OCR
Oxford Cambridge and RSA

GCE

Geography

Unit **H481/03:** Geographical debates

Advanced GCE

Mark Scheme for June 2018

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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.

Annotations

Annotation	Meaning
	Unclear or Indicates material for which there is no credit
BP	Blank page
EVAL	Evaluation
S	Synoptic link
IRRL	Significant amount of material which doesn't answer the question
L1	Level 1
L2	Level 2
L3	Level 3
L4	Level 4
	Highlighting an issue e.g. irrelevant paragraph. Use in conjunction with another stamp e.g. IRRL or EVAL
SEEN	Used to denote that points had been seen and noted but mostly where credit was given
^	Omission mark
NE	No place specific detail
R	Rubric error placed at start of response not being counted

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.

LEVELS OF RESPONSE QUESTIONS:

The indicative content indicates the expected parameters for candidates' answers, but be prepared to recognise and credit unexpected approaches where they show relevance.

Using 'best-fit', decide first which set of level descriptors best describes the overall quality of the answer. Once the level is located, adjust the mark concentrating on features of the answer which make it stronger or weaker following the guidelines for refinement.

Highest mark: If clear evidence of all the qualities in the level descriptors is shown, the HIGHEST Mark should be awarded.

Lowest mark: If the answer shows the candidate to be borderline (i.e. they have achieved all the qualities of the levels below and show limited evidence of meeting the criteria of the level in question) the LOWEST mark should be awarded.

Middle mark: This mark should be used for candidates who are secure in the level. They are not 'borderline' but they have only achieved some of the qualities in the level descriptors.

Be prepared to use the full range of marks. Do not reserve (e.g.) highest level marks 'in case' something turns up of a quality you have not yet seen. If an answer gives clear evidence of the qualities described in the level descriptors, reward appropriately.
Quality of extended response will be assessed in questions marked with an (*). Quality of extended response is not attributed to any single assessment objective but instead is assessed against the entire response for the question.

	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	Marks	Guidance
1	(a)		**Identify three limitations of Fig.1 in showing the relationship between Gross Domestic Product (GDP) per person and total CO_2 emissions for selected countries.** The scattergraph plots data for 10 countries across the development continuum. Possible limitations include: • CO_2 emissions are the total for each country, not per person. The considerable contrasts in populations of the countries have quite an influence on the total emissions. • GDP is per person but is in US $ and so is a limited indicator of wealth due to factors such as currency fluctuations and the under-counting of informal and subsistence economic activities. • No units for GDP per capita. • The dates for the two variables are different – GDP 2015 and CO_2 2014 – not comparing like with like. • The 10 selected countries may not be a sufficiently large enough sample to offer a meaningful representation of the relationship. • Absence of line of best fit makes it difficult to see the relationship (mention of the need for a statistical test in addition) • Factors such as climatic influences need to be taken into account as regards CO_2 emissions • Accuracy and reliability of data e.g. LIDCs/EDCs/ACs	**3** **AO3 x3**	**AO3 – 3 marks** 3x1 (seen) for limitations of the data identified through critical questioning of the resource.

Question			Answer	Marks	Guidance
	(b)		**Explain two ways that natural forcing has driven climate change in the geological past** **Level 3 (5–6 marks)** Demonstrates **thorough** knowledge and understanding of two natural forcing processes in the geological past (AO1). This will be shown by including **well-developed** ideas about the link between two natural forcing processes and climate change in the geological past. **Level 2 (3–4 marks)** Demonstrates **reasonable** knowledge and understanding of one or two natural forcing processes in the geological past (AO1). This will be shown by including **developed** ideas about the link between one or two natural forcing processes and climate change in the geological past. **Maximum L2 3 marks for one forcing process well-developed.** **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of one or two natural forcing processes in the geological past (AO1). There may be **simple** ideas about the link between one or two natural forcing processes and climate change in the geological past. **0 marks** No response or no response worthy of credit.	**6** **AO1 x6**	**Indicative content** **AO1 – 6 marks** Knowledge and understanding of natural forcing processes and how they have driven climate change in the geological past could potentially include: • Plate tectonics + continental drift – as continents broke apart and moved so distribution of land and sea across the latitudes varied. Earth's climate varied between greenhouse and icehouse • Ocean circulation – ocean currents vital component of global energy budget transferring heat from low to high latitudes. Continental drift can alter pattern of ocean currents e.g. closing of the gap between Pacific and Atlantic with formation of Panama isthmus • Natural changes in GHG – e.g. 50 million years ago CO2 at c. 1000 ppm; 3-5 million years ago CO2 at c. 400 ppm – causes considered to be creating of large-scale fold mt systems e.g. Himalayas which increased chemical weathering removing vast amounts of CO2 from atmosphere • Milankovitch cycles – astronomical events e.g. changes in Earth's axis + orbit + precession of equinoxes. Operate on timescales of 10,000 to 100,000 years. Credit tilt and orbit eccentricity separately • Volcanic eruptions – tend to affect shorter-term climate change • Solar output – sunspots used as a proxy

Question			Answer	Marks	Guidance
2	(a)		**Identify three limitations of Fig. 2 in showing the number of deaths from cholera in 2004.** The map from the worldmapper range presents cholera death data from 2004 – the most recent available on the worldmapper sites. Possible limitations include: • Not possible to determine the absolute number of deaths from cholera • Not easy to tell the countries apart especially given the distortion of shape • Country/national level data means that variations in impacts within a country are hidden • Issues of reliability of data – is every country's data of the same reliability and accuracy? The data is now 14 years old and therefore may be out of date	**3** **AO3 x3**	**AO3 – 3 marks** 3x1 (seen) for limitations of the data identified through critical questioning of the resource.
	(b)		**Explain how disease diffusion can take place.** **Level 3 (5–6 marks)** Demonstrates **thorough** knowledge and understanding of the process of diffusion (AO1). This will be shown by including **well-developed** ideas about how disease diffusion can take place. **Level 2 (3–4 marks)** Demonstrates **reasonable** knowledge and understanding of process of diffusion (AO1). This will be shown by including **developed** ideas about how disease diffusion can take place. **Level 1 (1–2 marks)**	**6** **AO1 x6**	**Indicative content** **AO1 – 6 marks** Knowledge and understanding of disease diffusion could potentially include: • Disease diffusion is the spatial spread outwards from an origin • Expansion diffusion – from a source, disease spreads outwards into new areas, meanwhile carriers in source area remain infected e.g. TB • Relocation diffusion – from a source disease moves into new areas spatially separate from the source e.g. people carrying a disease from one continent to another • Contagious diffusion – from a source, disease spreads through direct contact with a carrier – strongly influenced

Question			Answer	Marks	Guidance
			Demonstrates **basic** knowledge and understanding of process of diffusion (AO1). There may be **simple** ideas about how disease diffusion can take place. **0 marks** No response or no response worthy of credit.		by distance e.g. ebola • Hierarchical diffusion – from a source disease spreads through an ordered sequence of places usually from largest well connected locations eventually to more isolated and smaller centres. Can also be seen along transport networks • Hägerstrand's probabilistic diffusion model - neighbourhood effect and S-shaped curve • The role of barriers, physical or human, is relevant providing it is explicitly related to the operation of disease diffusion.

Question			Answer	Marks	Guidance
3	(a)		**Identify three limitations of Fig. 3 as a source of information about humpback whale populations.** The table of data presents data about numbers of humpback whales in various ocean areas. Possible limitations include: • Numbers can only be 'estimates'; impossible to count exact numbers of such a highly mobile species • Ocean areas are vast so accurate and reliable counting impossible • Vague definition of ocean areas and very different areas • Counts may have been taken over extended time periods therefore same individuals may have been counted more than once • Different dates when counts taken so not comparing like with like • Accuracy and reliability of data	**3** **AO3 x3**	**AO3 – 3 marks** 3x1 (seen) for limitations of the data identified through critical questioning of the resource.
	(b)		**Explain variations in nutrient supply within oceans** **Level 3 (5–6 marks)** Demonstrates **thorough** knowledge and understanding of nutrient supply in oceans (AO1). This will be shown by including **well-developed** ideas about how nutrient supply varies within oceans. **Level 2 (3–4 marks)** Demonstrates **reasonable** knowledge and understanding of nutrient supply in oceans (AO1). This will be shown by including **developed** ideas about how nutrient supply varies within oceans. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of	**6** **AO1 x6**	**Indicative content** **AO1 – 6 marks** Knowledge and understanding of how nutrient supply varies within oceans could potentially include: • Nutrient levels generally relatively low at ocean surface • Dissolved nutrients brought into oceans by rivers so ocean areas in immediate vicinity of river mouths have relatively higher nutrient levels e.g. Atlantic off mouth of Amazon + estuaries and deltas e.g. Nile • Mineral dust blown off land so ocean locations far away from land low in nutrients e.g. large areas of Pacific

