevent it melting the permafrost, which would make the ground unstable. Credit reference to challenges to development where relevant. These include getting access to resources, finding a workforce to exploit them, and providing protection from the extreme weather. • Discussion may consider the extent to which opportunities for development can take place. Degree of development depends partly on fragility of environment and ease of damage to tundra vegetation by human activities, including drilling for oil, commercial fishing, tourism, building roads, housing and mineral exploitation. • Opportunities for development may also depend on international agreements, eg Antarctic Treaty. Protected Areas have been set up. The treaty banned mining for at least 50 years. Seal hunting is strictly regulated. Fishing boats have quotas. Tourist numbers/activities are limited under agreement by IAATO and all tours must be guided and not enter environmentally sensitive areas. • The tundra/polar environment is among the least disturbed ecosystems in the world. However, that is changing with the discovery of large reserves of raw materials. Although there is much economic potential, the extent of development is partial, limited by physical factors, environmental issues, international agreements, technology, access and other factors.	

		AO1 – 3 marks AO2 – 3 marks AO3 – 3 marks	

Section C

Qu	Pt	Marking guidance	Total marks
03	1	**Which one of the following is a process of erosion in coastal areas?** **A**. Hydraulic power AO1 – 1 mark	1
03	2	**Give one type of weathering that takes place in coastal areas.** Freeze thaw (frost shattering) (1) Carbonation (1) Solution (1) Water continually seeps into cracks, freezes and expands, eventually breaking the rock apart. (1) Dissolved carbon dioxide in rainwater or in moist air forms carbonic acid, and this acid reacts with minerals in rocks. (1) Credit other types of weathering. Mechanical weathering (1) Chemical weathering (1) Biological weathering (1) AO1 – 1 mark	1
03	3	**Using Figure 11, what is the straight-line distance between Hill of Crogodale, marked X, and Duncansby Head, marked Y?** **A**. 2.25 km AO4 – 1 mark	1
03	4	**Using Figures 11 and 12, describe two pieces of evidence that show that this coastline is being eroded.** There are several stacks (1) There are stumps (1) There are (steep) cliffs (1) There are (natural) arches(1) There are caves (1) There is a wave cut platform (1) Rocks left standing out at sea, separated from the coastline (1) Narrow flat areas at the base of the cliff (1) Gaps and holes in the rock at the base (1) There are headlands (1) There are bays (1) Both pieces of evidence can be derived from the map or photograph. Naming a feature is sufficient eg stack	2

		AO4 – 2 marks	

<table>
<tr>
<td>03</td>
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<td>
Explain how spits and bars form along the coast as a result of deposition.
<table>
<tr><th>Level</th><th>Marks</th><th>Description</th></tr>
<tr><td>2
(Clear)</td><td>3–4</td><td>AO1 Demonstrates accurate knowledge about the formation of spits and bars and the process of deposition.

AO2 Shows a clear geographical understanding of how spits and bars form as a result of deposition along the coast. Explanations are developed.</td></tr>
<tr><td>1
(Basic)</td><td>1–2</td><td>AO1 Demonstrates limited knowledge about the formation of spits and bars and the process of deposition.

AO2 Shows a limited geographical understanding of how spits and bars form as a result of deposition along the coast. Explanations are partial.</td></tr>
<tr><td></td><td>0</td><td>No relevant content.</td></tr>
</table>

Level 2 (clear) responses are likely to contain linked statements showing understanding of the formation of spits and bars. Appropriate geographical terminology.
Level 1 (basic) responses will comprise simple ideas with limited or partial understanding of the formation of spits and bars. Limited geographical terminology.
Expect both spits and bars to be explained for top of Level 2, but a clear explanation of one of these gains access to low Level 2.
Sequence of formation and some reference to processes involved required to reach top of Level 2
Max level 1 for generic explanation of transport and deposition processes.

<u>Indicative content</u>

The command is ‘explain’, so responses should provide a reasoned account of the formation of spits and bars and the role of deposition
Understanding of transport and deposition processes. Longshore drift- Waves follow the direction of the prevailing wind. They usually hit the coast at an oblique angle. The swash carries material up the beach, in the same direction as the waves. The backwash then carries material down the beach at right angles, back towards the sea. Over time, material zigzags along the coast.

