GCE

Geography

H081/02: Geographical debates

Advanced Subsidiary GCE

Mark Scheme for November 2020

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Annotations

Annotation	Meaning
	Highlight
	Off page comment
λ	Omission
?	Indicates questionable points / comments
R	Rubric error (place at start of Question not being counted)
L1	Level 1
L2	Level 2
L3	Level 3
L4	Level 4
DEV	Development of point
IRRL	Irrelevant; a significant amount of material that does not answer the question
SEEN	Point has been seen and noted
NE	No Examples
BP	Must be used on all blank pages where there is no candidate response
EVAL	Evaluation
	Highlighting an issue e.g. irrelevant paragraph. Use in conjunction with another stamp e.g IRRL

Subject Specific Marking Instructions

INTRODUCTION

Your first task as an Examiner is to become thoroughly familiar with the material on which the examination depends. This material includes:

- the specification, especially the assessment objectives
- the question paper and its rubrics
- the mark scheme.

You should ensure that you have copies of these materials.

You should ensure also that you are familiar with the administrative procedures related to the marking process. These are set out in the OCR booklet **Instructions for Examiners**. If you are examining for the first time, please read carefully **Appendix 5 Introduction to Script Marking: Notes for New Examiners**.

Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

USING THE MARK SCHEME

Please study this Mark Scheme carefully. The Mark Scheme is an integral part of the process that begins with the setting of the question paper and ends with the awarding of grades. Question papers and Mark Schemes are developed in association with each other so that issues of differentiation and positive achievement can be addressed from the very start.

This Mark Scheme is a working document; it is not exhaustive; it does not provide 'correct' answers. The Mark Scheme can only provide 'best guesses' about how the question will work out, and it is subject to revision after we have looked at a wide range of scripts.

The Examiners' Standardisation Meeting will ensure that the Mark Scheme covers the range of candidates' responses to the questions, and that all Examiners understand and apply the Mark Scheme in the same way. The Mark Scheme will be discussed and amended at the meeting, and administrative procedures will be confirmed. Co-ordination scripts will be issued at the meeting to exemplify aspects of candidates' responses and achievements; the co-ordination scripts then become part of this Mark Scheme.

Before the Standardisation Meeting, you should read and mark in pencil a number of scripts, in order to gain an impression of the range of responses and achievement that may be expected.

In your marking, you will encounter valid responses which are not covered by the Mark Scheme: these responses must be credited. You will encounter answers which fall outside the 'target range' of Bands for the paper which you are marking. Please mark these answers according to the marking criteria.

Please read carefully all the scripts in your allocation and make every effort to look positively for achievement throughout the ability range. Always be prepared to use the full range of marks.

	AO1	AO2	AO3	Quality of extended response
Comprehensive	A wide range of detailed and accurate knowledge that demonstrates fully developed understanding that shows full relevance to the demands of the question. Precision in the use of question terminology.	Knowledge and understanding shown is consistently applied to the context of the question, in order to form a: clear, developed and convincing analysis that is fully accurate. clear, developed and convincing interpretation that is fully accurate. detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based.	Quantitative, qualitative and/or fieldwork skills are used in a consistently appropriate and effective way and with a high degree of competence and precision.	There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.
Thorough	A range of detailed and accurate knowledge that demonstrates well developed understanding that is relevant to the demands of the question. Generally precise in the use of question terminology.	Knowledge and understanding shown is mainly applied to the context of the question, in order to form a : clear and developed analysis that shows accuracy. clear and developed interpretation that shows accuracy. detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence.	Quantitative, qualitative and/or fieldwork skills are used in a suitable way and with a good level of competence and precision.	There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence.

Reasonable	Some sound knowledge that demonstrates partially developed understanding that is relevant to the demands of the question. Awareness of the meaning of the terms in the question.	Knowledge and understanding shown is partially applied to the context of the question, in order to form a: sound analysis that shows some accuracy. sound interpretation that shows some accuracy. sound evaluation that offers generalised judgements and conclusions, with limited use of evidence.	Quantitative, qualitative and/or fieldwork skills are used in a mostly suitable way with a sound level of competence but may lack precision.	The information has some relevance and is presented with limited structure. The information is supported by limited evidence.
Basic	Limited knowledge that is relevant to the topic or question with little or no development. Confusion and inability to deconstruct terminology as used in the question.	Knowledge and understanding shows limited application to the context of the question in order to form a: simple analysis that shows limited accuracy. simple interpretation that shows limited accuracy. Un-supported evaluation that offers simple conclusions.	Quantitative, qualitative and/or fieldwork skills are used inappropriately with limited competence and precision.	The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.

Question			Answer	Mark	Guidance
1	(a)		**Explain two ways in which continental drift has influenced past climates.** • 100 million years ago (cretaceous period) the continents were in different positions (✓). The distribution and configuration of the continents affect ocean circulation/currents which can influence the climate through heat transfer/the Earth's energy budget (✓) • Distribution: More land mass at higher latitudes increases ice cover which increases albedo (✓) and lowers the Earth's average temperature (✓). • Movement of Antarctica south where it was isolated from South America and Australia. The Antarctic Circumpolar Current formed around it, limiting heat transfer from the north/insulating it from warmer water further north (✓) and contributing to ice-house conditions/fall in temperatures (✓).	**4** **AO1 x4**	**AO1 – 4 marks** 2 x 1 (✓) for each way in which continental drift has influenced past climates 2 x 1 (✓) for each explanation point Only two ways can be credited. Focus should be on how continental drift has influenced past climates.
1	(b)		**Examine the role of international organisations in response to climate change.** **Level 3 (5-6 marks)** Demonstrates **thorough** knowledge and understanding of the role of international organisations in response to climate change (AO1).	**6** **AO1 x3** **AO2 x3**	The EU and the UN are possible organisations which may be used. Other international organisations also acceptable. The choice will determine the content of the answer. **AO1 - 3 marks** Knowledge and understanding of the role of international organisations in response to climate change could potentially include: <u>The UN</u>

			Place-specific details should be **accurate** with the amount helping determine where within the level the response lies. Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy as to the role of international organisations in response to climate change (AO2). **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of the role of international organisations in response to climate change (AO1). **Place specific** material is present which is **partially accurate** with the amount helping determine where within the level the response lies. Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy as to the role of international organisations in response to climate change (AO2). **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of the role of international organisations in response to climate change (AO1). Little or no **place specific** material is present and/or is inaccurate.		In 1992, 41 countries joined the UNFCCC (United Nations Framework Convention on Climate Change) which led to the Kyoto Protocol in 1997 - this was the first time that legally binding targets were placed on GHG emissions. Various agreements have since taken place such as the Kyoto Protocol and the Paris Agreement. The UN also created the IPCC (Intergovernmental Panel on Climate Change) which creates reports to inform policy-making for climate change. <u>The EU</u> The ECCP (European Climate Change Programme) is the EU's own mitigation package to reduce GHG emissions which was launched in 2000. Each EU state has its own policies which build upon this. The ETS (Emissions Trading System) is a vital part which includes Cap-and-Trade. **AO2 - 3 marks** Application of knowledge and understanding to analyse and examine the role of international organisations in response to climate change could potentially include: • Recognition that as a global problem, climate change requires international cooperation to successfully address. • Creating global forums to research the global climate, discuss findings and plan actions for the future. Examples are likely to be given, such as the Kyoto Protocol or the Paris Agreement. • A recognition that ACs take the lead due to their high level of responsibility. • Setting ambitious and legally binding targets to mitigate climate change. • A consideration of success and failures, e.g. ○ <u>Successes</u>: global cooperation - all countries working towards the same goal of reducing emissions; clear targets – climate change addressed quickly through top-down schemes; EU ETS incentivises through monetarising emissions

			Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy as to the role of international organisations in response to climate change (AO2). **0 marks** No response or no response worthy of credit.		whilst reducing the number of credits year-on-year therefore addressed quickly; ○ Failures: environmental groups – belief that initiatives do not go far enough to mitigate climate change; the Paris Agreement INDCs (Intended Nationally Determined Contributions) means countries can set themselves easy challenges, it has a "non-punitive compliance mechanism" so a lack of punishment if targets are not me and does not take into account international transport - a significant proportion of GHG emissions.
1	**(c)**	**(i)**	**Study Fig. 1, which shows the Columbia Glacier in Alaska in 2009 and 2015.** **Using evidence from Fig. 1, identify evidence that indicates climate change between 2009 and 2015.** • Top left of both photos - the ice surface is higher in 2009 than in 2015 (✓) • Main part of photos – in 2009 it is largely glacier; 2015 it is largely a lake with floating ice (✓) • Bottom left of both photos – 2009 there is a rocky outcrop then the edge of the glacier, 2015 the rocky outcrop extends down a muddy looking slope to the lake (✓) • Top right of both photos – what appears to be ice in 2009 is dark with little sign of fresh ice in 2015 (✓) • Peaks of both photos – in 2009 even though there is some cloud it looks as though the snow on the mountain tops is less extensive than on the mountain tops	**4** **AO3 x4**	**AO3 – 4 marks** 4 x 1 mark (✓) for correct identification of climate change evidence. Specific parts of the photographs should be mentioned within the answer.

			in 2015 which might suggest recent falls of snow before the 2015 photo was taken		

1	**(c)**	**(ii)**	**Using evidence from Fig. 1, analyse reasons for differences between the two photographs.**
			
			Level 3 (5-6 marks)
			Demonstrates **thorough** application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to reasons for differences between the two photographs (AO2).
			
			Demonstrates **thorough** investigation and interpretation of the resource to fully evidence differences between the two photographs. There must be strong ideas linking resource evidence to the possible reasons for differences between the two photographs (AO3).
			
			Level 2 (3-4 marks)
			Demonstrates **reasonable** application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to reasons for differences between the two photographs (AO2).
			
			Demonstrates **reasonable** investigation and interpretation of the resource to fully evidence differences between the two photographs. There must be good ideas linking resource evidence to the possible reasons for differences between the two photographs (AO3).
			
			Level 1 (1-2 marks)
				6
				AO2 x3
				AO3 x3
					AO2 - 3 marks
					Application of knowledge and understanding to analyse the reasons for differences between the two photographs could potentially include:
					• An increase in GHG emissions leading to the enhanced greenhouse effect and raised temperatures
					• Warmer average global temperatures over time have caused glaciers and ice sheets globally to melt.
					• Changes in albedo (from high to low) creates a positive feedback loop where the ice melt accelerates over time - as the ice melts, darker surfaces are revealed below and less reflection of insolation takes place, warming the area further.
					• It is possible that differences could be due to variation in the local climate, e.g. seasonal variations in snow and ice melt.
					
					AO3 - 3 marks
					Evidence from the photographs of reasons for differences between them could potentially include:
					• Evidence of melting:
					  ○ The Columbia glacier previously extended beyond the frame of the photograph in 2009 but now terminates at the base of the mountains in the distance, leaving a lake in its place.
					  ○ Small glaciers surrounding the main glacier in 2009 have disappeared and bare ground remains in its place e.g. the right of the photograph.
					• Some surfaces look darker in the bottom photo suggesting lower albedo.
					• The lake height is much lower than the height of the original glacier as seen by their positions relative to the surrounding landscape – suggests a reduction in ice/water storage in this area.

			Demonstrates **basic** application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to reasons for differences between the two photographs (AO2). Demonstrates **basic** investigation and interpretation of the resource to fully evidence differences between the two photographs There must be some ideas linking resource evidence to the possible reasons for differences between the two photographs (AO3). **0 marks** No response or no material worthy of credit.		
1	**(d)**		**'The influence of positive feedback makes predicting climate change difficult'. To what extent do you agree?** **Level 4 (10–12 marks)** Demonstrates **comprehensive** and accurate knowledge and understanding of the influence of positive feedback and climate change (AO1). Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and convincing evaluation offering secure judgements leading to rational conclusions that are evidence based as to the extent to which the influence of positive feedback makes predicting climate change difficult (AO2). **Level 3 (7-9 marks)**	**12** **AO1 x6** **AO2 x6**	**AO1 - 6 marks** Knowledge and understanding of the influence of positive feedback and climate change could potentially include: Positive feedback amplifies change and increases disequilibrium. There is a range of positive feedback relating to climate change including: • Albedo - as ice melts, it reveals a darker surface below which is less reflective. As more radiation is absorbed, the temperature of the land or sea increases and melts more ice. • Clouds: Higher temperatures increase levels of evaporation which increases the amount of water vapour in the atmosphere, which has a very high warming potential. Clouds also limit the release of radiation to space (greenhouse effect) which can raise local temperatures. • Vegetation: Higher temperatures cause heat stress in tropical areas reducing the amount of photosynthesis.

			Demonstrates **thorough** and mainly accurate knowledge and understanding of the influence of positive feedback and climate change (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation offering generally secure judgements with some link between rational conclusions and evidence as to the extent to which the influence of positive feedback makes predicting climate change difficult (AO2). **Level 2 (4-6 marks)** Demonstrates **reasonable** and some accurate knowledge and understanding of the influence of positive feedback and climate change (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation offering generalised judgements and conclusions with limited links to evidence as to the extent to which the influence of positive feedback makes predicting climate change difficult (AO2). **Level 1 (1-3 marks)** Demonstrates **basic** and/or inaccurate knowledge and understanding of the influence of positive feedback and climate change (AO1). Demonstrates **basic** application of knowledge and understanding offering either unsupported or minimal if any evaluation.		Carbon dioxide concentrations increase [less sequestration (absorption through photosynthesis) and more decomposition of decaying plant life] which further raises temperatures. Climate change: • Rising temperatures (global warming), most recently caused by increases in greenhouse gases. Leads to more extreme weather; long term changes to climate with implications for life (plant, animal, humans). **AO2 - 6 marks** Application of knowledge and understanding to evaluate the extent to which the influence of positive feedback makes predicting climate change difficult could potentially include: <u>Ways in which it is not difficult:</u> • Advancements in technology allow in-depth analysis and therefore patterns and correlations to be identified. The role of positive feedback can, to a certain extent, be identified from the data. • Data from a variety of scales allows the role of positive feedback loops at regional and global scales to be better understood. • Extrapolation of data allows us to take current and past findings to discover what the future climate may be like. <u>Ways in which it is difficult:</u> • Many feedback loops may act positively or negatively, which makes future predictions difficult: e.g. when clouds reflect insolation they can provide negative feedback thus regulating global temperatures; vegetation may form negative feedback loops where the photosynthetic rate of

			Judgements and conclusions, if any, are simplistic regarding the extent to which the influence of positive feedback makes predicting climate change difficult (AO2). **0 marks** No response or no material worthy of credit.		vegetation in higher latitudes increases (more CO_2 absorbed) - regulates global temperatures. • There are so many inter-related variables involved in the global climate that accurately predicting the climate change is very difficult. Predictions are only as good as the data they are based on.