Question			Answer	Marks	Guidance
			nutrient supply in oceans (AO1). There may be **simple** ideas about how nutrient supply varies within oceans. **0 marks** No response or no response worthy of credit.		• Surface nutrients soon used up or sink as 'marine snow' to ocean depths • Deep ocean water cold and dense so cannot rise to surface through thermocline so nutrients stay at depth • At some locations, upwelling of water from depth brings nutrients with it e.g. Southern Ocean around Antarctica • Cold and hot (hydrothermal vents) seeps in ocean deeps locations of dissolved nutrients e.g. along mid-oceanic ridges + cold seeps in Gulf of Mexico

Question			Answer	Marks	Guidance
4	(a)		**Identify three limitations of Fig. 4 as a source of information about the impact of food production on physical environments.** The photograph shows a group of farm-workers in India involved in spraying a crop. Possible limitations include: • No idea what is being sprayed – may or may not be toxic / biodegradable • Not sure how often the spraying has taken place • May be a very still day so no drift so less impact • What was the physical environment like before it was converted to agriculture e.g. tree clearance or draining of wetland? • Could be a monoculture which is likely to have negative impacts on soil for e.g. or part of a rotation.	**3** **AO3 x3**	**AO3 – 3 marks** 3x1 (seen) for limitations of the data identified through critical questioning of the resource.
	(b)		**Explain the theoretical views of food security offered by Malthus and Boserup.** **Level 3 (5–6 marks)** Demonstrates **thorough** knowledge and understanding of the theoretical views of both Malthus and Boserup (AO1). This will be shown by including **well-developed** ideas about the theoretical views of Malthus and Boserup regarding food security. **Level 2 (3–4 marks)** Demonstrates **reasonable** knowledge and understanding of the theoretical views of Malthus and/or Boserup (AO1).	**6** **AO1 x6**	**Indicative content** **AO1 – 6 marks** Knowledge and understanding of the theoretical views of Malthus and Boserup regarding food security could potentially include: • Malthus – theory that an optimum population exists in relation to food supply and any increase beyond this threshold will lead to 'war, famine + disease.' • Malthus – in absence of natural checks, human population ↑ at a geometric rate (1, 2, 4, 8, 16 etc) • Malthus – food supply ↑ at an arithmetic rate (1, 2, 3, 4, 5, etc) • Malthus – natural checks to pop. Growth could be avoided if 'preventive checks' occur e.g. abstinence, later age of

Question			Answer	Marks	Guidance
			This will be shown by including **developed** ideas about the theoretical views of Malthus and/or Boserup regarding food security. **Maximum L2 3 marks for discussion of either Malthus or Boserup.** **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of the theoretical views of Malthus and/or Boserup (AO1). There may be **simple** ideas about the theoretical views of Malthus and/or Boserup regarding food security. **0 marks** No response or no response worthy of credit.		marriage • Boserup – as population ↑, demand for food ↑ and this results in agriculture intensifying. • Boserup – agricultural production ↑ due to reductions in fallow land and changes to land tenure systems • Boserup – saying 'necessity is the mother of invention' associated with her as technology is applied to agriculture e.g. 'Green Revolution' of 1960s

Question			Answer	Marks	Guidance
5	(a)		**Identify three limitations of Fig. 5 as a source of information about impacts of earthquakes on people.** The text extract focuses on the impacts of earthquakes. Possible limitations include: • No quantitative indication of earthquake energy released in the China event • No indication of non-fatal casualties including long-term injuries e.g. amputations from the two events mentioned • Lower energy events not detailed '… have also killed.' • Economic impacts – quantified but in US $ so not clear as to what this means locally i.e. purchasing power • Several statistics are estimated • Only two Asian earthquakes are mentioned within the text – we are lacking information on the impacts of earthquakes elsewhere • No indication of short, medium or long-term issues of welfare e.g. housing, clean water supply, food supply • Provenance of text	**3** **AO3 x3**	**AO3 – 3 marks** 3x1 (seen) for limitations of the data identified through critical questioning of the resource.

Question			Answer	Marks	Guidance
	(b)		**Explain the features of explosive volcanic eruptions.** **Level 3 (5–6 marks)** Demonstrates **thorough** knowledge and understanding of the features of explosive eruptions (AO1). This will be shown by including **well-developed** ideas explaining the features of explosive eruptions. **Level 2 (3–4 marks)** Demonstrates **reasonable** knowledge and understanding of the features of explosive eruptions (AO1). This will be shown by including **developed** ideas explaining the features of explosive eruptions. **Maximum L2 3 marks for a purely descriptive response.** **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of the features of explosive eruptions (AO1). There may be **simple** ideas explaining the features of explosive eruptions. **0 marks** No response or no response worthy of credit.	**6** **AO1 x6**	**Indicative content** **AO1 – 6 marks** Knowledge and understanding of the features of explosive eruptions could potentially include: • Tend to involve acidic lava e.g. rhyolite and andesite • Acidic lava (high % silica), high viscosity, lower temperature at eruption • Violent bursting of gas bubbles when magma reaches surface; highly explosive eruption; pyroclastic flows • Materials erupted can include gases, dust, ash, lava bombs, tephra • Frequency of eruption – tend to have long periods with no activity

Question			Answer	Marks	Guidance
6			**Examine how climate change can affect weathering and erosion processes within any one landscape system you have studied.** **Level 4 (10–12 marks)** Demonstrates **comprehensive** knowledge and understanding of climate change and weathering and erosion processes (AO1). Demonstrates **comprehensive** application of knowledge and understanding to provide clear, developed and convincing analysis that is fully accurate of how climate change can affect weathering and erosion processes in a landscape system (AO2). This will be shown by including **well-developed** ideas about the relationship between climate change and **both** weathering **and** erosion processes in a landscape system. There are clear and explicit attempts to make appropriate synoptic links between content from different parts of the course of study. **Level 3 (7–9 marks)** Demonstrates **thorough** knowledge and understanding of climate change and weathering and erosion processes (AO1). Demonstrates **thorough** application of knowledge and understanding to provide clear and developed analysis that shows accuracy of how climate change can affect weathering and erosion processes in a landscape system (AO2).	**12** **AO1 x6** **AO2 x6**	**Indicative content** **AO1 – 6 Marks** Knowledge and understanding of climate change and weathering and erosion processes could potentially include: • evidence of how climate has changed e.g. warming of past two hundred years; changes to precipitation patterns in previous pluvial periods affecting drylands; longer term climate changes affecting landscapes; rising levels relevant • specific points will depend on the landscape system studied by the candidate, coastal, glaciated or dryland – only one is studied • weathering processes such as mechanical, chemical + biological • erosional processes e.g. abrasion, attrition, hydraulic action **AO2 – 6 marks** Application of knowledge and understanding to analyse how climate change can affect weathering and erosion processes could potentially include: • some points will depend on the landscape system studied by the candidate, coastal, glaciated or dryland – only one is studied • weathering processes (chemical, physical + biological) likely to be more active due to higher temperatures • erosional processes likely to be more active due to higher temperatures e.g. increased meltwater at glacier base

Question			Answer	Marks	Guidance
			This will be shown by including **well-developed** ideas about climate change and **either** weathering **or** erosion processes **or developed** ideas about climate change and **both** weathering and erosion processes. There are clear attempts to make synoptic links between content from different parts of the course of study but these are not always appropriate. **Level 2 (4–6 marks)** Demonstrates **reasonable** knowledge and understanding of climate change and weathering and erosion processes (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide sound analysis that shows some accuracy of how climate change can affect weathering and erosion processes in a landscape system (AO2). This will be shown by including **developed** ideas about climate change and **either** weathering **and/or** erosion 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 (1–3 marks)** Demonstrates **basic** knowledge and understanding of climate change and weathering and erosion processes (AO1). Demonstrates **basic** application of knowledge and understanding to provide simple analysis that shows		leads to higher ice velocities; increased atmospheric energy leads to stronger winds giving greater wave energy to erode coastlines and more aeolian energy for corrosion/attrition/deflation in dryland landscapes→ generate more material available to be transported as well as transporting more material themselves • regions becoming drier as a result of climate change likely to experience reduction in chemical weathering and less water erosion for example. However, with reduction in vegetation cover, fluvial erosion might increase • changes to the levels and types of precipitation affecting erosion such as river action in glaciated and dryland regions • increase in temperatures extend area affected by periglacial process as glaciers and ice sheets retreat;

Question			Answer	Marks	Guidance
			limited accuracy of how climate change can affect weathering and erosion processes in a landscape system (AO2). This will be shown by including **simple** ideas about climate change and **either** weathering **and/or** erosion 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.		