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		• Coastal deposition takes place in areas where the flow of water slows down, for example in sheltered bays and where there is a change in the direction of the coast. • Spits form at sharp bends in the coastline, eg at a river mouth. Longshore drift transports sand and shingle past the bend and deposits it in the sea. Strong winds and waves can curve the end of the spit (forming a recurved end). • Longshore drift may cause a spit to grow right across a bay, trapping a freshwater lake (or lagoon) behind it. This feature is called a bar. An offshore bar forms further out to sea. Waves approaching a gently sloping coast deposit sediment due to friction with the seabed. The build-up of sediment offshore causes waves to break at some distance from the coast. Credit idea of post glacial sea level rises causing material to be gradually pushed towards the coast, forming an offshore bar.(Only one type of bar is needed) Credit the use of labelled diagrams to support answer. AO1 – 2 marks AO2 – 2 marks	

<table>
<tr>
<td>03</td>
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<td>
Discuss the costs and benefits of hard engineering strategies for coastal management.
Use Figure 13 and your own understanding.
<table>
<tr><th>Level</th><th>Marks</th><th>Description</th></tr>
<tr><td>3 (Detailed)</td><td>5–6</td><td>AO2 Shows thorough geographical understanding of the costs and benefits of hard engineering strategies for coastal management.

AO3 Demonstrates thorough application of knowledge and understanding in discussing the costs and benefits of hard engineering strategies shown in Figure 13.</td></tr>
<tr><td>2 (Clear)</td><td>3–4</td><td>AO2 Shows some geographical understanding of the costs and/or benefits of hard engineering strategies for coastal management.

AO3 Demonstrates reasonable application of knowledge and understanding in discussing the costs and/or benefits of hard engineering strategies shown in Figure 13.</td></tr>
<tr><td>1 (Basic)</td><td>1–2</td><td>AO2 Shows limited geographical understanding of the costs and/or benefits of one or more hard engineering strategies for coastal management.

AO3 Demonstrates limited application of knowledge and understanding in discussing the costs and/or benefits of one or more of the hard engineering strategies shown in Figure 13.</td></tr>
<tr><td></td><td>0</td><td>No relevant content</td></tr>
</table>

Level 3 (detailed) responses will be developed responses clearly assessing costs and benefits of named coastal management strategies. Appropriate terminology will be used. Appropriate use of Figure 13.
Level 2 (clear) responses are likely to show understanding of coastal management strategy(ies) and their costs and/or benefits. Some assessment and some geographical terminology may be evident. Likely to use Figure 13.
Level 1 (basic) responses will be simple statements with limited understanding or development. May consist of listed points or random statements about general coastal management strategies. Answer may be largely reliant on Figure 13.
Max Level 2 for answer that does not refer to Figure 13.
Max Level 2 for answers that refer to a single strategy. Full marks available for assessment of two or more strategies.
No credit for consideration of soft engineering strategies.
No credit for river management strategies