Question			Answer	Mark	Guidance
2	(a)		**Explain two ways in which relief of land can affect the spread of diseases.** • Fall in temperature with altitude means that some diseases decrease in prevalence with height above sea level (✓). For example, areas in the Ethiopian Highlands above 2,000m in altitude only experience malaria outbreaks for short periods when the temperature has been unusually high (✓). • Water is frozen (✓) reducing spread of diseases (✓). Converse equally acceptable • Higher population densities are often lower at higher altitudes which reduces the likelihood of contamination of drinking water by sewage (✓) and communicable, water-borne diseases such as typhoid are less likely to spread between mountain ranges (via relocation diffusion) (✓). Converse equally acceptable. • Low relief land could increase the amount of stagnant water (✓). This will increase the breeding habitats for mosquitoes and any other waterborne, disease carrying vectors affecting the spread of the disease(✓). • Relief being a barrier to movement of people (✓) and as a result the spread of diseases is lower due to less people interacting in high relief areas(✓). NB do not allow mirror answers.	**4** **AO1 x4**	**AO1 – 4 marks** 2 x 1 (✓) for each way in which relief of land can affect the spread of diseases 2 x 1 (✓) for each explanation point Only two ways can be credited. Focus should be how relief can affect the spread of diseases.
2	(b)		**Examine the role of global organisations in providing international strategies to combat disease.**	**6** **AO1 x3** **AO2 x3**	**AO1 - 3 marks**

			Level 3 (5-6 marks) Demonstrates **thorough** knowledge and understanding of global organisations in providing international strategies to combat disease (AO1). **Place-specific** details should be **thorough** with the amount helping determine where within the level the response lies. Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy as to the role of global organisations in providing international strategies to combat disease (AO2). **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of global organisations in providing international strategies to combat disease (AO1). **Place specific** material is present which is **partially accurate** with the amount helping determine where within the level the response lies. Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy as to the role of global organisations in providing international strategies to combat disease (AO2). **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of the role of global organisations in providing international strategies to combat disease (AO1). Little or no **place specific** material is present and/or is inaccurate.		Knowledge and understanding of global organisations in providing international strategies to combat disease could potentially include: WHO - likely to be the main organisation referred to; World Bank or international NGOs may also be referenced. The choice of global organisations will determine the content of the answer. <u>WHO</u> Established in 1948, HQ - Geneva, the directing and coordinating authority on international health within the UN. Works closely with other international organisations (World Bank and NGOs such as the Red Cross and Red Crescent). WHO gathers health data (World Health Statistics from 194 countries), prioritises areas requiring assistance, researches health problems, monitors the international health situation, supports UN member states' health strategies and provides technical support in health crises. <u>Red Cross and Red Crescent Movement</u> The Red Cross is a private humanitarian institution to protect human life, founded in 1863 in Geneva. Has approximately 17 million volunteers, members and staff worldwide across 187 countries. Provides education about health e.g. HIV/AIDS, First Aid training, natural hazard drills and has been involved in vaccination programmes (e.g. measles in Africa and India preventing 2 million child deaths annually). **AO2 - 3 marks** Application of knowledge and understanding to analyse and examine the role of global organisations in providing international strategies to combat disease: • Recognition that as a global problem, many diseases such as HIV/AIDS or influenzas require international cooperation to successfully address them.

			Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy as to the role of global organisations in providing international strategies to combat disease (AO2).
			
			0 marks
			No response or no response worthy of credit.
					• Creating global forums to research the diseases, discuss findings and plan actions for the future. Examples are likely to be given, such as TB or HIV/AIDS.
					• A recognition that many diseases can be prevented e.g. measles which can now be vaccinated against and therefore aim to eradicate diseases such as this globally.
					• Recognition that a correlation exists between development status and disease outbreaks, particularly water-borne and vector-borne diseases. Working alongside disaster relief organisations to avoid outbreaks such as cholera after a tropical storm or earthquake when access to clean water may decrease.
					• A consideration of successes and failures:
					  ○ Successes: eradication of diseases globally by the WHO e.g. smallpox in 1977; more sustainable through addressing environmental and social issues also e.g. community-based solutions, water quality, poor housing.
					  ○ Failures: the WHO have made incorrect predictions about eradications despite cures e.g. Cholera and Tuberculosis; often only large, newsworthy diseases are tackled – they are less involved with small, isolated incidents.
					
					The Red Cross and Red Crescent helps people in disaster and war zones in a non-discriminatory way so that all people can access health care. It has saved thousands of lives over the years as a result.
					There have been oversights over the years which have harmed people's heath, e.g. the Canadian Red Cross and Red Crescent were found to be using infected blood which infected people with HIV and Hepatitis C.

2	**(c)**	**(i)**	**Study Fig. 2, which shows two photographs of healthcare challenges in LIDCs.** **Using evidence from Fig.2, identify evidence of healthcare challenges faced by government hospitals in LIDCs.** The first photo of a government hospital demonstrates multiple challenges: • Overcrowding (✓) – at least 12 patients are in the photograph within one room, which creates a greater risk of infectious diseases spreading (✓) • There are a lack of beds (✓) just mattresses, which highlights a lack of equipment (✓) • The drip stands (✓) create a trip hazard for the patients and staff, evidence of a lack of health and safety organisation within the facility (✓) • Lack of waste disposal (✓) as seen by the number of boxes pushed against the wall (✓) • Disorganised nature of the facilities (✓) makes it difficult for medical staff to access the patients (✓) • There are limited number of water bottles around the room (✓), unlikely to be enough for the number of patients present (✓) • The floor cannot be wiped clean (✓)on account of the number of patients lying directly on top of it (✓) • Lack of medical staff (✓) stretched to capacity (✓)	**4** **AO3 x4**	**AO3 – 4 marks** 2 x 1 mark (✓) for evidence of healthcare challenges from Figure 2. 2 x 1 mark (✓) for challenges faced by the government hospitals in LIDC's. Evidence from the photographs should be mentioned within the answer.
2	**(c)**	**(ii)**	**Using evidence from Fig. 2, analyse reasons why grassroots strategies play a vital role in combating disease risk.** **Level 3 (5-6 marks)** Demonstrates **thorough** application of knowledge and	**6** **AO2 x3** **AO3 x3**	**AO2 - 3 marks** Application of knowledge and understanding to suggest why grassroots strategies play a vital role in combating disease risk could potentially include:

			understanding to provide clear and developed analysis that shows accuracy as to reasons why grassroots strategies play a vital role in combating disease risk (AO2). Demonstrates **thorough** investigation and interpretation of the resource to fully evidence grassroots strategies that play a vital role in combating disease risk. There must be strong ideas linking resource evidence to the possible reasons why grassroots strategies play a vital role in combating disease risk (AO3). **Level 2 (3-4 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to reasons why grassroots strategies play a vital role in combating disease risk (AO2). Demonstrates **reasonable** investigation and interpretation of the resource to fully evidence grassroots strategies that play a vital role in combating disease risk. There must be good ideas linking resource evidence to the possible reasons why grassroots strategies play a vital role in combating disease risk (AO3). **Level 1 (1-2 marks)** Demonstrates **basic** application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to reasons why grassroots strategies play a vital role in combating disease risk (AO2). Demonstrates **basic** investigation and interpretation of the resource to fully evidence grassroots strategies that play a vital role in combating disease risk There must		• Grassroots strategies empower local communities – their healthcare is put in their hands which is more sustainable than involving external agencies • Women are included in grass roots scale strategies which is not always the case with top-down schemes, even though they are key players in providing food and water to local communities • Volunteers can be used which removes a cost • Outbreaks can be dealt with rapidly because local medical services are trained and ready; top-down often requires transport to cities which can be both lengthy and costly • The local population are focused on the needs of their community – their issues and solutions e.g. contamination of local water and the need to prevent it with latrines and/ or water treatment • The Cholera epidemic (12 patients pictured) could have been avoided if local people had been educated about safe water and the local water supplies, sewage disposal etc were safer, through grass roots strategies. **AO3 - 3 marks** Evidence from Fig.2 to analyse reasons why grassroots strategies play a vital role in combating disease risk could potentially include: • Volunteers could increase the workforce available from 5 to treat the patients • Lots of people waiting for a medical exam in the grassroots photo - evidently a need for these strategies • Access to medical exams for those who may not be able to afford to travel to a hub for a proper hospital • Grassroots helps the most vulnerable (young and elderly) by giving greater access.

			be some ideas linking resource evidence to the possible reasons why grassroots strategies play a vital role in combating disease risk (AO3). **0 marks** No response or no material worthy of credit.		
2	**(d)**		**'Disease epidemics pose the greatest health problem in developing countries'. To what extent do you agree?** **Level 4 (10–12 marks)** Demonstrates **comprehensive** and accurate knowledge and understanding of epidemics and other health problems in developing countries (AO1). Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and convincing evaluation offering secure judgements leading to rational conclusions that are evidence based as to the extent to which disease epidemics pose the greatest health problems in developing countries (AO2). **Level 3 (7-9 marks)** Demonstrates **thorough** and mainly accurate knowledge and understanding of epidemics and other health problems in developing countries (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation offering generally secure judgements with some link between rational conclusions and evidence as to the extent to which disease epidemics pose the greatest health problems in developing countries (AO2).	**12** **AO1 x6** **AO2 x6**	**AO1 - 6 marks** Knowledge and understanding of disease epidemics and other health problems in developing countries could potentially include: • The speed at which diseases spread in developing countries can be very rapid. • Epidemics create a significant strain on health centres within a country. • Other health problems as counterarguments including lack of Doctors, education programmes, engagement of the population. • Involvement of the WHO in many epidemics in developing countries means that epidemics should not pose the greatest health problem. • Expect case study detail to be included e.g. Ebola, Covid-19, Malaria, HIV/ AIDs, influenza, cholera; accept pandemics as an example of an epidemic. **AO2 - 6 marks** Application of knowledge and understanding to evaluate the extent to which disease epidemics pose the greatest health problems in developing countries could potentially include: • Reasons may be given for rapid disease diffusion in developing countries such as poor sanitation, lack of education, lack of engagement, which means that health agencies cannot easily limit their effect. • Epidemics stretch the resources of health centres within developing countries. This limits the extent to which they can be preventative in their approach. • Evidence for and against the statement.

			Level 2 (4-6 marks) Demonstrates **reasonable** and some accurate knowledge and understanding of epidemics and other health problems in developing countries (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation offering generalised judgements and conclusions with limited links to evidence as to the extent to which disease epidemics pose the greatest health problems in developing countries (AO2). **Level 1 (1-3 marks)** Demonstrates **basic** and/or inaccurate knowledge and understanding of epidemics and other health problems in developing countries (AO1). Demonstrates **basic** application of knowledge and understanding offering either unsupported or minimal if any evaluation. Judgements and conclusions, if any, are simplistic regarding the extent to which disease epidemics pose the greatest health problems in developing countries (AO2). **0 marks** No response or no material worthy of credit.		• Expect case study detail to be used.

Question			Answer	Mark	Guidance
3	(a)		**Explain two ways in which ocean basins can change in size over time.** • Mid-oceanic ridges exist in areas where the tectonic plates move apart (divergent/ constructive plate boundaries) (✓). An example includes the Mid-Atlantic Ridge where the plates are moving apart at a rate of approximately 2.5cm per year. This causes sea-floor spreading and widening of the ocean over time (✓). • Tectonic plates may move towards one another (convergent/ destructive plate boundaries) which can cause the ocean to narrow (✓). The gradient of the continental shelf and slope can influence the basin size, a higher angle resulting in a greater overall basin size (✓). • Sediment entering the ocean from surrounding land masses can reduce the capacity of the oceans (✓) by accumulating on the seabed or around guyots (former volcanoes) (✓).	**4** **AO1 x4**	**AO1 – 4 marks** 2 x 1 (✓) for each way in which ocean basins can change in size over time 2 x 1 (✓) for each explanation point Only two ways can be credited. Focus should be ocean basins and how they can change in size (area and/or volume).
3	(b)		**Examine the use of international frameworks in the management of ocean resources.** **Level 3 (5-6 marks)** Demonstrates **thorough** knowledge and understanding of the use of international frameworks in the management of ocean resources (AO1). **Place-specific** details should be **accurate** with the amount helping determine where within the level the response lies.	**6** **AO1 x3** **AO2 x3**	**AO1 - 3 marks** Knowledge and understanding of the use of international frameworks in the management of ocean resources could potentially include: The UNCLOS is likely to be the main framework which is referred to, although the IWC (International Whaling Commission) may be referenced. The choice of international framework will determine the content of the answer. <u>The UNCLOS</u>

			Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy as to the use of international frameworks in the management of ocean resources (AO2).
			
			Level 2 (3-4 marks)
			Demonstrates **reasonable** knowledge and understanding of the use of international frameworks in the management of ocean resources (AO1).
			
			Place specific material is present which is **partially accurate** with the amount helping determine where within the level the response lies.
			
			Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy as to the use of international frameworks in the management of ocean resources (AO2).
			
			Level 1 (1-2 marks)
			Demonstrates **basic** knowledge and understanding of the use of international frameworks in the management of ocean resources (AO1).
			
			Little or no **place specific** material is present and/or is inaccurate.
			
			Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy as to the use of international frameworks in the management of ocean resources (AO2).
			
			0 marks
			No response or no response worthy of credit.
					The UNCLOS is the international agreement which came into effect in 1994 and defines the rights and responsibilities of nations with respect to their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources.
					
					<u>The IWC</u>
					The IWC was founded in 1946 and, with its now 89 member governments, is the organization responsible for the management of whale species. In 1986, a moratorium banned commercial whaling with limited catches allowed for communities for whom it is culturally and economically important.
					
					AO2 - 3 marks
					Application of knowledge and understanding to analyse and examine the use of international frameworks in the management ocean resources could potentially include:
					• Recognition that as a global common, ocean use requires international cooperation to be successfully managed.
					• The UNCLOS has expanded since it was first established to include the International Seabed Authority to oversee the exploitation of sea-bed resources.
					• A consideration of success and failures, e.g.
					  ○ <u>Successes</u>: provided clarity about use of the oceans; IWC has enabled the population of whales to increase; creates a culture of cooperation on a global scale.
					  ○ <u>Failures</u>: exact boundaries often disputed e.g. Russia and Arctic seabed; piecemeal when multiple separate treaties; more management

					issues have emerged since establishment e.g. acidification and bio-prospecting – stretched to capacity; pressure from Norway and Japan to whale; whales can be harmed by non-whaling activities so limits IWC impact.
3	**(c)**	**(i)**	**Study Fig. 3, which shows part of the Great Barrier Reef, Australia, in 2009 and 2010.** **Using evidence from Fig.3, identify evidence of change in this coral reef between 2009 and 2010** • More fish in 2009 than 2010 (✓) • Many of the corals are significantly smaller, if present at all, in 2010 compared to 2009 (✓) • The water appears more turbid in 2010 than 2009 (✓) • Fish are no longer present but there is a shark – change in species (✓) • One coral in the background to the left of the image remains in the 2010 photographs which was present in the 2009 image (✓)	**4** **AO3 x4**	4 x 1 mark (✓) for correct identification of change between the photographs. Evidence from the photographs should be mentioned within the answer.

3	**(c)**	**(ii)**	**Using evidence from Fig. 3, analyse the reasons for differences identified in (c)(i).** **Level 3 (5-6 marks)** Demonstrates **thorough** application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to reasons for differences identified in (c)(i) (AO2). Demonstrates **thorough** investigation and interpretation of the resource to fully evidence identified in (c)(i). There must be strong ideas linking resource evidence to the possible reasons for differences identified in (c)(i) (AO3). **Level 2 (3-4 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to reasons for differences identified in (c)(i) (AO2). Demonstrates **reasonable** investigation and interpretation of the resource to fully evidence differences identified in (c)(i). There must be good ideas linking resource evidence to the possible reasons for differences identified in (c)(i) (AO3). **Level 1 (1-2 marks)** Demonstrates **basic** application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to reasons for differences identified in (c)(i) (AO2). Demonstrates **basic** investigation and interpretation of the resource to fully evidence differences identified in (c)(i). There must be some ideas linking resource evidence to the possible reasons for differences identified in (c)(i) (AO3).	**6** **AO2 x3** **AO3 x3**	**AO2 - 3 marks** Application of knowledge and understanding to analyse the reasons for differences identified in (c)(i) could potentially include: • Increased temperatures causing bleaching • Sea level rise: increasing the depth of water over corals thereby reducing light levels. • Damaged to cause the reef from tourism related activities. • Ocean acidification: carbon dioxide emissions diffuse into the ocean creating a weak carbonic acid which bleaches coral (the pH of the oceans has decreased by 0.1 since records began). • Increase wave energy from more intense storms. • Bottom trawling fishing: large nets scrape the sea floor which can smash up coral. **AO3 - 3 marks** Evidence from the photographs of reasons for differences identified in (c)(i) could potentially include: • Thermal expansion of water due to global warming. • The lack of fish could be evidence of destructive fishing. • The high level of damage in the one year between 2009 and 2010 could suggest a sudden catastrophic event such as waves generated by a severe storm or tsunami. • If the coral was previously near its limits (depth, temperature, salinity and clarity of water) relatively small changes in these could cause damage, but not as quickly as the differences between 2009 and 2010 indicate.