Question			Answer	Marks	Guidance
7			**Examine how disease risks can impact place profiles.** **Level 4 (10–12 marks)** Demonstrates **comprehensive** knowledge and understanding of disease risks and place profiles (AO1). Demonstrates **comprehensive** application of knowledge and understanding to provide clear, developed and convincing analysis that is fully accurate of how disease risks can impact place profiles (AO2). This will be shown by including **well-developed** ideas about the relationship between disease risks and place profiles. There are clear and explicit attempts to make appropriate synoptic links between content from different parts of the course of study. **Level 3 (7–9 marks)** Demonstrates **thorough** knowledge and understanding of disease risks and place profiles (AO1). Demonstrates **thorough** application of knowledge and understanding to provide clear and developed analysis that shows accuracy of how disease risks can impact place profiles (AO2). This will be shown by including **developed** ideas about disease risk and place profiles.	**12** **AO1 x6** **AO2 x6**	**Indicative content** **AO1 – 6 Marks** Knowledge and understanding of disease risks and place profiles could potentially include: • disease risk - physical factors e.g. stagnant surface water; anticyclonic atmospheric conditions; temperature; prevailing wind direction • disease risk - human factors e.g. level of economic development; level of nutrition – quantity and quality of diet; cultural factors e.g. attitudes towards risk factors • • place profiles – natural / physical characteristics e.g. altitude, drainage, climate and weather • place profiles – human characteristics e.g. demography; socio-economic; cultural; political; built environment **AO2 – 6 marks** Application of knowledge and understanding to analyse how disease risks can impact place profiles could potentially include: • where disease risk is high due to physical factors e.g. hot and humid locations → malaria/dengue fever/ yellow fever, place profiles tend to be characterised as 'unhealthy' • places with a high disease risk due to prevalence of epidemics might experience significant demographic changes e.g. HIV + Aids in some locations decimated adult populations leaving large numbers of children and elderly → socio-economic characteristics • places perceived as unhealthy tend to be occupied by

Question			Answer	Marks	Guidance
			There are clear attempts to make synoptic links between content from different parts of the course of study but these are not always appropriate. **Level 2 (4–6 marks)** Demonstrates **reasonable** knowledge and understanding of disease risks and place profiles (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide sound analysis that shows some accuracy of how disease risks can impact place profiles (AO2). This will be shown by including **sound** ideas about disease risk and place profiles. 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 (1–3 marks)** Demonstrates **basic** knowledge and understanding of disease risks and place profiles (AO1). Demonstrates **basic** application of knowledge and understanding to provide simple analysis that shows limited accuracy of how disease risks can impact place profiles (AO2). This will be shown by including **simple** ideas about disease risk and place profiles. There are limited attempts to make synoptic links between content from different parts of the course of study.		marginalised groups e.g. shanty / squatter settlements in LIDC cities but also in some ACs and EDCs affecting the socio-economic, demographic, political and built characteristics of such places • places with higher disease risk in AC cities e.g. inner cities (e.g. reduced access to health services; higher pollution levels) impacts on place profiles of those locations → demography (absence of families); socio-economically (absence of higher status); culturally (can have clusters of ethnic minorities) • some places have a seasonal change in their disease risk due to environmental factors and so vary in their place profiles e.g. impact of monsoon • climate change altering disease risks e.g. extending range of vector-borne diseases e.g. West Nile virus in North America impacting on place profiles

Question			Answer	Marks	Guidance
			0 marks No response or no response worthy of credit.		

Question			Answer	Marks	Guidance
8			**Assess ways in which ocean processes influence the carbon cycle.** **Level 4 (10–12 marks)** Demonstrates **comprehensive** knowledge and understanding of relevant ocean processes and the carbon cycle (AO1). Demonstrates **comprehensive** application of knowledge and understanding to provide clear, developed and convincing analysis that is fully accurate of how ocean processes influence the carbon cycle (AO2). This will be shown by including **well-developed** ideas about relevant ocean processes and the carbon cycle. There are clear and explicit attempts to make appropriate synoptic links between content from different parts of the course of study. **Level 3 (7–9 marks)** Demonstrates **thorough** knowledge and understanding of relevant ocean processes and the carbon cycle (AO1). Demonstrates **thorough** application of knowledge and understanding to provide clear and developed analysis that shows accuracy of how ocean processes influence the carbon cycle (AO2). This will be shown by including **developed** ideas about relevant ocean processes and the carbon cycle. There are clear attempts to make synoptic links between content from different parts of the course of study but these are not always appropriate.	**12** **AO1 x6** **AO2 x6**	**Indicative content** **AO1 – 6 Marks** Knowledge and understanding of relevant ocean processes and the carbon cycle could potentially include: • oceans (and seas) cover c. 71% Earth's surface with > half being >3 km deep – therefore a very significant part of the land/ atmosphere/ocean system • this system has flows, stores and processes operating which influence the carbon cycle • ocean currents, surface and deep, circulate water around the globe and thereby anything dissolved in sea water • the carbon cycle is a closed system on the global scale, with carbon atoms cycling on time scales varying from days to millions of years • main pathways between carbon stores are photosynthesis, respiration, oxidation + weathering **AO2 – 6 marks** Application of knowledge and understanding to analyse how oceans influence the carbon cycle could potentially include: • oceans absorb carbon by two mechanisms – a physical pump and a biological pump • physical (inorganic) pump – mixing of deep + surface waters disperses carbon throughout the oceans • CO_2 enters oceans from atmosphere by diffusion. Surface currents transport dissolved CO_2 polewards where water cools, its density ↑ and sinks e.g. between Greenland + Iceland • dissolved carbon carried to ocean depths – may remain there for centuries

Question			Answer	Marks	Guidance
			Level 2 (4–6 marks) Demonstrates **reasonable** knowledge and understanding of relevant ocean processes and the carbon cycle (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide sound analysis that shows some accuracy of how ocean processes influence the carbon cycle (AO2). This will be shown by including **sound** ideas about relevant ocean processes and the carbon cycle. 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 (1–3 marks)** Demonstrates **basic** knowledge and understanding of relevant ocean processes and the carbon cycle (AO1). Demonstrates **basic** application of knowledge and understanding to provide simple analysis that shows limited accuracy of how ocean processes influence the carbon cycle (AO2). This will be shown by including **simple** ideas about relevant ocean processes and the carbon cycle. 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.		• eventually cold carbon-rich water rises to surface where upwelling occurs + CO2 diffuses back to atmosphere • biological (organic) pump – phytoplankton in upper layer of oceans absorb carbon through photosynthesis – c. 50% of all carbon fixed by photosynthesis. • eventually this carbon either accumulates in ocean bed sediments via food chains or death or released by decomposition into ocean as CO2. • some marine organisms manufacture substances incorporating carbon e.g. shells + skeletons by extracting carbonate from sea water. This finds its way to ocean bed sediments via food chains or death • oceans receive weathered material from land via rivers which include carbon. This settles out in ocean bed sediments – has a very long residency time. • comments about impact of climate change, rising SSTs and CO2 exchange relevant

Question			Answer	Marks	Guidance
9			**Assess how food security can be affected by issues of either human rights or territorial integrity.** **Level 4 (10–12 marks)** Demonstrates **comprehensive** knowledge and understanding of food security and either human rights or territorial integrity (AO1). Demonstrates **comprehensive** application of knowledge and understanding to provide clear, developed and convincing analysis that is fully accurate of how food security can be affected by issues of either human rights or territorial integrity (AO2). This will be shown by including **well-developed** ideas about food security and **either** human rights **or** territorial integrity There are clear and explicit attempts to make appropriate synoptic links between content from different parts of the course of study. **Level 3 (7–9 marks)** Demonstrates **thorough** knowledge and understanding of food security and either human rights or territorial integrity (AO1). Demonstrates **thorough** application of knowledge and understanding to provide clear and developed analysis that shows accuracy of how food security can be affected by issues of either human rights or territorial integrity (AO2). This will be shown by including **developed** ideas	**12** **AO1 x6** **AO2 x6**	**Indicative content** **AO1 – 6 Marks** Knowledge and understanding of food security and either human rights or territorial integrity could potentially include: • UN FAO definition 'food security exists when all people, at all times have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life' • FAO and World Food Programme also identify physical availability of food; physical and economic access to food; food utilisation (how the body makes the most of nutrients in food); stability i.e. periodic influences on availability and access to food • Human rights – basic rights + freedoms to which all people are entitled. 1948 UN General Assembly Universal declaration of Human rights (UNHDR). Variety of issues contained e.g. children's rights, gender inequalities and forced labour • Territorial integrity – the principle that the defined territory of a state, over which it has exclusive and legitimate control, is inviolable. Closely linked with idea of sovereignty **AO2 – 6 marks** Application of knowledge and understanding to analyse how food security can be affected by issues of either human rights or territorial integrity could potentially include: • Food security can be threatened or supported by issues concerning human rights. Where human rights are upheld then food security tends to be at a high level e.g. ACs and for many people in EDCs. In too many LIDCs, human