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		Indicative content • Understanding of hard engineering schemes, which involve using artificial structures to control natural processes. These are designed to reduce wave energy or create a barrier between the land and sea, so storm waves can't reach the cliffs. • Application of understanding to **Figure 13**, showing coastal management in the form of rock groynes, rip rap or rock armour and a sea wall. Expect some assessment of the costs and benefits of these approaches. • **Rip rap / rock armour** consists of massive blocks of natural rock piled up at the base of a cliff. The rocks are dumped on top of each other leaving gaps between them that allow water through. Costs. Access to the beach is difficult as people have to climb over the rock armour. Costs may be high especially when the rock is imported. Rock armour looks unattractive. Benefits. Disperses the energy of the waves and reduces their erosional power. Structure is quick to build and easy to maintain. Much cheaper than a sea wall. If well maintained, rock armour lasts a long time. It is versatile, as it can be placed in front of a sea wall to lengthen its lifespan or used to stabilise slopes on sand dunes. Often used for fishing. • **Groynes** look like wooden 'fences' that are built down the beach at right angles to the coastline. **Figure 13** shows a series of wooden groynes or barriers that are built down the beach at right angles to the coastline. They are designed to stop material being moved along the beach by longshore drift. They work by building up the amount of sand on the updrift side. Costs. Beaches downdrift of the defences are starved of beach material due to their impact on longshore drift. This leads to increased erosion which has an economic impact further along the coast. They need regular maintenance and are ineffective during storm conditions. Benefits. Act as a buffer against wave attack, helping to protect the cliffs. Create a wider beach, which can be popular with tourists and boost local economy. Reduces risk of damage, making residents and local business feel more secure. Not too expensive. If well maintained, can last up to 40 years. Can act as windbreaks. • **Sea walls** aim to protect the coast using concrete, steel and/or stone. Costs. Sea walls are very expensive to construct and maintain (over £5000 per metre). Reflected waves scour the beach and can cause foundations to be undermined. Recurved sea walls can increase the erosion of beach material and may destroy habitats. Benefits. Effective in protecting cliffs from erosion and also act as a barrier to prevent flooding. Deflect wave energy back to sea. Give people a sense of security. Often have a promenade on top, which doubles up as cycle route. Steps at the base of a wall act as seating areas for beach users. If well maintained, sea walls can last for many years. Sea walls do not impede the movement of sediment downdrift, so they do not disadvantage other areas. • Credit reference to other hard engineering strategies, including gabions, revetments, offshore barriers and reefs, tetrapods. • Overall assessment of hard engineering strategies. The groynes, sea wall and rock armour are effective solutions which help reassure the coastal community. However, they are expensive to install and maintain. In addition to this by installing hard engineering solutions in one place this can have a detrimental effect further along the coast. They do little to work	

		with nature and sustainability is a key issue, despite their initial signs of success. AO2 – 3 marks AO3 – 3 marks	

Qu	Pt	Marking guidance	Total marks
04	1	**Which word describes the process of erosion when stones collide with each other as they move downstream?** **B**. Attrition AO1 – 1 mark	1
04	2	**Give one way rivers transport material.** Material is carried as dissolved minerals in the water (1) Solution (1) Lighter sediment is suspended (carried) within the water (1) Suspension (1) Pebbles are bounced along the river bed (1) Saltation (1) Large, heavy pebbles are rolled along the river bed (1) Traction (1) AO1 – 1 mark	1
04	3	**Using Figure 14, what is the approximate area of grid square 0495 covered by salt marsh?** **A**. 0.2 km^2 AO4 – 1 mark	1
04	4	**Using Figure 14 and Figure 15, describe <u>two</u> characteristics of an estuary.** An estuary is where the river meets the sea (map) (1) Wide river mouth (map) (1) General presence of mudflats (1|). Reference to sediment/silt/mud deposits/deposited material (1) There are salt marshes (photo) (1) Mudflats are exposed at low tide (1) in sheltered areas where the river flows more slowly for example at the sides of the river (1) (photo) Within the mudflats, there are smaller streams/creeks (1) (photo) The mudflats may become colonised by (salt-marsh) vegetation (1) (photo) Both features can be derived from the map or photograph. No credit for land features nearby eg flat floodplain. Credit width measurement eg the mouth of the estuary is 2km wide (1) Allow shallow (water) (1) AO4 – 2 marks	2