			0 marks No response or no material worthy of credit.		

3	**(d)**		**'Piracy poses the greatest political challenge to the use of oceans in the 21st century'. To what extent do you agree?**
			Level 4 (10–12 marks)
			Demonstrates **comprehensive** and accurate knowledge and understanding of piracy and other political challenges to the use of oceans in the 21st century (AO1).
			
			Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and convincing evaluation offering secure judgements leading to rational conclusions that are evidence based as to the extent to which piracy poses the greatest political challenge to the use of oceans in the 21st century (AO2).
			
			Level 3 (7-9 marks)
			Demonstrates **thorough** and mainly accurate knowledge and understanding of piracy and other political challenges to the use of oceans in the 21st century (AO1).
			
			Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation offering generally secure judgements with some link between rational conclusions and evidence as to the extent to which piracy poses the greatest political challenge to the use of oceans in the 21st century (AO2).
			
			Level 2 (4-6 marks)
			Demonstrates **reasonable** and some accurate knowledge and understanding of piracy and other political challenges to the use of oceans in the 21st
				12
				AO1 x6
				AO2 x6
					AO1 - 6 marks
					Knowledge and understanding of piracy and other political challenges to the use of oceans in the 21st century could potentially include:
					• Greater transcontinental shipping brings about a rise in piracy; the two go hand in hand
					• Case study detail e.g. the choke points of the Malacca Straight or the Gulf of Aden.
					• Crew being held at ransom involves government negotiations which can create tensions between countries.
					• Incidents have gone down in recent years due to the involvement of maritime coalitions.
					• Alternative political challenges may include:
					  ○ Shipping, including China's growing naval power
					  ○ Fishing disputes between nations
					  ○ Use of the oceans by different nations, territories and the implementation of the UNCLOS.
					  ○ The production of pollution
					  ○ Migration e.g. across the Mediterranean Sea
					
					AO2 - 6 marks
					Application of knowledge and understanding to evaluate the extent to which piracy poses the greatest political challenge to the use of oceans in the 21st century could potentially include:
					• Piracy is often affected by weather conditions and incidents therefore decrease in monsoon seasons; this makes it less of a challenge than non-weather related challenges such as pollution production.

			century (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation offering generalised judgements and conclusions with limited links to evidence as to the extent to which piracy poses the greatest political challenge to the use of oceans in the 21st century (AO2). **Level 1 (1-3 marks)** Demonstrates **basic** and/or inaccurate knowledge and understanding of piracy and other political challenges to the use of oceans in the 21st century (AO1). Demonstrates **basic** application of knowledge and understanding offering either unsupported or minimal if any evaluation. Judgements and conclusions, if any, are simplistic regarding the extent to which the influence of positive feedback makes predicting climate change difficult (AO2). **0 marks** No response or no material worthy of credit.		• Influence of maritime coalitions (EU, NATO etc). Patrolling the most vulnerable areas has reduced attacks i.e. reducing the challenge. • Petro-piracy (theft from tankers) is becoming a greater problem e.g. in the Gulf of Guinea therefore challenges relating to piracy have evolved. • Piracy is difficult to eradicate due to links to organised crime networks which are extensive and well-disguised e.g. through money laundering. • Piracy v other political challenges. a) Depends on the location e.g. dangerous migration across the Mediterranean or fishing 'wars' in the North Sea cannot be compared with piracy in the Gulf of Aden, b) economic cost e.g. additional costs to shipping c) political issues e.g. attacks on foreign nationals leading to negotiations, loss of life. • Geographical location can influence the extent that piracy can be the greatest challenge. Expect case study detail to be used to offer evidence for and against the statement.

Question			Answer	Mark	Guidance
4	(a)		**Explain two ways in which soil characteristics can affect food security.** • Soils are the mixture of mineral and organic matter in which crops grow (✓); they supply water, nutrients and material in which root systems can develop (✓). • Soils are the mixture of mineral and organic matter in which crops grow (✓). Without soil plants cannot grow (unless an artificial replacement is found as in high-tech glasshouse systems) (✓). • Soil depth, drainage, texture, structure, pH and mineral content influence food production (✓), and many essential nutrients – mainly nitrogen, phosphorus, potassium and calcium (✓) – are absorbed from soil by plant roots (✓)	**4** **AO1 x4**	**AO1 - 4 marks** 2 x 1 (✓) for each way in which soil characteristics can affect food security 2 x 1 (✓) for each explanation point Only two ways can be credited.
4	(b)		**Examine the role of food retailers in influencing the global food system.** **Level 3 (5-6 marks)** Demonstrates **thorough** knowledge and understanding of the role of food retailers in influencing the global food system (AO1). **Place-specific** details should be **accurate** with the amount helping determine where within the level the response lies. Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy as to the role of food retailers in influencing the global food system (AO2).	**6** **AO1 x3** **AO2 x3**	**AO1 - 3 marks** Knowledge and understanding of the role of food retailers in influencing the global food system could potentially include: • Fast-food retailers such as McDonalds has led to dietary change e.g. in China where there is an emerging middle class; meat consumption here has increased six-fold in 30 years. • Advertising provided by such retailer's changes food consumption patterns quickly creating more demand for meat and dairy products in particular. • Retailers also influence agriculture through consumer demands e.g. rise in cattle ranching in South America.

			Level 2 (3-4 marks)
			Demonstrates **reasonable** knowledge and understanding of the role of food retailers in influencing the global food system (AO1).
			
			Place specific material is present which is **partially accurate** with the amount helping determine where within the level the response lies.
			
			Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy as to the role of food retailers in influencing the global food system (AO2).
			
			Level 1 (1-2 marks)
			Demonstrates **basic** knowledge and understanding of the role of food retailers in influencing the global food system (AO1).
			
			Little or no **place specific** material is present and/or is inaccurate.
			
			Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy as to the role of food retailers in influencing the global food system (AO2).
			
			0 marks
			No response or no response worthy of credit.
					• Retailers influencing the availability of seasonal produce.
					• Recent changes by food retailers influencing healthy eating options.
					• TNCs such as Tesco and Wal-Mart
					  ○ Major role in food supply chains e.g. chosen suppliers/farmers who follow production rules;
					  ○ Aim for maximum profit gain; distribution globally.
					• TNCs often target investment opportunities e.g. EDCs with an emerging middle class and large populations.
					• The rise of Fair Trade and sustainable food production in ACs with the recent rise in environmental concern e.g. Iceland + palm oil advert.
					
					AO2 - 3 marks
					Application of knowledge and understanding to analyse the role of food retailers in influencing the global food system could potentially include:
					• Recognition of positive feedback whereupon dietary changes also serve to attract further fast-food retailers which accelerates changes in the food system globally.
					• Reasons for influences of retailers on the global food system e.g. maximise profit, quality control, meet consumer demands.

4	**(c)**	**(i)**	**Study Fig. 4, which shows a fenced area of the Karoo Desert in South Africa.** **Using evidence from Fig.4, identify differences in the vegetation either side of the fence.**	**4** **AO3 x4**	4 x 1 mark (✓) for correct identification of differences in the landscape either side of the fence. Specific use of the evidence from Figure 4 should be mentioned within the answer.

			• Grass/ vegetation: abundant on left side of the photograph and not on right (✓); grass (fairly long) on left, no grass on right (✓) • Height of shrubs: taller on left than right(✓) • Number of shrubs: at least 10 shrubs in the foreground on the left, none on the right. (✓) • Bare ground: the right side - approximately 70% bare, dry ground (✓), 0% on left side(✓) • Trees: the background of the right part of the photograph has trees, which are not as evident in the left part (✓)		

4	**(c)**	**(ii)**	**Using evidence from Fig. 4, analyse reasons for the differences identified in (c)(i).**
			
			Level 3 (5-6 marks)
			Demonstrates **thorough** application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to reasons for differences identified in (c)(i) (AO2).
			
			Demonstrates **thorough** investigation and interpretation of the resource to fully evidence identified in (c)(i). There must be strong ideas linking resource evidence to the possible reasons for differences identified in (c)(i) (AO3).
			
			Level 2 (3-4 marks)
			Demonstrates **reasonable** application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to reasons for differences identified in (c)(i) (AO2).
			
			Demonstrates **reasonable** investigation and interpretation of the resource to fully evidence differences identified in (c)(i). There must be good ideas linking resource evidence to the possible reasons for
				6
				AO2 x3
				AO3 x3
					AO2 - 3 marks
					Application of knowledge and understanding to analyse the reasons for the differences identified in (c)(i). could potentially include:
					• Causes of desertification e.g.:
					  ○ Overgrazing: livestock such as goats or sheep exceed the carrying capacity of the land so vegetation is unable to grow.
					  ○ Exhaustion of land from overuse: soil nutrients are depleted and harvesting leaves the soil bare and susceptible to wind and water erosion.
					  ○ Fires: large areas are cleared to create new farmland which leads to degradation.
					
					AO3 - 3 marks
					Evidence from the photographs of reasons for differences identified in (c)(i) could potentially include:
					• The fence suggests livestock control; possibly on the right overgrazing is taking place.
					• Land degradation is evident from bare earth and the lack of vegetation

			differences identified in (c)(i) (AO3). **Level 1 (1-2 marks)** Demonstrates **basic** application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to reasons for differences identified in (c)(i) (AO2). Demonstrates **basic** investigation and interpretation of the resource to fully evidence differences identified in (c)(i). There must be some ideas linking resource evidence to the possible reasons for differences identified in (c)(i) (AO3). **0 marks** No response or no material worthy of credit.		• Abundant vegetation on the left side evidences alternative farming practices which are more sustainable and have not exhausted the land.
4	**(d)**		**'Food aid is the least effective method for tackling food insecurity'. To what extent do you agree?** **Level 4 (10–12 marks)** Demonstrates **comprehensive** and accurate knowledge and understanding of food aid and other methods for tackling food insecurity (AO1). Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and convincing evaluation offering secure judgements leading to rational conclusions that are evidence based as to the effectiveness of food aid as a method for tackling food insecurity (AO2). **Level 3 (7-9 marks)** Demonstrates **thorough** and mainly accurate knowledge and understanding of food aid and other methods for tackling food insecurity (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation offering	**12** **AO1 x6** **AO2 x6**	**AO1 - 6 marks** Knowledge and understanding of food aid and other methods for tackling food insecurity could potentially include: • Mention of examples such as bilateral agreements between governments, the work of international agencies such as the WFP, and the storing and distribution of major food staples such as rice; types include project food aid or emergency or relief food aid. • In 2011 there was a major review of food aid through the FAC (Food Aid Convention) – many questioned the effectiveness of food aid. • The main benefit is that it saves lives in emergency situations. • Problems include creating dependency, putting farmers in recipient countries out of business, and creating power imbalances between donor and recipient nations. • Other strategies for tackling food insecurity are likely to be mentioned e.g. top-down initiatives

			generally secure judgements with some link between rational conclusions and evidence as to the effectiveness of food aid as a method for tackling food insecurity (AO2). **Level 2 (4-6 marks)** Demonstrates **reasonable** and some accurate knowledge and understanding of food aid and other methods for tackling food insecurity (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation offering generalised judgements and conclusions with limited links to evidence as to the effectiveness of food aid as a method for tackling food insecurity (AO2). **Level 1 (1-3 marks)** Demonstrates **basic** and/or inaccurate knowledge and understanding of food aid and other methods for tackling food insecurity (AO1). Demonstrates **basic** application of knowledge and understanding offering either unsupported or minimal if any evaluation. Judgements and conclusions, if any, are simplistic regarding the effectiveness of food aid as a method for tackling food insecurity (AO2). **0 marks** No response or no material worthy of credit.		such as economic development and agricultural restructuring; education, technological strategies e.g. GM crops; appropriate methods e.g. rainwater harvesting etc. **AO2 - 6 marks** Application of knowledge and understanding to evaluate the effectiveness of food aid as a method for tackling food insecurity could potentially include: <u>Benefits</u> • Food aid has saved lives in emergency situations e.g. following the Nepal Earthquake in 2015. • Proper use can save lives, protect livelihoods and promote recovery following disasters. <u>Problems</u> • Often food aid reflects the interests of the donor countries as opposed to the recipients' needs e.g. donor-driven uses food aid as a vehicle to dispose of surpluses from ACs e.g. the USA, Canada, the EU etc., creating geopolitical ties which may not be favourable to the LIDC. • Creates a culture of food aid dependency for recipient countries. • A flooding of markets in LIDCs can put indigenous farmers out of business. Expect case study detail to be used to offer evidence for and against the statement e.g. emergency food aid in Nepal.

Question			Answer	Mark	Guidance
5	(a)		**Explain two causes of volcanic activity at hot spots.** A hot spot is a fixed area of intense volcanic activity where magma from a rising mantle plume reaches the Earth's surface (✓).As the plate moves over the plume, volcanoes that were once active become dormant and then extinct (✓) with the area directly above the plume being the most active. Continental drift and the movement of a plate over a plume creates a chain of volcanic islands (✓), for example the movement of the Pacific plate northwest at an average rate of 10cm per year has created the basaltic Hawaiian Islands (✓).	**4** **AO1 x4**	2 x 1 (✓) for each cause of volcanic activity at hot spots. 2 x 1 (✓) for each explanation point Only two causes can be credited. Credit the use of diagrams in showing the relationship between plate movement and vulcanicity. Credit the use of examples.
5	(b)		**Examine how and why the frequency of tectonic hazards globally has changed over time.** **Level 3 (5-6 marks)** Demonstrates **thorough** knowledge and understanding of the frequency of tectonic hazards and change over time (AO1). **Place-specific** details should be **accurate** with the amount helping determine where within the level the response lies. Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy as to how and why the frequency of tectonic hazards globally has changed over time (AO2). **Level 2 (3-4 marks)**	**6** **AO1 x3** **AO2 x3**	**AO1 - 3 marks** Knowledge and understanding of the frequency of tectonic hazards and change over time could potentially include: • The number of tectonic hazards has increased over the past 50 years and now averages around 30 per year globally. • There are seemingly more tsunamis in the past two decades than previously, including the Sumatra-Andaman tsunami of 2004, the Tōhoku tsunami of 2011 and the Sulawesi tsunami of 2018. • In terms of fatalities, numbers affected and economic cost, a few years stand out as being particularly disastrous, including 2012. **AO2 - 3 marks** Application of knowledge and understanding to analyse how and why the frequency of tectonic hazards globally has changed over time could potentially include:

			Demonstrates **reasonable** knowledge and understanding of the frequency of tectonic hazards and change over time (AO1). **Place specific** material is present which is **partially accurate** with the amount helping determine where within the level the response lies. Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy as to how and why the frequency of tectonic hazards globally has changed over time (AO2). **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of the frequency of tectonic hazards and change over time (AO1). Little or no **place specific** material is present and/or is inaccurate. Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy as to how and why the frequency of tectonic hazards globally has changed over time (AO2). **0 marks** No response or no response worthy of credit.		• Changing definitions or differing definitions between sources of what constitutes as a disaster means that the events which are included in global statistics gives the illusion that the number of hazards has increased. • Events are more reported than previously; we have instant access to 24 hour news which also gives the illusion that the number of events has increased. Such events are often reported by the media due to public interest, and as such there is also an element of over-selection of these types of events. • Equipment for recording tectonic events has improved which means that seismometers identify much smaller tremors than previously which may add to the global statistics. • Humans, and reporting equipment, are present in many more parts of the globe than previously which means that few events escape identification and recording.