Question			Answer	Marks	Guidance
			about food security and **either** human rights **or** territorial integrity. There are clear attempts to make synoptic links between content from different parts of the course of study but these are not always appropriate. **Level 2 (4–6 marks)** Demonstrates **reasonable** knowledge and understanding of food security and either human rights or territorial integrity (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide sound analysis that shows some accuracy of how food security can be affected by issues of either human rights or territorial integrity (AO2). This will be shown by including **sound** ideas about food security and **either** human rights **or** territorial integrity. 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 (1–3 marks)** Demonstrates **basic** knowledge and understanding of food security and either human rights or territorial integrity (AO1). Demonstrates **basic** application of knowledge and understanding to provide simple analysis that shows limited accuracy of how food security can be affected by issues of either human rights or territorial integrity		rights are not upheld and food security is at low levels e.g. Sudan and South Sudan • Variations in food security with a country, either spatially or by group of people, can be threatened due to issues of human rights e.g. internally displaced people or by marginalisation of a particular group e.g. Syria, Iraq, Colombia • Factors such as land ownership and land grabbing can have human rights issue wrapped up in them which can affect food security e.g. DRCongo, Ethiopia • TNCs or countries that land grab denying locals access to land relevant • Food security can be threatened or supported by issues concerning territorial integrity. Where territorial integrity is secure then food security tends to be at a high level e.g. ACs and most EDCs and LIDCs. • Locations where tensions break out into physical conflict including civil war, threaten food security e.g. farmers cannot access their fields to sow or harvest; livestock killed; use of mines / IEDs restrict access to agricultural land e.g. Afghanistan, Iraq, Mozambique • Where territorial integrity is compromised e.g. civil war/border conflict, NGOs (Oxfam, Christian Aid, CAFOD) can intervene to try and improve food security

Question			Answer	Marks	Guidance
			(AO2). This will be shown by including **simple** ideas about food security and **either** human rights **or** territorial integrity. 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	Marks	Guidance
10			**Assess how tectonic hazards impact either global trade or global migration.** **Level 4 (10–12 marks)** Demonstrates **comprehensive** knowledge and understanding of tectonic hazards and either global trade or global migration (AO1). Demonstrates **comprehensive** application of knowledge and understanding to provide clear, developed and convincing analysis that is fully accurate of how tectonic hazards can impact either global trade or global migration (AO2). This will be shown by including **well-developed** ideas about tectonic hazards and **either** global trade **or** global migration. There are clear and explicit attempts to make appropriate synoptic links between content from different parts of the course of study. **Level 3 (7–9 marks)** Demonstrates **thorough** knowledge and understanding of tectonic hazards and either global trade or global migration (AO1). Demonstrates **thorough** application of knowledge and understanding to provide clear and developed analysis that shows accuracy of how tectonic hazards can impact either global trade or global migration (AO2). This will be shown by including **developed** ideas about tectonic hazards and **either** global trade **or** global migration.	**12** **AO1 x6** **AO2 x6**	**Indicative content** **AO1 – 6 Marks** Knowledge and understanding of tectonic hazards and either global trade or global migration could potentially include: • tectonic hazards – volcanic - lava, pyroclastic flows, tephra especially ash, lahars, toxic gas, floods, tsunami • tectonic hazards – earthquake – ground shaking + displacement, liquefaction, landslides + avalanches, tsunami • global trade – merchandise, services and capital – direction of flows, volumes, composition (e.g. primary / secondary goods) and value • global migration – dynamic flows of people between countries, regions and continents – numbers, composition (e.g. ages / gender) and direction **AO2 – 6 marks** Application of knowledge and understanding to analyse how tectonic hazards can impact either global trade or global migration could potentially include: • tectonic hazards can negatively impact global trade e.g. volcanic eruption which produces much ash can impact air transport e.g. Eyjafjallajökull, Iceland 2010 • tectonic hazards can negatively impact global trade e.g. earthquake which damages port facilities e.g. Kobe, Japan 1995 • tectonic hazards can negatively impact global trade e.g. tsunami damaging port facilities e.g. Aceh, 2004 and Japan 2011 • tectonic hazards can cause landslides which block land

Question			Answer	Marks	Guidance
			There are clear attempts to make synoptic links between content from different parts of the course of study but these are not always appropriate. **Level 2 (4–6 marks)** Demonstrates **reasonable** knowledge and understanding of tectonic hazards and either global trade or global migration (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide sound analysis that shows some accuracy of how tectonic hazards can impact either global trade or global migration (AO2). This will be shown by including **sound** ideas about tectonic hazards and **either** global trade **or** global migration. 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 (1–3 marks)** Demonstrates **basic** knowledge and understanding of tectonic hazards and either global trade or global migration (AO1). Demonstrates **basic** application of knowledge and understanding to provide simple analysis that shows limited accuracy of how tectonic hazards can impact either global trade or global migration (AO2). This will be shown by including **simple** ideas about tectonic hazards and **either** global trade **or** global migration		routes e.g. Kashmir 2005 preventing cross-border trade • tectonic hazards can encourage out-migration from a location e.g. a severe earthquake can be the 'final straw' encouraging some to leave e.g. Haiti 2010 (migration to Brazil) and Nepal 2015 (increase in human trafficking) • tectonic hazards can encourage out-migration from a location e.g. severe volcanic eruption such as Montserrat 1995 → • positive impacts - volcanic activity can ↑ tourism which leads to employment opportunities e.g. Etna, Hawaii • positive impacts – volcanic activity often gives fertile soils thereby reducing out-migration • positive impacts – hazards can create demand for equipment to help deal with damage – boosts trade • positive impacts – short-term in-migration of aid and relief personnel • discussion regarding the lack of impact on migration are equally valid e.g. in some ACs, resources to support people have meant that migration hasn't occurred • impact on migration could be affected by the scale of the tectonic event (most tectonic events are low/medium energy and therefore pose a limited hazard impact)

Question			Answer	Marks	Guidance
			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	Marks	Guidance
11*			**'To what extent is the debate over climate change influenced by a variety of agendas.' Discuss.** **AO1** **Level 4 (7–9 marks)** Demonstrates **comprehensive** knowledge and understanding of the climate change debate. **Level 3 (5–6 marks)** Demonstrates **thorough** knowledge and understanding of the climate change debate. **Level 2 (3–4 marks)** Demonstrates **reasonable** knowledge and understanding of the climate change debate. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of the climate change debate. **0 marks** No response or no response worthy of credit. **AO2** **Level 4 (19–24 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of the self-interests of different groups within the climate change debate. Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to the extent to which the debate over climate change is driven by self-interests of different groups.	**33** **AO1 x9** **AO2 x24**	**Indicative content** **AO1 – 9 marks** Demonstrating knowledge and understanding of the climate change debate could potentially include: • A brief outline of the global warming debate. • Scientific consensus on climate change. • Evolution of a debate over time. • A range of stakeholders hold views on climate change: governments, international organisations (UN), official bodies (IPCC), NGOs, media, energy industries, the public. **AO2 – 24 marks** Application of knowledge and understanding to analyse and evaluate the extent to which the debate over climate change is driven by self-interests of different groups could potentially include: • Climate change is a global issue requiring a co-ordinated response which can cause individual countries to protect their position. • UN and EU have taken a prominent role but views may be dominated by the most powerful member states e.g. US, China, Germany and their own self-interest. • Global consensus is difficult to meet – Kyoto Protocol was never ratified by the US and China; Japan and Russia withdrew from the second commitment period. • Individual countries protect their position on energy security and industrial development. • National governments have a range of positions when approaching debate; India and China as

Question			Answer	Marks	Guidance
			Relevant concepts are authoritatively discussed. **Level 3 (13–18 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of the self-interests of different groups within the climate change debate. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions as to the extent to which the debate over climate change is driven by self-interests of different groups. Relevant concepts are discussed but this may lack some authority. **Level 2 (7–12 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of the self-interests of different groups within the climate change debate. 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 debate over climate change is driven by self-interests of different groups. Concepts are discussed but their use lacks precision. **Level 1 (1–6 marks)** Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited		industrial super powers, scepticism of countries such as the US. • Countries produce their own climate change laws that may not reflect the global consensus. • View by emerging economies and low income countries that the advanced nations have created the problem and should therefore bear the cost. And concern that reducing GGE will reduce their ability to develop. • Political leanings of the media. • The view of energy industries with a financial interest in the debate. Many are based in emerging nations eg Mexico, Nigeria. • View of nations and industries with a high dependency on the livestock sector will have a protectionist viewpoint. • Delivering clean air technology and alternative energy supplies requires a level of investment that EDCs and LIDCs may not have. • View that the public are more driven to action if they understand how climate change will affect them – the self-interest argument.