04	5	**Explain how physical factors can affect flood risk.** 2 (Clear) | 3-4 | AO1 Demonstrates accurate knowledge about physical causes of flooding. AO2 Shows a clear geographical understanding of physical factor(s) and how they can increase the risk flooding. Explanations are developed. 1 (Basic) | 1-2 | AO1 Demonstrates some knowledge about physical causes of flooding. AO2 Shows limited geographical understanding of physical factor(s) and how they can increase the risk flooding. Explanations are partial. 0 | No relevant content • **Level 2 (clear) responses** are likely to contain linked statements showing understanding of the physical factors involved and how they increase flood risk. Appropriate geographical terminology. • **Level 1 (basic) responses** will comprise simple ideas about general factor(s) affecting flooding/flood risk. Geographical terminology will be limited. • No credit for explaining how human factors increase flood risk. • Allow Low level 2 for developed explanation of one physical factor <u>Indicative content</u> • The command is 'explain', so responses should provide a reasoned account of how and why physical factors increase or decrease flood risk. • The risk of flooding is affected by various factors linked to precipitation, geology and relief. • <u>Precipitation</u> flood risk is increased by: • Bands of depressions resulting in continuous heavy rain. This can saturate the soil and surface run off is increased. Rainwater will enter the river channel quicker resulting in a high river discharge and increased flood risk. • Sudden bursts of heavy rain may result in the infiltration rate being too slow to cope. This can occur after periods of drought when the ground has been baked hard. Surface run-off is increased and flash flooding may occur. • Prolonged light rainfall can saturate the soil particularly if there has been previous (antecedent) rainfall which has also saturated the soil. • Snowmelt can release stored water that flows as surface run-off. • <u>Geology</u> flood risk is increased by: • Impermeable rock types which do not allow water to pass through. Areas with impermeable rock often have thin soils and limited vegetation to intercept the rainfall. • <u>Relief</u> is the height and slope of the land. • Steep slopes can encourage greater surface run-off increasing flood risk. • Low-lying, flat, flood plains may have a greater risk of flooding as there is insufficient gradient to remove the water.	4

		• Vegetation • Lack of vegetation means that less rainfall is intercepted and stored by trees etc. Water is more likely to flow overland and reach the river at a quicker rate and therefore increase flood risk. • Basin size and shape: small and round drainage basins are likely to see the faster delivery of water to the river than large, elongated basins. • High drainage density refers to the number of tributaries in a drainage basin. Where there are more tributaries, the water is likely to reach the main river quicker and increase flood risk. AO1 – 2 marks AO2 – 2 marks	

04	6	**Discuss the issues which can arise from flood management schemes. Use Figure 16 and your own understanding.** **Level 3 (Detailed)** – 5–6 marks: AO2 Shows thorough geographical understanding of a range of issues associated with flood management schemes. AO3 Demonstrates thorough application of knowledge and understanding in a reasoned way in discussing the different issues associated with flood management schemes. **Level 2 (Clear)** – 3–4 marks: AO2 Shows some geographical understanding of one or more issues associated with flood management schemes. AO3 Demonstrates reasonable application of knowledge and understanding in discussing the issue(s) associated with flood management schemes. **Level 1 (Basic)** – 1–2 marks: AO2 Shows limited geographical understanding of one or more issues associated with flood management schemes. AO3 Demonstrates limited application of knowledge and understanding in discussing the issue(s) associated with flood management schemes. **0** – No relevant content • **Level 3 (detailed)** will be developed responses about issues associated with flood management schemes. Could be positive or negative or both. Appropriate terminology will be used. • **Level 2 (clear) responses** are likely to show understanding of the positive and/or negative issues associated with flood management schemes. Some geographical terminology evident. • **Level 1 (basic) responses** will be simple statements about flood management schemes with limited understanding or development. May consist of listed points from **Figure 16** or general statements about flood management. • Max Level 2 if there is no (direct or inferred) reference to Figure 16. Indicative content	6