5	**(c)**	**(i)**	**Study Fig 5, which shows the town of Amatrice in central Italy before and after the 2016 earthquake.** **Using evidence from Fig.5, identify evidence of the impact of the 2016 earthquake.** • Access made difficult (✓)**:** centre of right hand photograph: the road has changed: course, the road markings have gone and the top layer of tarmac is no longer visible (✓) • Property (both businesses and homes) severely damaged (✓)**:** left of photograph: the houses which were structurally sound in photograph A are a pile of broken and scattered debris in photograph B (✓). • Unemployment (✓) created as a result of damage to local businesses (✓)e.g. restaurants • Increase in the number of people made homeless (✓)due to damage of residential property(✓). • Infrastructure damage (✓): cable dangling on the left which probably provided electricity to the buildings (✓). • Demand for volunteers (✓): bottom of photograph: there are more people in photograph B, possibly to volunteer to help in the clear up which requires their time and availability (✓).	**4** **AO3 x4**	2 x 1 mark (✓) for correct identification of evidence of the impact of the 2016 earthquake. 2 x 1 mark (✓) for each explanation point. Use of the resource should be mentioned within the answer.
5	**(c)**	**(ii)**	**Using evidence from Fig.5, analyse strategies that could be used to manage hazards from earthquakes in Advanced Countries.** **Level 3 (5-6 marks)**	**6** **AO2 x3** **AO3 x3**	**AO2 - 3 marks** Application of knowledge and understanding of strategies that could be used to manage hazards from earthquakes in ACs could potentially include:

			Demonstrates **thorough** application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to strategies that could be used to manage hazards from earthquakes in ACs (AO2).
			
			Demonstrates **thorough** investigation and interpretation of the resource to fully evidence strategies that could be used to manage hazards from earthquakes in ACs. There should be strong ideas linking resource evidence to strategies that could be used to manage hazards from earthquakes in ACs (AO3).
			
			Level 2 (3-4 marks)
			Demonstrates **reasonable** application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to strategies that could be used to manage hazards from earthquakes in ACs (AO2).
			
			Demonstrates **reasonable** investigation and interpretation of the resource to fully evidence strategies that could be used to manage hazards from earthquakes in ACs. There must be good ideas linking resource evidence to strategies that could be used to manage hazards from earthquakes in ACs (AO3).
			
			Level 1 (1-2 marks)
			Demonstrates **basic** application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to strategies that could be used to manage hazards from earthquakes in ACs (AO2).
			
			Demonstrates **basic** investigation and interpretation of the resource to fully evidence strategies that could be used to manage hazards from earthquakes in ACs. There must be some ideas linking resource evidence to
					• Building design and strength: earthquake-proof buildings with cross-bracing or pivots minimise the damage due to being able to move flexibly during a seismic event. Rigid structures are more likely to experience damage and therefore collapse during an earthquake.
					• Education: practicing earthquake drills and preparing earthquake emergency kits minimises the number of fatalities due to people understanding what to do during a seismic event.
					• Preparation for secondary hazards:
					  ○ Avalanche clearance or barriers: reduces further casualties from avalanches or landslides during or after a seismic event and improves access to remote areas.
					  ○ Emergency gas shut offs: prevents fires after an earthquake has occurred.
					• Emergency procedure: fast and effective emergency services can reduce further casualties.
					
					Do not credit prediction.
					
					AO3 - 3 marks
					Evidence from interpretation of the resource could potentially include:
					• The buildings to the left of the photographs clearly lacked earthquake-proof design; they appear to be relatively old in the before photograph and as such it is unlikely that they were made using earthquake-proof technology.
					• Photograph to the right: the road has been cleared by emergency services and/or

			strategies that could be used to manage hazards from earthquakes in ACs. (AO3). **0 marks** No response or no material worthy of credit.		volunteers to allow access to damaged parts of the town. • There are four people in the foreground of the after picture, more in the background, who are likely helping with the clear up operation to minimise deaths from people trapped during the event.
5	**(d)**		**"Tsunamis are the most damaging hazard generated by earthquakes". To what extent do you agree?** **Level 4 (10–12 marks)** Demonstrates **comprehensive** and accurate knowledge and understanding of hazards generated by earthquakes (AO1). Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and convincing evaluation offering secure judgements leading to rational conclusions that are evidence based of the extent to which tsunamis are the most damaging of the hazards generated by earthquakes. (AO2). **Level 3 (7-9 marks)** Demonstrates **thorough** and mainly accurate knowledge and understanding of hazards generated by earthquakes (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation offering generally secure judgements with some link between rational conclusions and evidence of the extent to which tsunamis are the most damaging of the hazards generated by earthquakes (AO2). **Level 2 (4-6 marks)** Demonstrates **reasonable** and some accurate knowledge and understanding of hazards generated by	**12** **AO1 x6** **AO2 x6**	**AO1 - 6 marks** Knowledge and understanding of the hazards generated by earthquakes could potentially include: • Ground shaking and displacement: horizontal movements tend to create the most damage to buildings and infrastructure. • Liquefaction: fine-grain sediments behave like liquids and so lose their strength. • Landslides and avalanches: ground shaking and liquefaction can cause slope failure in high relief regions e.g. the Himalayas. • Tsunamis: underwater earthquakes cause the sea bed to rise vertically, displacing the water above it. High velocities and wave shoaling at the coast cause waves arrive unexpectedly and to be as high as 30 metres, both of which add to the damage created. Credit use of relevant case study detail. Not all hazards need to be considered to achieve full marks. **AO2 - 6 marks** Application of knowledge and understanding to evaluate the extent to which tsunamis are the most damaging of all the hazards generated by earthquakes could potentially include: Evaluation of damage caused by each hazard

			earthquakes (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation offering generalised judgements and conclusions with limited links to evidence of the extent to which tsunamis are the most damaging of the hazards generated by earthquakes (AO2). **Level 1 (1-3 marks)** Demonstrates **basic** and/or inaccurate knowledge and understanding of hazards generated by earthquakes (AO1). Demonstrates **basic** application of knowledge and understanding offering either unsupported or minimal if any evaluation. Judgements and conclusions, if any, are simplistic regarding the extent to which tsunamis are the most damaging of the hazards generated by earthquakes (AO2). **0 marks** No response or no material worthy of credit.		<u>In agreement with the statement:</u> Areas obliterated by amount of water; difficulties detecting due to high velocities and long wavelengths/ low heights; radial spread means large areas of coastline are affected; too strong and/or high for tsunami walls to contain; rebuild creates temporary increase in vulnerability; contamination can cause disease e.g. cholera. <u>Disagreement with the statement:</u> Seismometers and buoys help in prediction and therefore preparation; sea walls offer some protection; ground shaking and displacement occur more frequently so cause more global damage; landslides and avalanches restrict access to further areas but tsunamis are more localised; less immediate preparation time with ground shaking and displacement; recognition that the hazards are not mutually exclusive; significant role of preparation makes it difficult to provide a generalised answer. Geographical location of places and proximity to plate tectonics can influence the damage caused. Candidates need to weigh up tsunami damage against that of other hazards to acknowledge “the extent of agreement”.

Question			Answer	Mark	Guidance

6	(a)		**With reference to Fig.6, suggest how rising sea level might influence placemaking.**
			
			Level 3 (6-8 marks)
			Demonstrates **thorough** knowledge and understanding of rising sea level and placemaking (AO1).
			
			Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how rising sea level might influence placemaking (AO2).
			
			This will be shown by including **well-developed** ideas linking resource evidence of rising sea level to placemaking.
			
			There are clear attempts to make synoptic links between content from different parts of the course of study.
			
			Level 2 (3-5 marks)
			Demonstrates **reasonable** knowledge and understanding of rising sea level and placemaking (AO1).
			
			Demonstrates **reasonable** application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how rising sea level might influence placemaking (AO2).
				8
				AO1 x4
				AO2 x4
					AO1 - 4 marks
					Knowledge and understanding of sea level rise and placemaking could potentially include:
					
					• Ways in which sea level rise may affect urban areas such as:
					  ○ Built environment e.g. inundation of low-lying land, flooding roads, offices, houses; damage from debris and mud on roads and walls after the water has subsided, then reduces ease of transport
					  ○ Socio-economic: deterring investment and immigration; deterring tourists and reducing income from tourism; emigration to less vulnerable areas e.g. cities at higher altitudes.
					• Placemaking involves:
					  ○ Built environment: housing developments; transport improvements; change in street landscape e.g. widening streets, pedestrianizing areas, planting trees, installing more street furniture; art e.g. graffiti; flagship projects.
					  ○ Socio-economic: investing in businesses; marketing the area with a new image and identity; providing more education housing opportunities.
					• Allow additional reference to case studies.
					
					AO2 - 4 marks

			This will be shown by including **developed** ideas linking resource evidence of rising sea level to placemaking. There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant. **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of sea level rise and placemaking (AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how rising sea level might influence placemaking (AO2). There will be **simple** ideas linking resource evidence of rising sea level to placemaking. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No response or no response worthy of credit		Application of knowledge and understanding to interpret how rising sea level might influence placemaking could potentially include: • Flood defences: inundation of the land creates the need for defences e.g. the Thames Barrier in London which affects the aesthetics of the city. This then may go on to deter tourists if it is an area famed for an attractive coastline or reassure investors that the area is safe, preventing a decline in investment. • Infrastructure: transport which is less affected by frequent inundation from the sea, e.g. encouragement for people to ride bikes, or train tracks or roads being raised higher on bridges than the predicted sea level rise; drains and sewers reconfigured to prevent overground contamination during floods. • Reimaging/ rebranding: representing the city to prevent a decline in investment or tourism, e.g. publicising other areas of the city which are likely to be of interest other than the seafront. • Emergency services: relocated away from the coastline to areas which are both at higher altitude whilst being close to the population. • Property development: town planners may need to encourage property developers to focus new-builds on areas which are low risk from flooding. • Green spaces: integrated into the city design to allow water to infiltrate and be stored during flood events. • Reference to the figure could include the mention of the water rising around high-rise buildings which contributes significantly to New York's identity; increased inundation along roads; increased need for bridges and green spaces.
6	**(b)**		**Examine how increases in global mean temperatures can influence weathering processes within ONE landscape system that you have studied.** **Level 3 (6-8 marks)**	**8** **AO1 x4** **AO2 x4**	**AO1 - 4 marks** Knowledge and understanding of increases in global mean temperatures and weathering processes within one landscape system could potentially include:

			Demonstrates **thorough** knowledge and understanding of increases in global mean temperatures and weathering processes within one landscape system (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how increases in global mean temperatures can influence weathering processes in ONE landscape system (AO2). There must be **well-developed** ideas of how increases in global mean temperatures can influence weathering processes. There are clear attempts to make synoptic links between content from different parts of the course of study. **Level 2 (3-5 marks)** Demonstrates **reasonable** knowledge and understanding of increases in global mean temperatures and weathering processes within one landscape system (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how increases in global mean temperatures can influence weathering processes in ONE landscape system (AO2). There must be **developed** ideas of how increases in global mean temperatures can influence weathering processes. There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant. **Level 1 (1-2 marks)**		• Detail about the expected change in temperature e.g. the globally averaged combined land and ocean surface temperature has shown a warming between 0.65 and 1.06°C from 1880 to 2012; the polar regions are warming faster than the global mean etc (taken from the IPCC 5th assessment report). • Weathering processes include physical/mechanical eg freeze-thaw, thermal expansion, chemical eg oxidation, solution, biological eg chelation, growth of plant roots Candidates demonstrate that they have knowledge and understanding of some of these in the context of their chosen landscape system. **AO2 - 4 marks** Application of knowledge and understanding to analyse how increases in global mean temperatures can influence weathering processes in ONE landscape system. • Temperature is an important factor in rate of weathering • As temperature rises weathering often increases; particularly true of chemical weathering (Van't-Hoff's Law) but carbonation can be more effective at lower temperatures. • Weathering contributes to landform development. Examples from chosen landscape system. • Increased temperatures can contribute to extreme weather events which in turn have an impact on e.g. weathering may increase/ decrease in response to extreme weather becoming more intense and frequent; ablation exceeds accumulation causing glacial retreat; decreases hydration, oxidation and solutions leads to desertification in drylands.

			Demonstrates **basic** knowledge and understanding of increases in global mean temperatures and weathering processes within one landscape system (AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how increases in global mean temperatures can influence weathering processes in ONE landscape system (AO2). This will be shown by including **simple** ideas of how increases in global mean temperatures can influence weathering processes. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No response or no response worthy of credit.		
7	**(a)**		**With reference to Fig. 7, suggest how opportunities for disease mitigation can be influenced by the rebranding of a place.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of disease mitigation and rebranding (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how for disease mitigation can be influenced by the rebranding of a place (AO2). This will be shown by including **well-developed** ideas linking resource evidence of opportunities for disease mitigation to rebranding	**8** **AO1 x4** **AO2 x4**	**AO1 - 4 marks** Knowledge and understanding of disease mitigation and rebranding could potentially include: o Visible evidence – coloured paint, quality of structures. • Disease mitigation strategies include: o Education programmes o Sanitation of water o Appropriate waste disposal (both refuse and sewage) o Increase in doctors per thousand and health care clinics o Vaccination and screening programmes • Expect reference to case studies. **AO2 - 4 marks** Application of knowledge and understanding to interpret how opportunities for disease mitigation can be

			There are clear attempts to make synoptic links between content from different parts of the course of study. **Level 2 (3-5 marks)** Demonstrates **reasonable** knowledge and understanding of disease mitigation and rebranding (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how for disease mitigation can be influenced by the rebranding of a place (AO2). This will be shown by including **developed** ideas linking resource evidence of opportunities for disease mitigation to rebranding. There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant. **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of disease mitigation and rebranding (AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how for disease mitigation can be influenced by the rebranding of a place (AO2). There will be **simple** ideas linking resource evidence of opportunities for disease mitigation to rebranding. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No response or no response worthy of credit		influenced by the rebranding of a place could potentially include: • Improve quality of life for the inhabitants by setting up local scale healthcare programmes such as healthcare centre which educate the population about disease prevention and response. • Reduce the likelihood of disease diffusion by reducing sanitation problems (e.g. waste collection or by appropriate sewage disposal e.g. through sewers) and by improving water quality (e.g. having potable water standpipes and water treatment plants). • The attraction of tourists would also provide an incentive to improve disease mitigation as they provide further investment opportunities through a multiplier effect. • A community focus brings the two themes of disease mitigation and rebranding together - grassroots rebranding is likely to place the community in the centre as the focus which also places their wellbeing as a priority, therefore making education and vaccination programmes more prevalent. • The risk of injury and therefore diseases such as tetanus or sepsis are less due to the walkways being reinforced and safer. • Mention may be made to mental health due to the quality of life and built environment improving. • Reference to the figure could include the following: the waterway in the foreground of the 'before' picture is likely to have been cleaned up, both physically by removing litter and in terms of water quality through a treatment programme; the roofing and stairs of the houses have been improved making them safer e.g. damp, ventilation, possibly water quality; some buildings may have changed function to bring about a community focus e.g. drop-in healthcare clinics.