Question			Answer	Marks	Guidance
			accuracy of the self-interests of different groups within the climate change debate. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to the extent to which the debate over climate change is driven by self-interests of different groups. Concepts are not discussed or are so inaccurately. **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	Marks	Guidance
12*			**'A country's decisions on mitigation strategies to cope with climate change are mainly influenced by economic factors.' How far do you agree with this statement?** **AO1** **Level 4 (7–9 marks)** Demonstrates **comprehensive** knowledge and understanding of the economic factors that influence decisions on mitigation. **Level 3 (5–6 marks)** Demonstrates **thorough** knowledge and understanding of the economic factors that influence decisions on mitigation. **Level 2 (3–4 marks)** Demonstrates **reasonable** knowledge and understanding of the economic factors that influence decisions on mitigation. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of the economic factors that influence decisions on mitigation. **0 marks** No response or no response worthy of credit. **AO2** **Level 4 (19–24 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how economic factors influence decisions on the mitigation of climate change. Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to whether decisions on	**33** **AO1 x9** **AO2 x24**	**Indicative content** **AO1 – 9 marks** Demonstrating knowledge and understanding of the economic factors that influence decisions on mitigation could potentially include: • Mitigation strategies aim to reduce GHG emissions and tackle the causes of climate change. These tend to be long term approaches. Mitigation strategies range from the ratification of international treaties and agreements to specific practices within a country, for example energy efficiency and conservation. Economic factors influencing decision could include: • Cost of new technology- carbon capture, geo-engineering, sequestration technology • Economic needs of different land use e.g. plantation agriculture for export crops • Cost of the introduction of new farming practices which improve productivity and reduce negative impacts of farming such as deforestation. • Cost of infrastructure improvements for more environmentally friendly road and air travel. • Economic cost of improved energy efficiency and the development of alternative fuels e.g. renewable technology • View by EDCs and LIDCs that ACs have created the problem and should therefore bear the cost • Concern of EDCs and LIDCs that reducing GGE will reduce their ability to develop.

Question	Answer	Marks	Guidance
	mitigation strategies are influenced by economic factors more than other factors. Relevant concepts are authoritatively discussed. **Level 3 (13–18 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how economic factors influence decisions on the mitigation 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 as to whether decisions on mitigation strategies are influenced by economic factors more than other factors. Relevant concepts are discussed but this may lack some authority. **Level 2 (7–12 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how economic factors influence decisions on the mitigation of climate change. 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 decisions on mitigation strategies are influenced by economic factors more than other factors. Concepts are discussed but their use lacks precision.		**AO2 – 24 marks** Application of knowledge and understanding to analyse and evaluate whether decisions on mitigation strategies are influenced by economic factors more than other factors could potentially include: Multiple factors can influence a county's decision to adopt specific mitigation strategies: • Adaptation strategies aim to offer greater protection to those people and environments already facing risks from climate change, for example hard engineering. Mitigation and adaptation are complimentary. • Economic factors are important however, a range of technological, social, political and environmental factors will also be a consideration. • Environmental concerns relating to the level of impact within countries. • Social factors such as public engagement • The level of expertise and training in specialist fields • The political will of the government. • Social acceptance – countries vary in willingness to engage with costly schemes. • Cost benefit analysis by individual countries – if a country faces modest negative impacts of climate change the cost of implementing mitigation strategies may outweigh their benefits. • Adoption of mitigation strategies may vary with the degree to which a government sees its country as part of the cause, an AC will be more accountable in this respect than an LIDC potentially. • Emission targets are debated at a global level and

Question			Answer	Marks	Guidance
			Level 1 (1–6 marks) Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how economic factors influence decisions on the mitigation of climate change. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to whether decisions on mitigation strategies are influenced by economic factors more than other factors. Concepts are not discussed or are so inaccurately. **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 of economic development is not the only driving factor in these complex discussions. • Political commitment and willingness to engage in climate change mitigation must be balanced against a range of immediate domestic concerns. For example, individual countries may need a focus of resources on e.g. water supply, food production, industrial development and job creation, tackling poverty, disease and ill health. • The specification requires case study knowledge of the technological, socio-economic and political challenges associated with effective mitigation facing countries and this should form exemplification within this essay.

Question			Answer	Marks	Guidance
			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	Marks	Guidance
13*			**'Physical factors will determine the future global pattern of disease prevalence.' Discuss.** **AO1** **Level 4 (7–9 marks)** Demonstrates **comprehensive** knowledge and understanding of the physical factors that influence the global pattern of disease prevalence. **Level 3 (5–6 marks)** Demonstrates **thorough** knowledge and understanding of the physical factors that influence the global pattern of disease prevalence. **Level 2 (3–4 marks)** Demonstrates **reasonable** knowledge and understanding of the physical factors that influence the global pattern of disease prevalence. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of the physical factors that influence the global pattern of disease prevalence. **0 marks** No response or no response worthy of credit. **AO2** **Level 4 (19–24 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how physical factors could influence the future global pattern of disease prevalence. Demonstrates **comprehensive** application of knowledge and	**33** **AO1 x9** **AO2 x24**	**Indicative content** **AO1 – 9 marks** Demonstrating knowledge and understanding of the physical factors that influence the future global pattern of disease prevalence could potentially include: • Climatic factors such as temperature and precipitation. • Extremes of climate lead to disease – drought (lack of food to maintain health and diseases related to malnutrition), floods and unseasonal heavy rainfall leading to water borne diseases. • Extremes of temperature – cold – flu and pneumonia. • Relief – flat flood plains become waterlogged and water borne disease such as dysentery and hepatitis A and E spread. • Air quality – leading to cardiovascular and respiratory illness. • Water sources leading to water related vectors e.g. mosquitoes. **AO2 – 24 marks** Application of knowledge and understanding to analyse and evaluate the extent to which physical factors will determine the future global pattern of disease more than any other factors could potentially include: • Physical factors will continue to determine pattern of disease prevalence in the short term with seasonal changes and in the long term due to the impacts of climate change. • Changes in the global pattern of infectious diseases are a likely major consequence of climate change.

Question			Answer	Marks	Guidance
			understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to the extent to which physical factors will determine the future global pattern of disease more than any other factors. Relevant concepts are authoritatively discussed. **Level 3 (13–18 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how physical factors could influence the future global pattern of disease prevalence. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions as to the extent to which physical factors will determine the future global pattern of disease more than any other factors. Relevant concepts are discussed but this may lack some authority. **Level 2 (7–12 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how physical factors could influence the future global pattern of disease prevalence. 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 physical factors will determine the future global pattern of disease more than any		A detailed discussion could include the link between malaria and climate and changing distributions as temperature, humidity and rainfall patterns vary in the future. • There could also be a decline in vector diseases dependent on climatic conditions as some areas become drier and warmer. • Many diseases are climate sensitive and therefore physical factors will always be a key determinant of global pattern – malaria, dengue fever, cholera and these will continue to be affected by climate in the short and long term. • There are other factors which will affect the global pattern of disease prevalence in the future: • Social factors – changing pattern of non-communicable diseases such as diabetes, cardiovascular disease and some cancers, related to changing lifestyle associated with rising affluence and development. • Cultural factors – spread of western culture can affect dietary choices and lead to an increased prevalence of certain diseases. • Technological advancements in medicines will alter the global pattern of disease prevalence. • Immunisation programmes, better health care education and improved infrastructure developments will, in the future, increase access and engagement with immunization programmes and change the pattern of disease prevalence. This reflects the impact of economic and social factors.