		• The resource focuses on a flood relief channel on the River Thames but credit can also be given to the positive and negative issues associated with other flood management strategies. Hard engineering schemes such as dams and reservoirs, straightening, embankments, flood relief channels and soft engineering schemes such as flood warnings, preparation, flood plain zoning, planting trees and river restoration are listed in the specification. • There are a wide range of social, economic and environmental issues which may be discussed. • For the flood relief channel detailed in **Figure 16**, the positive issues include protection from flooding for 15 000 homes and 2400 businesses, improved biodiversity for wildlife through the creation of 250 hectares of new habitat and opportunities for recreational activities including walking, cycling, boating and angling. • There are negative issues associated with flood relief channels which are not presented in the resource. These include economic cost of building and maintenance, disruption for people living in the area, potential increase in flooding in other areas as a result of the flood relief channel, disturbance to habitats and the negative appearance of some flood relief channels. • Dams and reservoirs can provide HEP, water supply and tourism and recreational opportunities. However, they can also displace people, disrupt habitats and trigger earthquakes or landslides. Reservoirs such as Kielder Water have flooded areas of outstanding natural beauty. • Channel straightening can endanger animals and destroy habitats. The river's ecosystem is changed. A straightened river may have a concrete lining which is visually unattractive and deprives burrowing river bank animals of their habitat. In straightened sections, there is some evidence of increased pollution on the land from agro-chemicals, as run-off cannot drain into the river so easily. However, river straightening does reduce flood risk and can improve navigation. • Embankments can reduce flood risk and provide habitats for riverbank animals as well as walking routes for people. However, they can also reduce access to the river, have higher maintenance costs and look unattractive. • Soft engineering strategies tend to be less intrusive and more economical but their effectiveness in reducing flood risk may be questioned. Flood plain zoning creates green spaces but can restrict house building programmes. Planting trees has numerous environmental benefits and can be relatively inexpensive. River restoration creates new wetland habitats and recreational areas and increases biodiversity but can lead to loss of agricultural or other productive land. Flood warnings and preparation helps people to be prepared and act accordingly but recognise that flooding is a natural event and people need to live with floods. People may not always act appropriately, especially if warnings turn out to be false alarms. • Students might discuss short and long term costs and benefits to different management schemes. • Students may refer to examples of specific flood management schemes they have studied. Examples might include the Jubilee river flood-relief channel, Banbury flood storage, Kielder dam, Quaggy river restoration. AO2 – 3 marks	

		AO3 – 3 marks	

Qu	Pt	Marking guidance	Total marks
05	1	**What is the name given to a large boulder transported and deposited by glaciers in areas with a different rock type?** **A**. Erratic AO1 – 1 mark	1
05	2	**Give one way glaciers move material.** Rotational slip (1) Bulldozing (1) The snout of a glacier pushes material forward (1) Material is carried within/on top of/ under the glacier (as moraine) (1) AO1 – 1 mark	1
05	3	**Give the six-figure grid reference for the part of the corrie marked X.** **C**. 642 591 AO4 – 1 mark	1
05	4	**Using Figure 17 and Figure 18, describe two characteristics of a ribbon lake**. A ribbon lake is long (1) and relatively narrow/thin (1) it is in/occupies a glacial trough/u-shaped valley (1) Llyn Ogwen is over 1.5 km in length (1) It is up to 0.4 km wide (1) It is wider in the east than in the west (1) Both features can be derived from the map or photograph AO4 – 2 marks	2

<table>
<tr>
<td>05</td>
<td>5</td>
<td>
Explain how corries form as a result of glacial erosion.
<table>
<tr><td>2 (Clear)</td><td>3–4</td><td>AO1 Demonstrates accurate knowledge about glacial erosion processes and corrie formation.
AO2 Shows a clear geographical understanding of the interrelationships between glacial environments and processes. Explanations are developed.</td></tr>
<tr><td>1 (Basic)</td><td>1–2</td><td>AO1 Demonstrates limited knowledge of glacial erosion processes and corrie formation.
AO2 Shows limited geographical understanding of the interrelationships between glacial environments and processes. Explanations are partial.</td></tr>
<tr><td></td><td>0</td><td>No relevant content</td></tr>
</table>

Level 2 (clear) responses are likely to contain linked statements showing understanding of the erosional processes involved and the sequence of corrie formation. Appropriate geographical terminology.
Level 1 (basic) responses will comprise simple ideas with limited or partial sequence and little reference to the processes involved. Geographical terminology will be limited.
Sequence of formation and some reference to processes involved required to reach top of Level 2

<u>Indicative content</u>

The command is ‘explain’, so responses should provide a reasoned account of how and why a corrie forms. This could include post-glacial changes through to the present day. Processes should be outlined as well as the sequence of formation.
Although a landform of glacial erosion, some reference to depositional processes, weathering and mass movement is also relevant and should be credited.
A corrie is a hollow in the mountainside in which snow first collects and eventually forms glacier ice as the snow is compressed and the air is squeezed out. In the UK, this occurred in hollows facing North or North-East so less affected by direct sunshine.
Over time, gravity will encourage the corrie glacier to move downhill by rotational sliding. Freeze-thaw weathering, along with plucking, loosens and removes material from the back of the hollow, producing a steep back-wall. This plucked debris from the back wall causes further erosion through abrasion which deepens the corrie and forms a rock basin.
Erosion at the front edge of the corrie is not so powerful, so a sill or rock-lip develops, often made higher by deposition of some of the moraine. When the ice begins to melt, the rock lip acts as a natural dam to the meltwater, and a deep, rounded corrie-loch (or tarn) sometimes forms.
Credit relevant labelled diagrams as part of the explanation of processes and the sequence of corrie formation and change over time.