7	**(b)**		**Examine how relocation diffusion of diseases could be influenced by human activities in ONE landscape system that you have studied.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of relocation diffusion of diseases and human activities in one landscape system (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how relocation diffusion of diseases could be influenced by human activities in ONE landscape system (AO2). There must be **well-developed** ideas of how relocation diffusion of diseases could be influenced by human activities. There are clear attempts to make synoptic links between content from different parts of the course of study. **Level 2 (3-5 marks)** Demonstrates **reasonable** knowledge and understanding of relocation diffusion of diseases and human activities in one landscape system (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how relocation diffusion of diseases could be influenced by human activities in ONE landscape system (AO2). There must be **developed** ideas of how relocation diffusion of diseases could be influenced by human activities.	**8** **AO1 x4** **AO2 x4**	**AO1 - 4 marks** Knowledge and understanding of relocation diffusion of diseases and human activities in one landscape system could potentially include: <u>Disease diffusion:</u> • Socioeconomic and political barriers to diffusion e.g. political borders, curfews, quarantines. • Possible mention of Hägerstrand's diffusion model including the neighbourhood effect, the number of infected people and physical barriers. • Human activities in one landscape system include management strategies e.g. groynes, managed retreat, dams, climate change mitigation; tourism and recreation; conservation. Candidates demonstrate that they have knowledge and understanding of some of these in the context of their chosen landscape system. **AO2 - 4 marks** Application of knowledge and understanding to analyse how relocation diffusion of diseases could be influenced by human activities in ONE landscape system could potentially include: • Tourism management: managing numbers to prevent damage to fragile ecosystems such as sand dunes and glaciers – reduces probability of relocation diseases. • Climate change mitigation: to reduce sea level rise, glacial retreat, increased aridity may involve a reduction of international travel – reduces probability of relocation diseases. • Restricting human activity**:** e.g. extraction of resources or road building in wilderness, areas such as the Arctic National Wildlife Refuge or Utah, USA

			There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant. **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of relocation diffusion of diseases and human activities in one landscape system (AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how relocation diffusion of diseases could be influenced by human activities in ONE landscape system (AO2). This will be shown by including **simple** ideas of how relocation diffusion of diseases could be influenced by human activities. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No response or no response worthy of credit.		restricts relocation diseases spreading through workers relocating there.
8	**(a)**		**With reference to Fig.8, suggest how high levels of biodiversity in inter-tidal ecosystems can influence socio-economic place characteristics.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of inter-tidal ecosystems and socio-economic place characteristics (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how high levels of	**8** **AO1 x4** **AO2 x4**	**AO1 - 4 marks** Knowledge and understanding of inter-tidal ecosystems and socio-economic place characteristics could potentially include: • Organisms within this zone have evolved to cope with sometimes rapid and frequent changes in environmental conditions; zonation leads to high biodiversity's. • Mention may be made regarding salt-marshes as an example, e.g. high biodiversity's due to rapid accumulation of sediment from rivers; high productivity from the nutrients provided by rivers; succession across the zones.

			biodiversity in inter-tidal ecosystems can influence socio-economic place characteristics (AO2). This will be shown by including **well-developed** ideas linking resource evidence of biodiversity in inter-tidal ecosystems to socio-economic place characteristics. There are clear attempts to make synoptic links between content from different parts of the course of study. **Level 2 (3-5 marks)** Demonstrates **reasonable** knowledge and understanding of inter-tidal ecosystems and socio-economic place characteristics (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how high levels of biodiversity in inter-tidal ecosystems can influence socio-economic place characteristics (AO2). This will be shown by including **developed** ideas linking resource evidence of biodiversity in inter-tidal ecosystems to socio-economic place characteristics. There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant. **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of inter-tidal ecosystems and socio-economic place characteristics (AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how high levels of biodiversity in inter-		• Socio-economic place characteristics include employment, income, family status and education. **AO2 - 4 marks** Application of knowledge and understanding to interpret how high levels of biodiversity in inter-tidal ecosystems can influence socio-economic place characteristics could potentially include: • Fishing practices: fishing within the low-tide zone and the collection of shellfish in the high-tide zone can directly provide employment opportunities and therefore increase the income in some areas. • Fishing and foraging of a high diversity of fish and shellfish can lead to the creation of fish markets and seafood restaurants, which may attract tourists due to a place identity and therefore boost employment and income. • Recreational opportunities e.g. boat trips, glass-bottom boats, paddle boarding etc can bring tourism to the area. • Educational and job opportunities arise from the creation of conservation areas, aquariums or sea-life centres which showcase the biodiversity of the inter-tidal zone. • Use of the figure is likely to involve selecting species at particular tide zones to highlight biodiversity and ecosystem goods.

			tidal ecosystems can influence socio-economic place characteristics (AO2). There will be **simple** ideas linking resource evidence of biodiversity in inter-tidal ecosystems to socio-economic place characteristics. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No response or no response worthy of credit		
8	**(b)**		**Examine how far the impacts of climate change are the same for an island community and ONE landscape system that you have studied.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of the impacts of climate change on an island community and one landscape system (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how far the impacts of climate change are the same for an island community and ONE landscape system (AO2). There must be **well-developed** ideas of how far the impacts of climate change are the same for an island community and ONE landscape system. There are clear attempts to make synoptic links between content from different parts of the course of study. **Level 2 (3-5 marks)**	**8** **AO1 x4** **AO2 x4**	**AO1 - 4 marks** Knowledge and understanding of the impacts of climate change on an island community and one landscape system could potentially include: • Climate change impacts include acidification, higher temperatures, rising sea levels, salt contamination, increased frequency of storms/severe weather etc • Impacts of these on an island community include specifically acidification leading to declining fish stocks; sea-level rise creating climate change refugees; salt contamination of fresh water aquifers; inundation and storm surges reducing tourist numbers. Impacts of these on ONE landscape systems include: <u>Coastal landscapes:</u> • **Rising sea-level** leading to greater coastal erosion and flooding (potentially leading to the formation of rias and fjords). • Potential reduction in **tourism** due to sea-level rise directly or anaesthetic sea defences being erected. • **Salt contamination** of fresh water aquifers by rising sea-levels.

			Demonstrates **reasonable** knowledge and understanding of the impacts of climate change on an island community and one landscape system (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how far the impacts of climate change are the same for an island community and ONE landscape system (AO2). There must be **developed** ideas of how far the impacts of climate change are the same for an island community and ONE landscape system. There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant. **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of the impacts of climate change on an island community and one landscape system (AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how far the impacts of climate change are the same for an island community and ONE landscape system (AO2). This will be shown by including **simple** ideas of how far the impacts of climate change are the same for an island community and ONE landscape system. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No response or no response worthy of credit.		• **Acidification** and warming will affect ecosystems leading to an overall reduction in fish stocks. <u>Glaciated landscapes:</u> • Potential reduction in **tourism** due to a loss of snow and ice over in high altitude areas e.g. the European Alps, which will negatively impact upon ski resorts. • Decrease of **water supply** from melting glaciers may result in increased dam-building e.g. Grande Dixence Scheme, Switzerland. • **Freeze-thaw weathering** is likely to increase in high latitude and altitude areas where temperatures rarely exceeded 0°C, and decrease in areas lower latitude and altitude areas where the temperature will rarely dip below 0°C. • Release of methane and carbon dioxide from **permafrost melt** e.g. in Siberia leading to positive feedback in temperature increase. <u>Dryland landscapes:</u> • **Deserts** could expand if the average temperature increases due to less frequent and reliable convection rainfall and more drought; this is likely to decrease hydration, oxidation and solution due to a lack of water. • Decrease of **water supply** due to a reduction in convection rainfall. • Wadis and ephemeral streams may lack water which will affect organisms dependent upon rainfall in semi-arid areas e.g. buffalo and the Lesser Flamingos in Tanzania. • Semi-arid areas are likely to experience an increase in **wildfires**; they are susceptible already and a decrease in precipitation will dry the vegetation and make the area more susceptible. • Rates of **weathering**, mass movement and fluvial erosion will slow.

					• The effectiveness of aeolian erosion and transport will increase causing the **advancement of dunes**. Candidates demonstrate that they have knowledge and understanding of some impacts of climate change in the context of their chosen landscape system. **AO2 - 4 marks** Application of knowledge and understanding to examine how far the impacts of climate change are the same for an island community and ONE landscape system could potentially include: <u>Coastal landscapes - possible examples</u> • Increased inundation of coastal areas by storm surges and an increase in coastal erosion. • Loss of tourism due to inundation or a change in aesthetics due to sea defences. • Acidification leading to fewer fish stocks. • Mention may be made to the higher level of vulnerability of island communities to climate change than many other coastal landscapes due to a reliance on fishing and tourism for income. <u>Glaciated landscapes - possible examples</u> • Decrease in reliable fresh water supplies. • Reduction in tourism. • Changing geomorphological processes e.g. levels of erosion. <u>Dryland landscapes - possible examples</u> • Decrease in reliable fresh water supplies. • Decrease in food supply (soil degradation in drylands and a decrease in fish stocks in island communities). • Changing geomorphological processes e.g. levels of erosion.

9	**(a)**		**With reference to Fig. 9, suggest how TWO strategies to improve food security could affect socio-economic place characteristics in developing countries.**
			
			Level 3 (6-8 marks)
			Demonstrates **thorough** knowledge and understanding of strategies to improve food security and socio-economic place characteristics in developing countries (AO1).
			
			Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how two strategies to improve food security may influence socio-economic place characteristics in developing countries (AO2).
			
			This will be shown by including **well-developed** ideas linking resource evidence of strategies to improve food security to socio-economic place characteristics in developing countries.
			
			There are clear attempts to make synoptic links between content from different parts of the course of study.
			
			Level 2 (3-5 marks)
			Demonstrates **reasonable** knowledge and understanding of strategies to improve food security and socio-economic place characteristics in developing countries (AO1).
				8
				AO1 x4
				AO2 x4
					AO1 - 4 marks
					Knowledge and understanding of strategies to improve food security and socio-economic place characteristics in developing countries could potentially include:
					• The figure acts as a prompt but expect further detail regarding two of the approaches to be provided, this may be through the use of a case study e.g. Cuba
					• Socio-economic place characteristics include employment, income, family status and education.
					• Strategies to improve food security:
					  ○ **Small-scale bottom-up and appropriate approaches** e.g. self-help schemes such as the use of simple tools manufactured locally, rainwater harvesting and sack gardening.
					  ○ **Large-scale technological techniques** e.g. GM crops creating higher yields and pest resistance; water conservation and irrigation schemes to reduce the effects of climate change.
					  ○ **Long-term system redesign** e.g. capacity building where a resilient food system is constructed.
					  ○ **Short-term relief** e.g. food aid donations for those requiring immediate supplies

			Demonstrates **reasonable** application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how two strategies to improve food security may influence socio-economic place characteristics in developing countries (AO2).
			
			This will be shown by including **developed** ideas linking resource evidence of strategies to improve food security to socio-economic place characteristics in developing countries.
			
			There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant.
			
			Level 1 (1-2 marks)
			Demonstrates **basic** knowledge and understanding of strategies to improve food security and socio-economic place characteristics in developing countries (AO1).
			
			Demonstrates **basic** application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how two strategies to improve food security may influence socio-economic place characteristics in developing countries (AO2).
			
			There will be **simple** ideas linking resource evidence of strategies to improve food security to socio-economic place characteristics in developing countries.
			
			There are limited attempts to make synoptic links between content from different parts of the course of study.
			
			0 marks
			No response or no response worthy of credit
					following political unrest or a natural disaster.
					
					AO2 - 4 marks
					Application of knowledge and understanding to interpret how two strategies to improve food security may influence socio-economic place characteristics in developing countries could potentially include:
					• Long-term system redesign
					  ○ Local farmers may be better educated about how to produce high yields of necessary and desirable crops, which also increases income.
					  ○ Employment for local people becomes available in other parts of the supply chain e.g. transport, infrastructure, research and trade.
					• Small-scale bottom-up and appropriate approaches
					  ○ Increase in yields and therefore income for farmers without requiring spending on costly inputs.
					  ○ Farmers learn new skills and methods which increases their knowledge and understanding of agricultural techniques.
					• Large-scale technological techniques
					  ○ Local farmers are potentially put out of business and become unemployed due to expertise being used from ACs.
					  ○ Opportunities for local farmers to learn new skills and to continue their livelihoods due to knowledge and/ or infrastructure being provided by ACs.

					• Short term relief
					  ○ Local farmers can be put out of business due to supply exceeding demand.
					  ○ Reduction in unemployment and faster recovery from a disaster as recipients do not need to find food.

9	**(b)**		**Examine how the globalisation of the food industry impacts on human activities in ONE landscape system that you have studied.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of the globalisation of the food industry and human activities in one landscape system (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how the globalisation of the food industry impacts on human activities in ONE landscape system (AO2). There must be **well-developed** ideas of how the globalisation of the food industry impacts on human activities in ONE landscape system. There are clear attempts to make synoptic links between content from different parts of the course of study. **Level 2 (3-5 marks)** Demonstrates **reasonable** knowledge and understanding of the globalisation of the food industry and human activities in one landscape system (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how the globalisation of the food industry	**8** **AO1 x4** **AO2 x4**	**AO1 - 4 marks** Knowledge and understanding of the globalisation of the food industry and human activities in one landscape system could potentially include: • Detail about the globalisation of the food industry, including production for a growing global population, supply chain, marketing, consumption, waste management and retailers. • Human activities in landscape systems include management strategies e.g. groynes, managed retreat, dams, climate change mitigation; tourism and recreation; conservation. Candidates demonstrate that they have knowledge and understanding of some impacts of globalisation in the context of their chosen landscape system. **AO2 - 4 marks** Application of knowledge and understanding to analyse how the globalisation of the food industry impacts on human activities in ONE landscape system could potentially include: • Demand for food and pressure on land: e.g. deltas, semi-arid land, cattle farming for increased meat and dairy diets – excessive human use for a growing population is likely to degrade soil long term.

			impacts on human activities in ONE landscape system (AO2). There must be **developed** ideas of how the globalisation of the food industry impacts on human activities in ONE landscape system. There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant. **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of the globalisation of the food industry and human activities in one landscape system (AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how the globalisation of the food industry impacts on human activities in ONE landscape system (AO2). This will be shown by including **simple** ideas of how the globalisation of the food industry impacts on human activities in ONE landscape system. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No response or no response worthy of credit.		• Increased hazards e.g. storm surges and avalanches, and weathering and erosion, ablation of glaciers, desertification due to increased food miles and their contribution to climate change. • Management e.g. sea walls protecting inundation affects transportation of sediment and deposition. • Pollution – plastic wrappers often used by TNCs, particularly those operating in EDCs and LIDCs which have laxer environmental regulations. • Roads and infrastructure to transport food can increase melting in high altitude areas and aeolian erosion in drylands where ATV use increases. • Water supply solutions for irrigation – dams increase deposition behind the construction.
10	**(a)**		**With reference to Fig. 10, suggest how earthquake damage and social inequality are linked.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of earthquake damage and social inequality (AO1).	**8** **AO1 x4** **AO2 x4**	**AO1 - 4 marks** Knowledge and understanding of earthquake damage and social inequality could potentially include: • Includes differences in wealth, housing, health etc.

			Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how earthquake damage and social inequality are linked (AO2). This will be shown by including **well-developed** ideas linking resource evidence of earthquake damage to social inequality. There are clear attempts to make synoptic links between content from different parts of the course of study. **Level 2 (3-5 marks)** Demonstrates **reasonable** knowledge and understanding of earthquake damage and social inequality (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how earthquake damage and social inequality are linked (AO2). This will be shown by including **reasonable** ideas linking resource evidence of earthquake damage to social inequality. There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant. **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of earthquake damage and social inequality (AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how earthquake damage and social inequality are linked (AO2).		• Earthquake damage will include landslides, ground shaking, tsunamis, etc **AO2 - 4 marks** Application of knowledge and understanding to analyse how earthquake damage and social inequality are linked could potentially include: • Earthquake damage and housing: High MMI earthquakes destroy almost all housing regardless of location or proofing. • Slums are often located on marginal land e.g. high relief areas which are prone to mass movement damage during earthquakes. More expensive housing tends to be in safer areas and more earthquake-proof. • Spiral of decline/ negative multiplier effect where rebuilding costs and time reinforces low-income statuses. Earthquake damage and education: • High MMI earthquakes destroy almost all schools and universities regardless of building quality which limits education across the **population** • Schools in low-income areas can be located on marginal land e.g. high relief areas which are prone to mass movement damage during earthquakes. • Inequality in the earthquake education e.g. drills and procedures. This is very thorough in ACs such as New Zealand and Japan but occasionally less-so in LIDCs such as Afghanistan. • Earthquake damage and health: ○ High MMI earthquakes destroy almost all healthcare centres regardless of building

			There will be **simple** ideas linking resource evidence of earthquake damage to social inequality. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No response or no response worthy of credit		quality which limits healthcare provision following an earthquake across the population e.g. Sulawesi, Indonesia in 2018 where disinfectant had to be sprayed over the deceased. ○ Healthcare centres in low-income areas can be located on marginal land e.g. high relief areas which are prone to mass movement damage during earthquakes. ○ Inequality in the healthcare provided such that those with less access to healthcare are more vulnerable e.g. potentially less mobile or less resilient to surviving injuries. • Earthquake damage and gender: ○ Women and children affected more due to poorer health generally – more susceptible to disease (maternal health and infant health). ○ Linked to landscape of gender inequality generally. • Use of the figure to link earthquake damage and social inequality e.g. class leveller – if magnitude is high enough then does not discriminate; terrain affected – mass movement greater in high relief areas; building quality meant that poor were affected more; women and children more affected than men; widening gap. Do not double credit the same explanation for multiple factors.

10	**(b)**		**Examine how far people's choice of where to live is influenced by the same factors for volcanically active regions and ONE landscape system that you have studied.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of people's choice for living in volcanically active regions and one landscape system (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how far people's choice of where to live is influenced by the same factors for volcanically active regions and one landscape system (AO2). There must be **well-developed** ideas of how far people's choice of where to live is influenced by the same factors for volcanically active regions and one landscape system. There are clear attempts to make synoptic links between content from different parts of the course of study. **Level 2 (3-5 marks)** Demonstrates **reasonable** knowledge and understanding of people's choice for living in volcanically active regions and one landscape system (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how far people's choice of where to live is influenced by the same factors for volcanically active regions and one landscape system (AO2). There must be **developed** ideas of how far people's choice of where to live is influenced by the same factors for volcanically active regions and one landscape system.	**8** **AO1 x4** **AO2 x4**	**AO1 - 4 marks** Knowledge and understanding of people's choice for living in volcanically active regions and one landscape system could potentially include: • Reasons for living in volcanically active regions include intensive farming can be practiced due to the fertile soil from weathered lava, particularly in wet tropical regions; lack of choice; tourism; geothermal energy; mineral mining; research. • Reasons for living in coastal/ glaciated/ dryland regions include trading; energy provision (tidal, wave, HEP, solar); tourism and recreation; constructing transport routes; fishing and farming; extraction of minerals and oil; research; desirable climate; lack of choice. • Credit relevant case study detail if included. **AO2 - 4 marks** Application of knowledge and understanding to analyse how far people's choice of where to live is influenced by the same factors for volcanically active regions and one landscape system could potentially include: • Agriculture e.g. deltas, livestock herding in drylands. • Income opportunities from tourism and recreation (beach holidays, skiing, hiking, desert excursions etc). • Improved water supply due to relief rainfall in glaciated regions. • Energy provision from tidal, wave, HEP, solar, geothermal. • Lack of choice.

			There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant. **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of people's choice for living in volcanically active regions and one landscape system (AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how far people's choice of where to live is influenced by the same factors for volcanically active regions and one landscape system (AO2). This will be shown by including **basic** ideas of how far people's choice of where to live is influenced by the same factors for volcanically active regions and one landscape system. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No response or no response worthy of credit.		

Question			Answer	Mark	Guidance

11*			**To what extent has the global balance of anthropogenic emissions of greenhouse gases changed in recent history?**
			
			AO1
			Level 4 (8-10 marks)
			Demonstrates **comprehensive** knowledge and understanding of the global balance of anthropogenic emissions of greenhouse gases and changes in recent history.
			
			Level 3 (5-7 marks)
			Demonstrates **thorough** knowledge and understanding of the global balance of anthropogenic emissions of greenhouse gases and changes in recent history.
			
			Level 2 (3-4 marks)
			Demonstrates **reasonable** knowledge and understanding of the global balance of anthropogenic emissions of greenhouse gases and changes in recent history.
			
			Level 1 (1-2 marks)
			Demonstrates **basic** knowledge and understanding of the global balance of anthropogenic emissions of greenhouse gases and changes in recent history.
			
			0 marks
			No response or no response worthy of credit.
			
			AO2
			Level 4 (8-10 marks)
			Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how the global balance of anthropogenic emissions of greenhouse gases has changed in recent history.
				20
				AO1 x10
				AO2 x10
					AO1 - 10 marks
					Knowledge and understanding of the global balance of anthropogenic emissions of greenhouse gases and changes in recent history could potentially include:
					• Anthropogenic emissions of greenhouse gases globally:
					  ○ Carbon dioxide
					  ○ CFCs
					  ○ Methane
					• Global balance now: CO_2 - USA and Australia both emit an average of 17 tonnes/ year per person of carbon dioxide, compared with 5.4 tonnes by China and 1.4 tonnes by India.
					  ○ Global GHG emissions. EDCs produce a substantial proportion, for example, China produces an estimated 28.6% of the global GHG emissions which is the highest when not provided as a per capita measurement.
					  ○ LIDCs produce few greenhouse gas emissions but stand to suffer the most from their impacts.
					• Changes of emissions over the last 200 years
					  ○ Carbon dioxide was the main greenhouse gas emission - 280ppm before 1800 . Today it accounts for more than 75% of all anthropogenic greenhouse gas emissions; 400ppm in 2015 and nearly half the increase has occurred since 1960.
					  ○ Methane is 25x more potent than carbon dioxide and is being produced in higher quantities today (1735ppb in 1984; 1890ppm in 2009).
					
					AO2 - 10 marks
					Application of knowledge and understanding to analyse and evaluate the extent to which the global balance of anthropogenic emissions of greenhouse gases has changed in recent history could potentially include:
					• Changes in emissions related to development status:
					  ○ ACs have produced the most emissions cumulatively in the last 200 years; AC contribution

			Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to the extent to which the global balance of anthropogenic emissions of greenhouse gases has changed in recent history. Level 3 (5-7 marks) Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows how the global balance of anthropogenic emissions of greenhouse gases has changed in recent history. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to the extent to which the global balance of anthropogenic emissions of greenhouse gases has changed in recent history. Level 2 (3-4 marks) Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows how the global balance of anthropogenic emissions of greenhouse gases has changed in recent history. Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence as to the extent to which the global balance of anthropogenic emissions of greenhouse gases has changed in recent history.		has been the result of developing their economies; they were the first to begin this process at the time of the Industrial Revolution which led to a significant increase in atmospheric carbon dioxide. AC emissions are plateauing or decreasing at present and coal which produces the most carbon dioxide of the three fossil fuels no longer leads. ○ EDCs emissions have changed significantly particularly in the last 50 years - surge in demand for energy (powered largely by coal in China and India): an emerging middle class now with higher disposable incomes; growth of secondary industries/ manufacturing and services; decline of rural employment (using biofuels with limited GHG emissions). ○ LIDCs produce few GHG emissions due to a lack of growth of energy consuming industries so limited change over 200 years. • Reasons for changes in emissions ○ The combustion of fossil fuels during the Industrial Revolution - main GHG at this time. Today, demand for energy globally and technological advances in transport and manufacturing (particularly in EDCs) explain GHG increase; fossil fuels still supply 87% of the world's energy. ○ Deforestation which reduces the carbon sink and, with other land use changes accounts for 30% of GHG emissions. ○ Methane production is higher today on account of rice paddies in Asia (a quarter of the world's population) + ruminant farming (increased demand for animal products in EDCs) ○ The current reduction in AC emissions is largely due to a growing concern over climate change and greater global interest in mitigation, (school climate strikes March 2019) e.g. in 2017 the UK government planned to: invest £900 million into

			Level 1 (1-2 marks)
			Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows how human the global balance of anthropogenic emissions of greenhouse gases has changed in recent history.
			
			Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to the extent to which the global balance of anthropogenic emissions of greenhouse gases has changed in recent history.
			
			0 marks
			No response or no response worthy of credit.
			
			Quality of extended response
			
			Level 4
			There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.
			
			Level 3
			There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence.
			
			Level 2
			The information has some relevance and is presented with limited structure. The information is supported by limited evidence.
			
			Level 1
			The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.
					renewable and nuclear to meet a 2050 emissions reduction target;
					• Outcomes:
					  ○ global balance of anthropogenic GHG emissions has changed particularly since 1960 where dominance by Europe and N America has been replaced by Asia.
					  ○ increased anthropogenic GHG emissions linked to positive feedback mechanisms which release further greenhouse gases naturally (the melting permafrost in Siberia which releases methane).
					
					Conclusion expected to show how the global balance of anthropogenic emissions of greenhouse gases changed in recent history.

Question			Answer	Mark	Guidance
12*			**Examine the extent to which different stages of economic development affect current socio-economic and environmental impacts of climate change.** AO1 Level 4 (8-10 marks) Demonstrates **comprehensive** knowledge and understanding of different stages of economic development and current socio-economic and environmental impacts of climate change. Level 3 (5-7 marks) Demonstrates **thorough** knowledge and understanding of different stages of economic development and current socio-economic and environmental impacts of climate change. Level 2 (3-4 marks) Demonstrates **reasonable** knowledge and understanding of different stages of economic development and current socio-economic and environmental impacts of climate change. Level 1 (1-2 marks) Demonstrates **basic** knowledge and understanding of different stages of economic development and current socio-economic and environmental impacts of climate change. **0 marks** No response or no response worthy of credit. AO2 Level 4 (8-10 marks)	**20** **AO1 x10** **AO2 x10**	**AO1 - 10 marks** Knowledge and understanding of different stages of economic development and current socio-economic and environmental impacts of climate change could potentially include: <u>Different stages of economic development:</u> • **LIDCs:** lower income e.g. Bangladesh, Niger, Sierra Leone; predominantly primary and secondary industries; fewer healthcare and educational provisions. • **EDCs:** middle income e.g. Brazil, China, India; predominantly secondary industries; average incomes increasing but widening gap between emerging middle class and poor. • **ACs:** high income e.g. UK, the USA, Germany; predominantly tertiary industries but some quaternary; generally accessible healthcare and education for all. <u>Socio-economic and environmental impacts of climate change:</u> <u>Socio-economic:</u> • **Deaths** from increasing hazard frequency e.g. tropical cyclones and drought • **Spread of disease** • **Homelessness** and **climate change refugees** • **Cost** from hazard response and adaptation • **Tourism** negatively affected • **Agriculture** – lower yields and possible need to change crops <u>Environmental:</u> • **Increase in the frequency and magnitude of climatic hazards** e.g. tropical storms, wild fires, flooding. • **Sea-level rise** • **Contamination of land** from salt-water intrusion • **Loss of coastal ecosystems** e.g. mangrove forests and wetlands

			Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how human activities influence the balance between incoming and outgoing energy through the atmosphere. Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to the extent to which human activities influence the balance between incoming and outgoing energy through the atmosphere. Level 3 (5-7 marks) Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows how different stages of economic development affect current socio-economic and environmental impacts of climate change. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to the extent to which different stages of economic development affect current socio-economic and environmental impacts of climate change. Level 2 (3-4 marks) Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows how different stages of economic development affect current socio-economic and environmental impacts of climate change. Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that		Give credit where the content of the answer is two contrasting case studies e.g. Bangladesh and Australia. Many socioeconomic and environmental impacts overlap - expect some crossover in categorisation. **AO2 - 10 marks** Application of knowledge and understanding to analyse and evaluate the extent to which different stages of economic development affect current socio-economic and environmental impacts of climate change could potentially include: <u>Examples of common impacts regardless of different stages of development:</u> • Increase in the frequency and magnitude of coastal flooding from storm surges in the future. • Significant cost, either through adaptation or damage response. • Decline in agricultural productivity. • Loss of coastal ecosystems. <u>Examples of contrasting impacts linked to different stages of development:</u> • The cost of is likely to slow development in LIDCs compared to ACs as they have less money to put towards adaptation and repairs. • LIDCs are more dependent upon primary industries such as fishing and agriculture than ACs and EDCs and so they will be disproportionately more affected by climate change. • A lack of options and often official welfare systems means that the level of homelessness is likely to be higher in LIDCs and EDCs than ACs.

			offers generalised judgements and conclusions, with limited use of evidence as to the extent to which different stages of economic development affect current socio-economic and environmental impacts of climate change. Level 1 (1-2 marks) Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows how different stages of economic development affect current socio-economic and environmental impacts of climate change. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to the extent to which different stages of economic development affect current socio-economic and environmental impacts of climate change. **0 marks** No response or no response worthy of credit. **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2**		• Generally higher life expectancies in ACs means that healthcare could be stretched more in ACs than EDCs and LIDCs e.g. by heat stress. Expect conclusions that consider the extent to which stages of economic development affect impacts.

			The information has some relevance and is presented with limited structure. The information is supported by limited evidence. **Level 1** The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		

Question			Answer	Mark	Guidance
13*			**'At a national scale the socio-economic impacts of a communicable disease are more significant than they are for a non-communicable disease.' Discuss.** AO1 Level 4 (8-10 marks) Demonstrates **comprehensive** knowledge and understanding of the socio-economic impacts of a communicable and a non-communicable disease at a country scale. Level 3 (5-7 marks) Demonstrates **thorough** knowledge and understanding of the socio-economic impacts of a communicable and a non-communicable disease at a country scale. Level 2 (3-4 marks) Demonstrates **reasonable** knowledge and understanding of the socio-economic impacts of a communicable and a non-communicable disease at a country scale. Level 1 (1-2 marks)	**20** **AO1 x10** **AO2 x10**	**AO1 - 10 marks** Knowledge and understanding of the socio-economic impacts of a communicable and a non-communicable disease at a country scale could potentially include (content depends upon the diseases referenced): <u>Socio-economic impacts of communicable diseases e.g. HIV/AIDS, Covid-19, cholera, Ebola or influenza:</u> • **Significant cost** due to early deaths, time off work, treatment from the government/ NHS, the cost of unpaid care and also funding efforts to minimise the spread. • **Social isolation** often due to the need to quarantine. • **Psychological effects** such as anxiety and trauma. • **Deters tourism**, particularly during epidemics when government advice is to not travel. • **Prevents mobility** e.g. restrictions in international travel. • **Reduces inwards investment** • **Punctuated in effects** due to quickly leading to epidemics if not contained. • Often involves a **spiral of decline** where a lack of control leads to further disease spread which makes control more challenging. • In LIDCs, often requires **international aid** to bring to manageable levels.