Question			Answer	Marks	Guidance
			other factors. Concepts are discussed but their use lacks precision. **Level 1 (1–6 marks)** Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how physical factors could influence the future global pattern of disease prevalence. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to the extent to which physical factors will determine the future global pattern of disease more than any other factors. Concepts are not discussed or are so inaccurately. **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.		• Processes such as increasing rates of urbanization over time in the developing parts of the world could lead to an increase of diseases related to poor and cramped living conditions e.g. cholera.

Question			Answer	Marks	Guidance
			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	Marks	Guidance
14*			**Assess the view that grass roots strategies are the most effective ways of dealing with disease risk and eradication.** **AO1** **Level 4 (7–9 marks)** Demonstrates **comprehensive** knowledge and understanding of different strategies of dealing with disease risk and eradication. **Level 3 (5–6 marks)** Demonstrates **thorough** knowledge and understanding of different strategies of dealing with disease risk and eradication. **Level 2 (3–4 marks)** Demonstrates **reasonable** knowledge and understanding of different strategies of dealing with disease risk and eradication. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of different strategies of dealing with disease risk and eradication. **0 marks** No response or no response worthy of credit. **AO2** **Level 4 (19–24 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of the effectiveness of grass roots strategies. Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to whether grass roots strategies are more effective than other strategies.	**33** **AO1 x9** **AO2 x24**	**Indicative content** **AO1 – 9 marks** Demonstrating knowledge and understanding of different grass roots strategies for dealing with disease risk and eradication could potentially include: • Community based projects to encourage the uptake of vaccines. • Projects led by volunteers with agencies such as the WHO working with families at the local level. • Local level education programmes such as education on basic hygiene to tackle the spread of Ebola. • Projects to improve disease recognition so that early treatment is accessed. • The work of global organisations and NGOs such as UNICEF, WHO, Medicines Sans Frontiers, Christian Aid, WaterAid. • National campaigns run by central governments such as MMR vaccinations, anti-smoking, obesity/diabetes, HIV/AIDS. **AO2 – 24 marks** Application of knowledge and understanding to analyse and evaluate whether grass roots strategies are more effective than other strategies could potentially include: • With campaigns by global organisations both physical access and local engagement can provide obstacles. Poor infrastructure development may prevent teams of medical personnel reaching out to remote areas, also cultural and language difficulties may present a further barrier. • Some of the worst affected areas for disease outbreak are often in politically unstable areas

Question			Answer	Marks	Guidance
			Relevant concepts are authoritatively discussed. **Level 3 (13–18 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of the effectiveness of grass roots strategies. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions as to whether grass roots strategies are more effective than other strategies. Relevant concepts are discussed but this may lack some authority. **Level 2 (7–12 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of the effectiveness of grass roots strategies. 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 grass roots strategies are more effective than other strategies. Concepts are discussed but their use lacks precision. **Level 1 (1–6 marks)** Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of the effectiveness of grass roots strategies.		meaning that grassroots participation is restricted and medical staff must work in dangerous situations e.g. Syria. • Key groups, especially women, are crucial in the uptake of grass roots strategies, many medical organisations focus on their work with women – a range of examples can be drawn upon for exemplification. • Success of any strategy, including grass roots, is dependent upon both financial and human resources. Often international organisations and NGOs must rely on volunteers and local people if there is a language barrier. In situations where there are dangers from the risk of infection (e.g. Ebola) or from personal safety (e.g. areas with civil unrest and terrorism) it may be difficult to recruit staff. • All strategies require the willingness and engagement of national governments who may present political obstacles. • With improvements in internet access and other forms of communication national campaigns have more success and can reach more people than labour intensive grass roots campaigns.

Question			Answer	Marks	Guidance
			Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to whether grass roots strategies are more effective than other strategies. Concepts are not discussed or are so inaccurately. **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	Marks	Guidance
15*			**'Economic factors account for rising levels of oceanic pollution'. Discuss** **AO1** **Level 4 (7–9 marks)** Demonstrates **comprehensive** knowledge and understanding of economic factors that lead to oceanic pollution. **Level 3 (5–6 marks)** Demonstrates **thorough** knowledge and understanding of economic factors that lead to oceanic pollution. **Level 2 (3–4 marks)** Demonstrates **reasonable** knowledge and understanding of economic factors that lead to oceanic pollution. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of economic factors that lead to oceanic pollution. **0 marks** No response or no response worthy of credit. **AO2** **Level 4 (19–24 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how economic factors account for oceanic pollution. Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to the extent to which economic factors account for rising oceanic pollution more than other factors.	**33** **AO1 x9** **AO2 x24**	**Indicative content** **AO1 – 9 marks** Demonstrating knowledge and understanding of the economic factors that account for rising oceanic pollution could potentially include: • Rising energy demand for fuel, domestic and industrial use leads to increased use and transportation of oil which can pollute oceans through runoff and spills. • Rising demand for resources to drive industrial development lead to pollution in oceans e.g. runoff from mining activities. • Increased affluence leads to increased use and demand for oil and other fuels. • Increased economic activity in other sectors e.g. primary sector – farming – pollution from fertilizer and agrochemicals and increased activity in the service sector – tourism, leading to increase of cruise ships which leads to oceanic pollution. • Many industrial sectors are using more chemicals and other pollutants which find their way to oceans – plastics, heavy metals. • Increased flows of goods due to globalisation leads to pollution of the oceans through increased trade and more use of shipping routes. • Combustion of fossil fuels (atmospheric CO2 rises, increasing ocean acidity) **AO2 – 24 marks** Application of knowledge and understanding to analyse and evaluate whether economic factors account for rising oceanic pollution more than other factors could

Question			Answer	Marks	Guidance
			Relevant concepts are authoritatively discussed. **Level 3 (13–18 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how economic factors account for oceanic pollution. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions as to the extent to which economic factors account for rising oceanic pollution more than other factors. Relevant concepts are discussed but this may lack some authority. **Level 2 (7–12 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how economic factors account for oceanic pollution. 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 economic factors account for rising oceanic pollution more than other factors. Concepts are discussed but their use lacks precision. **Level 1 (1–6 marks)** Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how economic factors account for oceanic		potentially include: • Social factors such as the assumption that the oceans are so vast and deep that pollutants will be dispersed and diluted. This leads to increased levels of activities where waste is dumped at sea. • Political factors – for example a lack of legislation to regulate the waste from domestic and industrial sources that ends up in oceans. • Economic factors lead to oceanic pollution through – large volumes of waste from an increasing amount of industrial activity and disposal of waste products. • Some countries are increasing their use of nuclear power as part of their long-term energy strategy and this leads to increased amounts of radioactive waste; the oceans continue to be seen as the safest method of dealing with radioactive waste. • Some natural processes can contribute to oceanic pollution e.g. eutrophication and the production of algal blooms leading to the reduction of oxygen in the water and the death of marine species. • Transport is a major economic cause of oceanic pollution. Oil remains one of the most dangerous pollution sources in the oceans with widespread and long term consequences.

Question			Answer	Marks	Guidance
			pollution. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to the extent to which economic factors account for rising oceanic pollution more than other factors. Concepts are not discussed or are so inaccurately. **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	Marks	Guidance
16*			**To what extent does the successful management of oceanic resources require international cooperation?** **AO1** **Level 4 (7–9 marks)** Demonstrates **comprehensive** knowledge and understanding of the management of oceanic resources. **Level 3 (5–6 marks)** Demonstrates **thorough** knowledge and understanding of the management of oceanic resources. **Level 2 (3–4 marks)** Demonstrates **reasonable** knowledge and understanding of the management of oceanic resources. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of the management of oceanic resources. **0 marks** No response or no response worthy of credit. **AO2** **Level 4 (19–24 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how international cooperation can affect the management of ocean resources. Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to the extent to which international cooperation is required to successfully manage ocean resources.	**33** **AO1 x9** **AO2 x24**	**Indicative content** **AO1 – 9 marks** Demonstrating knowledge and understanding of the management of oceanic resources could potentially include: • The concept of the global commons – so management is a broad responsibility. • Concept of the tragedy of the commons – collective responsibility leads to exploitation by individuals as the cost is shared. • Frameworks for management such as UNCLOS • Management through international treaties. • Management through organisations such as the UN or the EU. **AO2 – 24 marks** Application of knowledge and understanding to analyse and evaluate the extent to which international cooperation is required to successfully manage oceanic resources could potentially include: • Management has different degrees of international cooperation depending on the spatial zones from the shoreline, as set out by UNCLOS. There is a distance decay from national to international responsibility. It could be argued that countries are most likely to be proactive regarding management issues when there is physical proximity to the issue. So shore line management under national control is more successful than control of the high seas where international cooperation is required. • Zones of management are disputed by individual countries particularly when access to resources is an issue. This means that international agreement