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		AO1 – 2 marks AO2 – 2 marks	

05	6	**Discuss the possible conflict between development and conservation in glaciated areas.** **Use Figure 19 and your own understanding.**	6

Level	Marks	Description
3 (Detailed)	5–6	AO2 Shows thorough geographical understanding of the potential conflict between conservation and development in glaciated areas. AO3 Demonstrates thorough application of knowledge and understanding in a reasoned way in discussing the issues relating to one or more land uses in glaciated environments.
2 (Clear)	3–4	AO2 Shows some geographical understanding of the potential conflict between conservation and development in glaciated areas. AO3 Demonstrates reasonable application of knowledge and understanding in discussing the issues relating to one or more land uses in glaciated environments.
1 (Basic)	1–2	AO2 Shows limited geographical understanding of the potential conflict between conservation and/or development in glaciated areas. AO3 May include limited application of knowledge and understanding in discussing the issues relating to one or more land uses in glaciated environments.
	0	No relevant content

- **Level 3 (detailed) responses** will include linked statements showing understanding of one or more land uses and their potential for conflict in glaciated areas. Reference made to **Figure 19**. Appropriate terminology will be used.
- **Level 2 (clear) responses** are likely to contain linked statements showing understanding of one or more land uses and their potential for conflict in glaciated areas. Reference likely to be made to **Figure 19**. Some geographical terminology evident.
- **Level 1 (basic) responses** will comprise simple ideas with limited understanding of the link between one or more land uses and/or potential conflict in glaciated areas. Geographical terminology will be limited.
- Max Level 1 for reference to either conservation or development only.
- Max Level 2 for answer that does not refer to Figure 19

<u>Indicative content</u>

- The command is 'discuss', so responses should provide a reasoned discussion of the potential conflicts between development (land uses) and conservation in glaciated areas.
- General conflicts include the fact that some people believe that the natural glacial environment should be preserved, not used for economic gain.
- The different land use options outlined in the specification are tourism, farming, forestry and quarrying and there is likely to be discussion of more

		than one of these to satisfy the command to look at development. **Figure 19** refers to a zip-wire proposal and implicit or explicit reference to this should also feature in the answer. • Tourism is a major source of employment and income in rural mountainous areas. It creates many jobs but tourist-related activities such as zip-wires, walking, skiing, climbing, mountain biking etc create conflict with those people who believe that the area should be conserved for wildlife. Footpath erosion and traffic congestion are two of the environmental problems associated with tourism and which may conflict with conservation. Noise and air pollution can also result from the increased traffic and footfall which comes with attractions such as zip-wire developments. The newspaper source refers to concerns about extra traffic on narrow roads and spoiling the view. • Farming and forestry provides much needed employment in rural areas and boost the local economy. However, some people feel that farming and logging can destroy natural habitats and reduce biodiversity. • Quarrying for rocks like sandstone, granite and slate creates lots of jobs, which is good for the local economy. However, it also brings noise, heavy traffic and dust which can destroy natural habitats and reduce biodiversity. Quarrying can also be an eyesore so tourist sites may be badly affected. • Other potential (and valid) development land uses include military training, reservoirs, energy production such as wind turbines and hunting. Each of these land uses could be judged as having negative impacts on the landscape and wildlife, thereby conflicting with conservation. • It could be argued that different land uses and economic activities bring in valuable economic revenue which can be put towards conservation strategies. This is particularly the case for tourism where money can be invested in sustainable management of glaciated areas. • Answers could make reference to specific examples of glaciated landscapes in the UK where there is potential conflict between development and conservation. AO2 – 3 marks AO3 – 3 marks	