			Demonstrates **basic** knowledge and understanding of the socio-economic impacts of a communicable and a non-communicable disease at a country scale. **0 marks** No response or no response worthy of credit. AO2 Level 4 (8-10 marks) Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how human activities influence the balance between incoming and outgoing energy through the atmosphere. Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to whether the socio-economic impacts of communicable diseases are more significant than those of non-communicable diseases. Level 3 (5-7 marks) Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows whether the socio-economic impacts of communicable diseases are more significant than those of non-communicable diseases. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to whether the socio-economic impacts of communicable diseases are more significant than those of non-communicable diseases.		<u>Socio-economic impacts of non-communicable diseases e.g. cancer, malaria, heart disease:</u> • **Significant cost** due to early deaths, time off work, treatment from the government/ NHS and the cost of unpaid care. • **Delayed diagnosis and treatments** due to the focus on disease prevention such as Covid-19. • **Social isolation**, particularly if the disease is stigmatised. • **Psychological effects** such as anxiety and trauma. • **Survival rates** often correlate with deprivation. • Occasionally related to **lifestyle** which is difficult to change at a country scale. • **Deters tourism**. **AO2 - 10 marks** Application of knowledge and understanding to analyse and evaluate whether the socio-economic impacts of communicable diseases are more significant than those of non-communicable diseases could potentially include: <u>Examples of how the socio-economic impacts of communicable diseases are more significant than those of non-communicable diseases:</u> • The timescale on which communicable diseases spread means that the socio-economic impacts are often greater in intensity than non-communicable diseases. • Communicable diseases are often more isolating on a country scale e.g. travel restrictions, loss of tourism, loss of inward investment – this means that they can have a greater impact on a country's overall development status. • Communicable diseases can have a more direct impact on food security due to a sudden loss in workforce, particularly in LIDCs. <u>Examples of how the socio-economic impacts of communicable diseases are not more significant than those of non-communicable diseases:</u>

			Level 2 (3-4 marks) Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows whether the socio-economic impacts of communicable diseases are more significant than those of non-communicable diseases. Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence as to whether the socio-economic impacts of communicable diseases are more significant than those of non-communicable diseases. Level 1 (1-2 marks) Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows whether the socio-economic impacts of communicable diseases are more significant than those of non-communicable diseases. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to whether the socio-economic impacts of communicable diseases are more significant than those of non-communicable diseases. **0 marks** No response or no response worthy of credit. **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3**		• Although communicable diseases often occur quickly and at high intensity, non-communicable diseases are more chronic which creates longer-term socioeconomic impacts for countries. • Both create spirals of decline, although these are arguably faster for communicable diseases. • Non-communicable diseases are more closely linked to lifestyle and therefore levels of deprivation and so the impacts are not spread evenly through a country's population. Conclusions are expected which consider whether the socio-economic impacts of communicable diseases are more significant than those of non-communicable diseases.

			There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with limited structure. The information is supported by limited evidence. **Level 1** The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		

Question			Answer	Mark	Guidance

14*			**'Use of medicines from nature continues to be an essential part of disease mitigation'. How far do you agree with this statement?**
			
			AO1
			Level 4 (8-10 marks)
			Demonstrates **comprehensive** knowledge and understanding of use of medicines from nature and disease mitigation.
			
			Level 3 (5-7 marks)
			Demonstrates **thorough** knowledge and understanding of use of medicines from nature and disease mitigation.
			
			Level 2 (3-4 marks)
			Demonstrates **reasonable** knowledge and understanding of use of medicines from nature and disease mitigation.
			
			Level 1 (1-2 marks)
				20
				AO1 x10
				AO2 x10
					AO1 - 10 marks
					Knowledge and understanding of use of medicines from nature and disease mitigation could potentially include:
					
					• Use of medicines from nature – healing properties known for thousands of years. E.g. Hippocrates recorded more than 300 medicinal plants and herbs. The Society of Apothecaries founded the Chelsea Physic Garden in London in 1673. 19th century – first naturally derived medicine extracted from a plant, morphine from poppies; others included quinine and aspirin.
					• Disease mitigation in addition to medicines from plants:
					  ○ chemically manufactured medicinal drugs
					  ○ campaigns and educational programmes on a variety of scales such as those created by the WHO;
					  ○ lifestyle changes e.g. prevention of heart attacks brought on by lack of exercise and poor diets;
					  ○ scientific research to identify diseases e.g. HIV/ AIDS

			Demonstrates **basic** knowledge and understanding of use of medicines from nature and disease mitigation.
			
			0 marks
			No response or no response worthy of credit.
			
			AO2
			Level 4 (8-10 marks)
			Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of whether use of medicines from nature continues to be an essential part of disease mitigation.
			
			Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to whether use of medicines from nature continues to be an essential part of disease mitigation.
			
			Level 3 (5-7 marks)
			Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows whether use of medicines from nature continues to be an essential part of disease mitigation.
			
			Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to whether use of medicines from nature continues to be an essential part of disease mitigation.
			
			Level 2 (3-4 marks)
			Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that
					AO2 - 10 marks
					Application of knowledge and understanding to analyse and evaluate whether use of medicines from nature continues to be an essential part of disease mitigation could potentially include:
					
					• Many modern medicines originate from natural compounds found in wild plants. Today, the active ingredients of many herbal medicines have been extracted in laboratories and synthesised as compounds, including
					  ○ Nicotine from tobacco plants to treat wounds, Alzheimer's, depression
					  ○ Rosy periwinkle from Madagascar (contains 70 alkaloids shown to treat some cancers such as leukaemia)
					
					<u>Agreement with the statement:</u>
					• Plants were clearly the main source of medicine in the past but they continue to have an essential role through providing the compounds for the relief of various symptoms and diseases as highlighted above.
					• The essential nature of medicinal plants is apparent even in city centres today where shops and clinics are dedicated to using them e.g. Holland and Barratt.
					• There is a movement at present away from synthetic products to more holistic and wellbeing type medicines which plants provide e.g. St John's Wort.
					
					<u>Disagreement with the statement:</u>
					• Many compounds that were discovered in plants can now be synthesised in laboratories, - plants may only be required at the beginning of the process.
					• Much disease mitigation is about education and awareness (preventative methods) as opposed to fighting diseases.

			shows whether use of medicines from nature continues to be an essential part of disease mitigation. Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence as to whether use of medicines from nature continues to be an essential part of disease mitigation. Level 1 (1-2 marks) Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows whether use of medicines from nature continues to be an essential part of disease mitigation. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to whether use of medicines from nature continues to be an essential part of disease mitigation. **0 marks** No response or no response worthy of credit. **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2**		• The compounds from plants are often used to relieve symptoms as opposed to tackling the disease itself e.g. aspirin and quinine; the effects are temporary. • Awareness of environmental implications as well as biopiracy so when alternatives to plants are economically available they are/should be used. Conclusions are expected which consider whether the use of medicines continue to be an essential part of disease mitigation.

			The information has some relevance and is presented with limited structure. The information is supported by limited evidence. **Level 1** The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		

Question			Answer	Mark	Guidance

15*			**'The opportunities arising from the use of ocean resources greatly outweigh the threats'. How far do you agree with this statement?**
			
			AO1
			Level 4 (8-10 marks)
			Demonstrates **comprehensive** knowledge and understanding of the opportunities and threats arising from the use of ocean resources.
			
			Level 3 (5-7 marks)
			Demonstrates **thorough** knowledge and understanding of the opportunities and threats arising from the use of ocean resources.
			
			Level 2 (3-4 marks)
			Demonstrates **reasonable** knowledge and understanding of the opportunities and threats arising from the use of ocean resources.
			
			Level 1 (1-2 marks)
			Demonstrates **basic** knowledge and understanding of the opportunities and threats arising from the use of ocean resources.
				20
				AO1 x10
				AO2 x10
					AO1 - 10 marks
					Knowledge and understanding of the opportunities and threats arising from the use of ocean resources could potentially include:
					• Ocean resources include:
					  ○ Biological resources/ natural capital e.g. phytoplankton, krill, fish
					  ○ Non-renewable resources e.g. oil and gas
					  ○ Renewable ocean resources e.g. waves and tides
					  ○ Sea-floor mining e.g. ferrous and non-ferrous deposits
					  ○ Bio-prospecting
					• Expect use of case studies e.g. commercial harvesting of krill or the Gulf of Mexico
					
					AO2 - 10 marks
					Application of knowledge and understanding to analyse and evaluate whether the opportunities arising from the use of ocean resources greatly outweigh the threats, could potentially include:
					
					Opportunities outweigh the threats:
					Economic including
					Versatility a) harvesting krill e.g. for paste, oil or animal feed, b) Oil can be used in the production of many other

			0 marks No response or no response worthy of credit. AO2 Level 4 (8-10 marks) Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of whether the opportunities arising from the use of ocean resources greatly outweigh the threats. Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to whether the opportunities arising from the use of ocean resources greatly outweigh the threats. Level 3 (5-7 marks) Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows whether the opportunities arising from the use of ocean resources greatly outweigh the threats. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to whether the opportunities arising from the use of ocean resources greatly outweigh the threats. Level 2 (3-4 marks) Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows whether the opportunities arising from the use of ocean resources greatly outweigh the threats.		materials e.g. plastic, fertiliser; Oil and gas provision e.g. from the Gulf of Mexico, the Persian Gulf and the North Sea. Drilling rigs are operating in deeper water due to advancing technology so more areas are accessible; Minerals mined e.g. diamonds off the coast of southern Africa which are a valuable resource to sell; often they are in greater concentrations than on land Provision of jobs + Contribution towards GDP + Increased standard of living Environmental including The ocean provides both non-renewable and renewable energy resources which allows a gradual and managed transition from non-renewable to renewable; Renewable energies reduce emissions which helps in mitigating climate change Collecting ocean resources forces improvements in ocean mapping and navigation Threats outweigh opportunities • Lack of sustainability/damage to ecosystem Concerns that the harvesting of krill is showing signs of “boom and bust” patterns. (need for controls); communities become over dependent on one industry (e.g. fishing or oil drilling) for jobs; Ecosystem disturbance means that the population of species may decrease unsustainably; Oil spills are costly to clean up and harm organisms and their habitats.; Sea-floor mining is controversial given the potential damage it may be doing to relatively unknown ocean ecosystems, particularly from tailings • Cost may be prohibitive until economic climate changes/demand increases e.g. offshore wind farms, wave energy – expensive, equipment damage - parts becomes debris (harming ecosystems). • Geopolitics include monitoring of commercial operations e.g. CCAMLR – krill harvest in Antarctic, mining of Rare

			Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence as to whether the opportunities arising from the use of ocean resources greatly outweigh the threats. Level 1 (1-2 marks) Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows whether the opportunities arising from the use of ocean resources greatly outweigh the threats. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to whether the opportunities arising from the use of ocean resources greatly outweigh the threats. **0 marks** No response or no response worthy of credit. **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with limited structure. The information is supported by limited evidence.		Earth Elements (REEs) has strategic importance with possible restrictions to permissions granted in EEZs. Conclusions are expected about the opportunities arising from the use of ocean resources outweighing the threats.

			Level 1 The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		

Question			Answer	Mark	Guidance

16*			**'Plastic is the most problematic ocean pollutant of the 21st century'. Discuss.**
			
			AO1
			Level 4 (8-10 marks)
			Demonstrates **comprehensive** knowledge and understanding of ocean pollutants of the 21st century.
			
			Level 3 (5-7 marks)
			Demonstrates **thorough** knowledge and understanding of ocean pollutants of the 21st century.
			
			Level 2 (3-4 marks)
			Demonstrates **reasonable** knowledge and understanding of human activities and the balance between incoming and outgoing energy through the atmosphere.
			
			Level 1 (1-2 marks)
			Demonstrates **basic** knowledge and understanding of human activities and the balance between incoming and outgoing energy through the atmosphere.
			
			0 marks
			No response or no response worthy of credit.
			
			AO2
			Level 4 (8-10 marks)
				20
				AO1 x10
				AO2 x10
					AO1 - 10 marks
					Knowledge and understanding of ocean pollutants of the 21st century could potentially include:
					
					<u>Pollutants and their harmful effects</u>
					• Plastic from rivers, beaches and ships:
					  ○ Larger marine organisms such as turtles and seals can become entangled in discarded fishing nets or plastic packaging
					  ○ Most plastics are long lasting and do not biodegrade for hundreds of years. Photodegradation breaks them down to form microplastics which accumulate in ocean gyres, e.g. the Great Pacific Garbage Patch.
					• Agricultural runoff including leached phosphate fertilisers and pesticides such as DDT
					• Heavy metals e.g. mercury off the coast of Minamata, Japan
					• Products of combustion of fossil fuels for shipping e.g. SO_2, nitrogen oxides; the volume of shipping means that levels are significant on a global scale (approximately 100,000 cargo vessels for 24 hours each day, 280 days of the year on average plus cruise ships).
					• Lack of environmental regulation in LIDCs means that many toxic substances are released into oceans annually e.g. organic waste, hormones and heavy metals
					• Oil spills e.g. the Deepwater Horizon disaster of 2010 which affected 180,000km^2 of the Gulf of Mexico

			Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of whether plastic is the most problematic ocean pollutant of the 21st century. Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to whether plastic is the most problematic ocean pollutant of the 21st century. Level 3 (5-7 marks) Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows whether plastic is the most problematic ocean pollutant of the 21st century. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to whether plastic is the most problematic ocean pollutant of the 21st century. Level 2 (3-4 marks) Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows whether plastic is the most problematic ocean pollutant of the 21st century. Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence as to whether plastic is the most problematic ocean pollutant of the 21st century.		• Carbon dioxide from terrestrial activities which leads to ocean acidification; pH of the oceans has lowered by 0.1 (8.2 to 8.1 representing a 30% increase in acidity) since records began which causes a softening and reduced production of calcite exoskeletons. **AO2 - 10 marks** Application of knowledge and understanding to analyse and evaluate whether plastic is the most problematic ocean pollutant of the 21st century could potentially include: <u>Plastics are the most problematic ocean pollutant</u> • Plastic is found in every ocean and along the majority of coastlines either in the form of whole plastic or as microplastic • Microplastic can enter food chains, particularly those that filter sea water. This bio-accumulates through food chains • Other pollutants have been present in the oceans for decades but plastic has become a particular problem within the 21st century • A combination of EDCs using more plastic and lack of environmental regulation - the amount of plastic has rapidly increased in the last 20 years • Plastics are a chronic problem - the estimated 5 trillion pieces of plastic in the ocean, particularly microplastic, will now be near impossible to remove <u>Plastics are not the most problematic ocean pollutant</u> • The amount of media attention on plastics may make it appear to be the worst ocean pollutant of the 21st century. • Other pollutants which have a less visible impact are no less deadly or harmful to ecosystems e.g. mercury off the coast of Japan which has resided there for decades still contaminates fishing grounds. • Pollutants which are more punctuated in their impacts e.g. low frequency/ high magnitude oil spills could be argued to be more damaging at the time that they occur

			Level 1 (1-2 marks) Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows whether plastic is the most problematic ocean pollutant of the 21st century. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to whether plastic is the most problematic ocean pollutant of the 21st century. **0 marks** No response or no response worthy of credit. **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with limited structure. The information is supported by limited evidence. **Level 1** The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		• Larger pieces of plastic can be removed through environmental legislation, beach cleans and the Ocean Cleanup Project whereas agricultural pollution or carbon dioxide cannot be addressed so easily. Conclusions are expected which consider whether plastic is the most problematic ocean pollutant of the 21st century.

Question			Answer	Mark	Guidance

17*			**Examine the view that extreme weather events caused by climate change have the greatest impact on food security.**
			
			AO1
			Level 4 (8-10 marks)
			Demonstrates **comprehensive** knowledge and understanding of factors which affect food security.
			
			Level 3 (5-7 marks)
			Demonstrates **thorough** knowledge and understanding of factors which affect food security.
			
			Level 2 (3-4 marks)
			Demonstrates **reasonable** knowledge and understanding of factors which affect food security.
			
			Level 1 (1-2 marks)
			Demonstrates **basic** knowledge and understanding of factors which affect food security.
			
			0 marks
			No response or no response worthy of credit.
			