Question	Answer	Marks	Guidance
	Relevant concepts are authoritatively discussed. **Level 3 (13–18 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how international cooperation can affect the management of ocean resources. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions as to the extent to which international cooperation is required to successfully manage ocean resources. Relevant concepts are discussed but this may lack some authority. **Level 2 (7–12 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how international cooperation can affect the management of ocean resources. 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 international cooperation is required to successfully manage ocean resources. Concepts are discussed but their use lacks precision. **Level 1 (1–6 marks)** Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited		is required but difficult to achieve. • Different resources are managed in different ways, some require more international cooperation than others e.g. waste – issue of those producing the problem and the countries where the effects are being felt as a result of the waste being carried by ocean currents; fishing rights and oil spills are other examples of a complex issue. • New issues are emerging which are not covered by current management agreements e.g. ocean acidification and bio prospecting, so international cooperation is needed to set out new approaches to management. • With some management issues, there is no international agreement eg noise pollution. • Other resources (eg declining and/or protected species) require international management agreement on a broad scale, however, in such situations decision making and consensus are difficult to achieve e.g. International Convention on Biological Diversity where the EU wanted 30% of oceans designated as Marine Protection Areas, other members wanted 10%, and only 3% of oceans are MPAs. International cooperation has proved difficult to achieve.

Question			Answer	Marks	Guidance
			accuracy of how international cooperation can affect the management of ocean resources. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to the extent to which international cooperation is required to successfully manage ocean resources. Concepts are not discussed or are so inaccurately. **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	Marks	Guidance
17*			**Examine the extent to which globalisation impacts on the food industry.** **AO1** **Level 4 (7–9 marks)** Demonstrates **comprehensive** knowledge and understanding of globalisation and its impact on the food industry. **Level 3 (5–6 marks)** Demonstrates **thorough** knowledge and understanding of globalisation and its impact on the food industry. **Level 2 (3–4 marks)** Demonstrates **reasonable** knowledge and understanding of globalisation and its impact on the food industry. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of globalisation and its impact on the food industry. **0 marks** No response or no response worthy of credit. **AO2** **Level 4 (19–24 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how globalisation impacts on the food industry. Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to the extent to which globalisation impacts the food industry.	**33** **AO1 x9** **AO2 x24**	**Indicative content** **AO1 – 9 marks** Demonstrating knowledge and understanding of globalisation and its impact on the food industry could potentially include: • Understanding of the meaning of globalisation as it relates to the food industry. Greater interconnectedness has allowed greater flows of people and goods which has impacted trade in food, diets and consumer choice. • Global food tastes have changed due to increased travel. • There is wider availability of food due to improvements in transport systems e.g. containerisation. • Involvement of TNCs has impacted food production and prices. • Diets have changed with increased affluence and flows of information and people, and the spread of global fast food restaurants and retail chains. • Short term food relief is readily available due to improvements in transport networks. **AO2 – 24 marks** Application of knowledge and understanding to analyse and evaluate the extent to which globalisation impacts the food industry could potentially include: • Improvements in transportation allow food products to travel over long distances and be available all year round. This has impacted on people's expectations, particularly in ACs, that a wide selection of foods are readily available and also it

Question			Answer	Marks	Guidance
			Relevant concepts are authoritatively discussed. **Level 3 (13–18 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how globalisation impacts on the food industry. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions as to the extent to which globalisation impacts the food industry. Relevant concepts are discussed but this may lack some authority. **Level 2 (7–12 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how globalisation impacts on the food industry. 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 globalisation impacts the food industry. Concepts are discussed but their use lacks precision. **Level 1 (1–6 marks)** Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how globalisation impacts on the food industry.		has led to concerns over the environmental impact of 'food miles'. • Despite the fact that globalisation has allowed food to be transported over much greater distances than ever before, there remain issues with food distribution ie: there is overconsumption and waste in some areas and food shortages in others. • globalisation has not particularly led to increased efficiency in the distribution of food from areas of surplus to areas of need. • Globalisation has led to an increase in agribusiness and farming on an industrial scale. Whilst this has impacted on increased supply for some, it has had negative consequences for traditional food systems and small scale farmers who are unable to compete. Sometimes TNCs have more control over the agricultural sector in a country than the national government. • Patterns of food trade have been impacted by globalisation; this has had positive effects for some countries (eg those who benefit from multilateral and bilateral trade agreements). However, often poor countries are left marginalized and unable to compete. • As affluence increases in developed and developing nations, dietary habits change and generally there is more consumption of dairy, meat and convenience foods. This can have health implications if these foods are consumed in excess – obesity is now a global issue hence the term globesity. This has knock on impacts for health care costs with the diet related non-communicable diseases.

Question			Answer	Marks	Guidance
			Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to the extent to which globalisation impacts the food industry. Concepts are not discussed or are so inaccurately. **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.		• The wide availability of food can lead to impacts on supply and price crises. Agribusiness production methods can lead to increased supply over demand and prices fall making small scale producers less competitive. • The positive impacts of the global sharing of new technology is considered an opportunity presented by globalisation but again some small-scale farmers do not have access to the knowledge sharing or the economic means to participate and so are left disadvantaged by this impact.

Question			Answer	Marks	Guidance
18*			**Evaluate the effectiveness and sustainability of techniques used to improve food security.** **AO1** **Level 4 (7–9 marks)** Demonstrates **comprehensive** knowledge and understanding of techniques used to improve food security. **Level 3 (5–6 marks)** Demonstrates **thorough** knowledge and understanding of techniques used to improve food security. **Level 2 (3–4 marks)** Demonstrates **reasonable** knowledge and understanding of techniques used to improve food security. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of techniques used to improve food security. **0 marks** No response or no response worthy of credit. **AO2** **Level 4 (19–24 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how different techniques can be used to improve food security. Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to the effectiveness and sustainability of techniques used to improve food security.	**33** **AO1 x9** **AO2 x24**	**Indicative content** **AO1 – 9 marks** Demonstrating knowledge and understanding of techniques used to improve food security could potentially include: • Food security is a broad term covering the physical and economic access to sufficient quantities of food but also to safe and nutritious food. • Techniques exist at a range of scales: • Different project sizes o Large scale projects such as engineering schemes ensuring water supply through the construction of dams and reservoirs; large investments in research and food technology – GM crops, HYV crops. o Small scale projects such as sack gardening in shanty towns; small cooperatives – *organiponicos* in Cuba. o Use of appropriate technology – tools manufactured locally to be effective in local conditions, rainwater harvesting. • Different time scales o Short term relief o Long term system redesign • Educating people in healthy and nutritious diets. **AO2 – 24 marks** Application of knowledge and understanding to analyse and evaluate the effectiveness and sustainability of techniques used to improve food security could potentially include: • The answer should draw on a range of techniques, however, some techniques can be effective but not

Question			Answer	Marks	Guidance
			Relevant concepts are authoritatively discussed. **Level 3 (13–18 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how different techniques can be used to improve 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 as to the effectiveness and sustainability of techniques used to improve food security. Relevant concepts are discussed but this may lack some authority. **Level 2 (7–12 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how different techniques can be used to improve 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 the effectiveness and sustainability of techniques used to improve food security. Concepts are discussed but their use lacks precision. **Level 1 (1–6 marks)** Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how different techniques can be used to improve		sustainable or sustainable but not as effective as other methods. • Exploration of the concept of sustainability – farming techniques that help present generations to meet their food requirements but do not compromise the ability of future generations to do the same. • Large scale technological investments in agriculture often lead to farming practices (eg mono culture and intensification) which damage the environment and decrease soil fertility so they are effective in the short term but not sustainable. • Large scale or high tech projects often impact local farming communities in a negative way as they cannot afford the costly inputs; this does not give long term sustainability to farming at a local scale. • Sustainable techniques include agro ecology, conservation agriculture and organic farming which can achieve long term sustainability but in some examples are not widely effective to meet food security issues – e.g. in ACs organic produce is beyond the economic means of some families. • Sustainability can be improved by short term positive methods to give farmers a renewed incentive e.g. improved access to markets can trigger motivation. • Farmers in LIDCs are slow to adapt to technological innovations and sophisticated machinery making them less effective. • Education, training and engagement with local farmers is often an effective and sustainable route to improving food security. The local knowledge of farmers provides an invaluable input to the design

Question			Answer	Marks	Guidance
			food security. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to the effectiveness and sustainability of techniques used to improve food security. Concepts are not discussed or are so inaccurately. **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.		of new farming techniques. • A range of examples can be used to illustrate the points above; the specification requires detailed examples from 2 case studies.