			AO2
			Level 4 (8-10 marks)
			Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of whether extreme weather events caused by climate change, amongst other factors, have the greatest impact on food security.
			
			Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based
				20
				AO1 x10
				AO2 x10
					AO1 - 10 marks
					Knowledge and understanding of factors which affect food security could potentially include:
					• Knowledge of the three pillars of availability, access and utilisation.
					• Climate change may be outlined through various means e.g. 0.87°C of average surface temperature warming since 1880 or efforts to cap global average temperature increase to 2°C in accordance with the Paris Agreement.
					• Extreme weather caused by climate change include drought, tropical cyclones, wildfire and heatwaves.
					• Other factors which may be mentioned as contenders to climate change may include:
					  ○ **Distribution** whereupon ACs often experience food waste whilst LIDCs often lack the infrastructure, trade agreements and income to import food.
					  ○ **Pests** e.g. locust plagues can cause famine and therefore reduce availability, e.g. Africa in 2004.
					  ○ **Disease** e.g. wheat blight in Africa and Asia in 2007.
					  ○ **Lifestyle** e.g. obesity in ACs where meat and dairy foods are often very affordable, promoting unhealthy diets.
					  ○ **Land grabbing** where farmland is bought in developing countries by other countries wishing to make their food supplies more secure e.g. China buying up land in Africa.
					
					AO2 - 10 marks
					Application of knowledge and understanding to analyse and evaluate whether extreme weather events caused by climate change, amongst other factors, have the greatest impact on food security could potentially include:
					
					<u>Extreme weather caused by climate change does have the greatest impact on food security:</u>
					• **Drought and higher temperatures:** can lead to desertification and land degradation, lowering food

			as to whether extreme weather events caused by climate change, amongst other factors, have the greatest impact on food security.
			
			Level 3 (5-7 marks)
			Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows whether extreme weather events caused by climate change, amongst other factors, have the greatest impact on food security.
			
			Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to whether extreme weather events caused by climate change, amongst other factors, have the greatest impact on food security.
			
			Level 2 (3-4 marks)
			Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows whether extreme weather events caused by climate change, amongst other factors, have the greatest impact on food security.
			
			Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence as to whether extreme weather events caused by climate change, amongst other factors, have the greatest impact on food security.
			
			Level 1 (1-2 marks)
			Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows whether extreme weather events caused by climate
					availability particularly in areas which already have low Food Security Indices E.g. Sub-Saharan Africa.
					• **Heatwaves** may increase availability in some areas such as the UK due to longer growing seasons and higher temperatures. Reference may be made to new varieties being introduced such as vineyards in Cornwall.
					• Increasing frequency of **floods**, **wildfires** and **drought** will significantly reduce food production in affected areas.
					• Mention may also be made to the fact that climate change will have indirect effects upon some of the factors mentioned above, e.g. locust swarms and spread of diseases e.g. the Bluetongue virus travelling westwards from Asia.
					
					<u>Extreme weather caused by climate change does not have the greatest impact on food security:</u>
					• Socioeconomic and political factors have a greater impact e.g.:
					  ○ Land ownership, land grabbing and competition which may be linked to greater global issues such as population increase and uneven power relations (particularly in EDCs such as China and India).
					  ○ Trade agreements which restrict some countries importing food at an affordable price, therefore affecting all three of the food security pillars. Some candidates may refer to Brexit and the potential implications that this may have on the UK's food security.
					  ○ "Globesity" where more affordable meat and dairy products in ACs coupled with a reduction in exercise has reduced utilisation.
					
					A conclusion should be present which considers the view that extreme weather events caused by climate change have the greatest impact on food security.

			change, amongst other factors, have the greatest impact on food security. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to whether extreme weather events caused by climate change, amongst other factors, have the greatest impact on food security. **0 marks** No response or no response worthy of credit. **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with limited structure. The information is supported by limited evidence. **Level 1** The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		

Question			Answer	Mark	Guidance

18*			**'The role and responsibilities of agribusinesses have had a positive influence on the global food system'. How far do you agree with this statement?**
			
			AO1
			Level 4 (8-10 marks)
			Demonstrates **comprehensive** knowledge and understanding of agribusinesses and the global food system.
			
			Level 3 (5-7 marks)
			Demonstrates **thorough** knowledge and understanding of agribusinesses and the global food system.
			
			Level 2 (3-4 marks)
			Demonstrates **reasonable** knowledge and understanding of agribusinesses and the global food system.
			
			Level 1 (1-2 marks)
			Demonstrates **basic** knowledge and understanding of agribusinesses and the global food system.
			
			0 marks
			No response or no response worthy of credit.
			
			AO2
			Level 4 (8-10 marks)
			Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how the role and responsibilities of agribusinesses have had a positive influence on the global food system.
			
			Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and
				20
				AO1 x10
				AO2 x10
					AO1 - 10 marks
					Knowledge and understanding of agribusinesses and the global food system could potentially include:
					
					• Agribusiness - likely to include reference to the following:
					  ○ **Commercial agriculture** where farming for profit is conducted on a large scale with often high capital inputs e.g. cattle ranching in South America. This improves access for consumers.
					  ○ **Intensive agriculture** which is small-scale with high labour and/or capital inputs and high yields per hectare e.g. horticulture in the Netherlands. This improves both availability and access for consumers.
					  ○ Globally, agriculture is largely controlled by **TNCs** such as Tyson and Walmart which favour large, capital intensive growers. In Brazil, for example, large agribusinesses account for 62% of the value of agricultural production.
					  ○ **Biotechnology** such as GMOs (genetically modified organisms) can increase yields and the distribution of crops
					• Global food system could include pre-production, farming, market supply chain, distribution, consumption, waste management.
					
					AO2 - 10 marks
					Application of knowledge and understanding to analyse and evaluate the extent to which the role and responsibilities of agribusinesses have had a positive influence on the global food system could potentially include:
					
					<u>Ways in which agribusinesses have had a positive influence on the global food system:</u>
					• **Cheaper food - improved access and utilisation**: due to commercial and intensive agriculture, particularly those with lower income.

			substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to the extent to which the role and responsibilities of agribusinesses have had a positive influence on the global food system. Level 3 (5-7 marks) Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows how the role and responsibilities of agribusinesses have had a positive influence on the global food system. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to the extent to which the role and responsibilities of agribusinesses have had a positive influence on the global food system. Level 2 (3-4 marks) Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows how the role and responsibilities of agribusinesses have had a positive influence on the global food system. Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence as to the extent to which the role and responsibilities of agribusinesses have had a positive influence on the global food system. Level 1 (1-2 marks) Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows		• **Higher yields - improved availability and utilisation:** biotechnology has produced HYVs (higher yielding varieties) and GMOs – these improve availability and reduce the long term costs of using fertilizers and pesticides, therefore improving access. The example of the Green Revolution may be mentioned. • **Distribution** is improved by TNCs who transport food globally using container ships, air freight and lorries – this improves availability, access and utilisation. <u>Ways in which agribusinesses have not had a positive influence on the global food system:</u> • **"Globesity":** commercial agriculture has arguably reduced utilisation due to making meat and dairy products more affordable. • **Unequal food security:** biotechnology has improved food security for largely ACs who are more able to take advantage of technological innovation than LIDCs due to greater capital reserves and expertise. The example of the Green Revolution may be mentioned. • **Appropriate technology:** is a more effective way to ensure food security for LIDCs who often lose out from agribusiness models. • Agribusinesses are often very present in competition with food markets and **land grabbing**, which promotes food security for the countries that they supply to but reduces security for those that they are located within. A conclusion should be present which acknowledges the role and responsibilities agribusinesses have had on the global food system.

			how the role and responsibilities of agribusinesses have had a positive influence on the global food system. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to the extent to which the role and responsibilities of agribusinesses have had a positive influence on the global food system. **0 marks** No response or no response worthy of credit. **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with limited structure. The information is supported by limited evidence. **Level 1** The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		

Question			Answer	Mark	Guidance
19*			**Examine the view that information collected from the sea floor provides compelling evidence for continental drift**. AO1 Level 4 (8-10 marks) Demonstrates **comprehensive** knowledge and understanding of evidence for continental drift. Level 3 (5-7 marks) Demonstrates **thorough** knowledge and understanding of evidence for continental drift. Level 2 (3-4 marks) Demonstrates **reasonable** knowledge and understanding of evidence for continental drift. Level 1 (1-2 marks) Demonstrates **basic** knowledge and understanding of evidence for continental drift. **0 marks** No response or no response worthy of credit. AO2 Level 4 (8-10 marks) Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how information collected from the sea floor provides compelling evidence for continental drift. Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to the extent to which information collected from the	**20** **AO1 x10** **AO2 x10**	**AO1 - 10 marks** Knowledge and understanding of evidence for continental drift could potentially include: <u>From the sea floor:</u> • **Palaeomagnetism**: the oceanic crust at mid-oceanic ridges is made up of igneous rocks which form symmetrical bands parallel to the ridge. This led to conclusions about sea floor spreading. The orientation of the iron particles indicates the polarity of the Earth at the time that the lava cooled and is seen to change every 400,000 to 500,000 years. <u>Not limited to the sea floor:</u> • **Biological evidence:** similar fossils are found in continents that are now separated, e.g. brachiopods in Australia and Indian limestone and Mesosaurus fossils in South America and Africa. • **Continental fit:** the continents look like pieces of a jigsaw - North America fits with Europe and South America fits with Africa to form a supercontinent, Pangaea, approximately 250 million years ago. • **Geological evidence:** rock samples in different areas are similar in composition and age, e.g. northeast Canada and northern Scotland. **AO2 - 10 marks** Application of knowledge and understanding to analyse and evaluate the view that information collected from the sea floor provides compelling evidence for continental drift could potentially include: • **Palaeomagnetism and sea floor spreading:** the symmetry in rock type, magnetic orientation and coverage either side of the plate boundary suggests that the rocks have originated from the boundary and

			sea floor provides compelling evidence for continental drift. Level 3 (5-7 marks) Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows how information collected from the sea floor provides compelling evidence for continental drift. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to the extent to which information collected from the sea floor provides compelling evidence for continental drift. Level 2 (3-4 marks) Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows how information collected from the sea floor provides compelling evidence for continental drift. Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence as to the extent to which information collected from the sea floor provides compelling evidence for continental drift. Level 1 (1-2 marks) Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows how information collected from the sea floor provides compelling evidence for continental drift. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation		moved outwards. The increasing age of the rocks either side suggests that the sea floor is moving over time on account of the divergent plates. • **Biological evidence**: the Mesosaurus was a freshwater reptile and as such, to be found in now separated continents, the continents must have drifted apart. • **Continental fit and geological samples** suggest that the continents once joined as the rocks would have been formed in once location and then separated by continental drift. <u>The sea floor provides compelling evidence:</u> • The symmetry of the igneous rocks, both in rock type and polarity, provides compelling evidence for continental drift. The symmetry suggests that the ocean floor acts as a conveyor belt where new rock surfaces at the ocean ridges whilst old rock is subducted into the asthenosphere at ocean trenches. • Sea floor spreading and palaeomagnetism provide comprehensive evidence in terms of age, symmetry, existence globally, along with a mechanism for the creation and destruction of crust, which the other pieces of evidence do not. • Continental fit could be coincidental; it is not quantitative enough to provide strong evidence by itself. • With regards to geological evidence, there are anomalies where certain areas which would be expected to match do not; some areas have been eroded such that they no longer provide compelling evidence. <u>Compelling evidence is not limited to the sea floor:</u> • Biological evidence is very compelling due to identical evolutionary pathways being near impossible in

			that offers simple conclusions as to the extent to which information collected from the sea floor provides compelling evidence for continental drift. **0 marks** No response or no response worthy of credit. **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with limited structure. The information is supported by limited evidence. **Level 1** The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		separated areas, e.g. the Mesosaurus existing in multiple continents. • It is the "convergence of evidence" where the agreement of all of the evidence towards one mechanism, the theory of continental drift, makes it compelling. Conclusions expected which examine the view that information collected from the sea floor provides compelling evidence for continental drift.

Question			Answer	Mark	Guidance

20*			**'Effective management of volcanic eruptions prevents disasters.' To what extent do you agree with this statement?**
			
			AO1
			Level 4 (8-10 marks)
			Demonstrates **comprehensive** knowledge and understanding of management of volcanic eruptions and disasters.
			
			Level 3 (5-7 marks)
			Demonstrates **thorough** knowledge and understanding of management of volcanic eruptions and disasters.
			
			Level 2 (3-4 marks)
			Demonstrates **reasonable** knowledge and understanding of management of volcanic eruptions and disasters.
			
			Level 1 (1-2 marks)
			Demonstrates **basic** knowledge and understanding of management of volcanic eruptions and disasters.
			
			0 marks
			No response or no response worthy of credit.
			
			AO2
			Level 4 (8-10 marks)
			Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how effective management of volcanic eruptions prevents disasters.
			
			Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements
				20
				AO1 x10
				AO2 x10
					AO1 - 10 marks
					Knowledge and understanding of management of volcanic eruptions and disasters could potentially include:
					• Mention of the disaster risk equation
					  ○ (R = (H x V) / C where R is risk, H is the frequency or magnitude of a hazard, V is the level of vulnerability and C is the capacity to cope.
					• Mention of the disaster-response curve (Park, 1991) focusing on modifying the cause and event.
					• Presence of case study detail to be expected.
					
					<u>Volcanic Eruptions</u>
					• Volcanic disasters can be related to the following volcanic hazards:
					  ○ Pyroclastic flows (e.g. Montserrat)
					  ○ Lava bombs
					  ○ Gas release (e.g. Lake Nyos, Cameroon, 1986)
					  ○ Tephra and asphyxiation
					  ○ Lahars (e.g. Nevado del Ruiz, 1984)
					  ○ Floods, often from jökulhlaups
					  ○ Tsunamis
					• Effective volcanic eruption management includes:
					  ○ Geological monitoring e.g. use of seismometers and tiltmeters on volcano flanks to detect changes in activity.
					  ○ Educating the population in terms of what to do in the event of a volcanic eruption.
					  ○ Detecting gases – greater release can indicate and impending eruption.
					  ○ Houses which can be moved in the event of effusive eruptions e.g. Hawaii
					  ○ Evacuation and closing roads and airports during an event.
					  ○ Well trained and accessible health clinics to treat injuries relating to a volcanic eruption e.g. asphyxiation.

			leading to rational conclusions that are evidence based as to the extent to which effective management of volcanic eruptions prevents disasters. Level 3 (5-7 marks) Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows how effective management of volcanic eruptions prevents disasters. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to the extent to which effective management of volcanic eruptions prevents disasters. Level 2 (3-4 marks) Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows how effective management of volcanic eruptions prevents disasters. Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence as to the extent to which effective management of volcanic eruptions prevents disasters. Level 1 (1-2 marks) Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows how effective management of volcanic eruptions prevents disasters. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation		**AO2 - 10 marks** Application of knowledge and understanding to analyse and evaluate the extent to which effective management of volcanic eruptions prevents disasters could potentially include: • Application of the disaster risk equation, to demonstrate the R value is lowered through a high C value and low H and V values. • A recognition that other factors influence disaster severity e.g. magnitude of the event, human factors (e.g. level of development) • Many of the AO2 marks will be gained through relevant exemplification, using case studies to demonstrate that effective management of volcanic eruptions does or does not always prevent disasters (eg Eyjafjallajökull in 2010 where the airports were closed internationally and the volcanic eruption Nevado del Ruiz in 1984 respectively). A conclusion should be present which acknowledges the extent to which effective management of volcanic eruptions prevents disasters.

			that offers simple conclusions as to the extent to which effective management of volcanic eruptions prevents disasters. **0 marks** No response or no response worthy of credit. **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with limited structure. The information is supported by limited evidence. **Level 1** The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		

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