Question			Answer	Marks	Guidance
19*			**Assess the extent to which the decision to live in tectonically active locations is determined by economic factors.** **AO1** **Level 4 (7–9 marks)** Demonstrates **comprehensive** knowledge and understanding of reasons for living in tectonically active locations. **Level 3 (5–6 marks)** Demonstrates **thorough** knowledge and understanding of reasons for living in tectonically active locations. **Level 2 (3–4 marks)** Demonstrates **reasonable** knowledge and understanding of reasons for living in tectonically active locations. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of reasons for living in tectonically active locations. **0 marks** No response or no response worthy of credit. **AO2** **Level 4 (19–24 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how economic factors influence the decision to live in tectonically active areas. Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to whether economic	**33** **AO1 x9** **AO2 x24**	**Indicative content** **AO1 – 9 marks** Demonstrating knowledge and understanding of the reasons for living in tectonically active locations could potentially include: • Economic reasons: jobs and income from tourism, cheap geothermal energy, valuable minerals nearby, lack of income to move, taking advantage of cheaper housing. • Social reasons: low perception of hazard risk, low frequency of hazard, family and community are more important than the hazard risk, new building design and protection methods mean that people feel safe, a sense of security from evacuation and warning systems. • Environmental: in areas highly dependent on agriculture volcanic soils are very fertile. **AO2 – 24 marks** Application of knowledge and understanding to analyse and evaluate the extent to which the decision to live in tectonically active areas is determined by economic factors could potentially include: • There will be variations in the basis of decisions between ACs and LIDCs – in an AC such as Japan there will be a high level of confidence in prediction and prevention and in ACs also support from insurance is much greater. In LIDCs there are few who can afford insurance and there is less investment in technology for prevention, protection and prediction. • Individuals make risk assessments based on a range of factors – economic but also social, as they

Question			Answer	Marks	Guidance
			factors influence the decision to live in tectonically active areas more than any other factors. Relevant concepts are authoritatively discussed. **Level 3 (13–18 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how economic factors influence the decision to live in tectonically active areas. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions as to whether economic factors influence the decision to live in tectonically active areas more than any other factors. Relevant concepts are discussed but this may lack some authority. **Level 2 (7–12 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how economic factors influence the decision to live in tectonically active areas. 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 economic factors influence the decision to live in tectonically active areas more than any other factors. Concepts are discussed but their use lacks precision.		relate to their personal circumstances. • Some individuals have a strong sense of belonging and emotional attachment to a place and have a low perception of risk. • Some individuals will not have the financial means to move or the skills set or opportunities to move elsewhere to a different job. They may also lose money in a house sale (negative equity) or even find it impossible to sell their home. • Hazard perception is an important concept – some hazards are very infrequent, Pinatubo erupted in the Philippines in 1991 but it had been 600 years since the previous eruption. • Concept of inertia – it has always been like this. • A range of examples can be used to illustrate the points above; the specification requires 2 x 2 case studies.

Question			Answer	Marks	Guidance
			Level 1 (1–6 marks) Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how economic factors influence the decision to live in tectonically active areas. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to whether economic factors influence the decision to live in tectonically active areas more than any other factors. Concepts are not discussed or are so inaccurately. **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.		

Question			Answer	Marks	Guidance
			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	Marks	Guidance
20*			**To what extent is it possible to manage hazards arising from earthquakes?** **AO1** **Level 4 (7–9 marks)** Demonstrates **comprehensive** knowledge and understanding of the hazards arising from earthquakes and their management. **Level 3 (5–6 marks)** Demonstrates **thorough** knowledge and understanding of the hazards arising from earthquakes and their management. **Level 2 (3–4 marks)** Demonstrates **reasonable** knowledge and understanding of the hazards arising from earthquakes and their management. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of the hazards arising from earthquakes and their management. **0 marks** No response or no response worthy of credit. **AO2** **Level 4 (19–24 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how hazards arising from earthquakes can be managed. Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational	**33** **AO1 x9** **AO2 x24**	**Indicative content** **AO1 – 9 marks** Demonstrating knowledge and understanding of the hazards arising from earthquakes and their management could potentially include: The following earthquake hazards: • All result in potential for loss of life on a large scale, injury, economic loss and long term trauma. • Ground shaking – collapse of buildings, damage to infrastructure, displacement to rocks and ground surface, disruption to natural drainage surface water supplies and groundwater. • Tsunamis – destruction of buildings and infrastructure, coastal flooding. • Landslides and rockfalls – destruction of property and infrastructure • Ground subsidence – slope failure, infrastructure damaged, large structures such as dams may fail leading to flooding. • Liquefaction – natural features e.g. river banks collapse, building structures affected, buildings collapse. • After shocks – these can take emergency services by surprise and cause further injury, loss of life, damage and destruction. • The following strategies to manage hazards: • Land use zoning – land uses with high economic cost of repair or potential for high loss of life moved to low risk sites. • building design – fire proof materials, steel frames, shock absorbers,

Question	Answer	Marks	Guidance
	conclusions that are evidence based as to the extent to which it is possible to manage hazards arising from earthquakes. Relevant concepts are authoritatively discussed. **Level 3 (13–18 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how hazards arising from earthquakes can be managed. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions as to the extent to which it is possible to manage hazards arising from earthquakes. Relevant concepts are discussed but this may lack some authority. **Level 2 (7–12 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how hazards arising from earthquakes can be managed. 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 it is possible to manage hazards arising from earthquakes. Concepts are discussed but their use lacks precision.		• Education, warning systems, insurance. **AO2 – 24 marks** Application of knowledge and understanding to analyse and evaluate the extent to which it is possible to manage hazards arising from earthquakes could potentially include: • Opportunities and potential success in management of the hazards resulting from earthquakes vary with level of economic development, resources available, level of expertise and technology available. • Management can also vary over time as progress is made in prediction and protection technology and scientists' understanding of long term patterns of hazard activity which can make management more effective. • New organisations e.g. WAPMERR aim to bring together different agencies in hazard management however, such organisations are dependent on both human and financial resources. They can give predictions but 100% accuracy in hazard prediction and planning is unlikely to occur. • A range of methods should be considered in the context of 2 case studies, as the specification requires, at contrasting levels of economic development. • Evaluation points may include: personal choice eg whether to invest in home protection or insurance; perception of risk eg education and safety drills may be met with complacency by residents if they perceive the hazard risk as low due to infrequency, • Warning systems are not always accurate and this

Question			Answer	Marks	Guidance
			Level 1 (1–6 marks) Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how hazards arising from earthquakes can be managed. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to the extent to which it is possible to manage hazards arising from earthquakes. Concepts are not discussed or are so inaccurately. **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.		can result in loss of confidence in them and economic cost of disruption. • Even in LIDCs there are effective means of hazard management and expert knowledge, it should not be assumed that only ACs can engage in effective management although obviously, their access to human and financial resources does make a difference to resilience. • Sometimes natural factors come into play which cannot be managed – the unpredictable nature of earthquakes, the physical geography of a country may mean that emergency services are hindered. • The extent to which hazards can be managed in the short and long term will vary across different countries and this impacts on how long the effects are felt, in LIDCs the hazard impact from earthquake events may well be more long lasting.

Assessment Objectives (AO) grid

Candidates answer **two** of questions 1 to 5, **two** of questions 6 to 10 and **two** of questions 11 to 15. This has been considered in the totals indicated below.

Question	AO1	AO2	AO3	Marks
1a	0	0	3	3
1b	6	0	0	6
2a	0	0	3	3
2b	6	0	0	6
3a	0	0	3	3
3b	6	0	0	6
4a	0	0	3	3
4b	6	0	0	6
5a	0	0	3	3
5b	6	0	0	6
6	6	6	0	12
7	6	6	0	12
8	6	6	0	12
9	6	6	0	12
10	6	6	0	12
11*	9	24	0	33
12*	9	24	0	33
13*	9	24	0	33
14*	9	24	0	33
15*	9	24	0	33
16*	9	24	0	33
17*	9	24	0	33
18*	9	24	0	33
19*	9	24	0	33
20*	9	24	0	33
Total	42	60	6	108

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