



GCE

Geography

H081/02: Geographical debates

AS Level

Mark Scheme for June 2025

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

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

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

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MARKING INSTRUCTIONS

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**PREPARATION FOR MARKING
RM ASSESSOR**

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *RM Assessor Online Training: OCR Essential Guide to Marking*.
2. Make sure that you have read and understood the mark scheme and the question paper for this unit. These are available in RM Assessor
3. Log-in to RM Assessor and mark the **required number** of practice responses (“scripts”) and the **required number** of standardisation responses.

MARKING

1. Mark strictly to the mark scheme.
2. Marks awarded must relate directly to the marking criteria.
3. The schedule of dates is very important. It is essential that you meet the RM Assessor 50% and 100% (traditional 40% Batch 1 and 100% Batch 2) deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.
4. If you are in any doubt about applying the mark scheme, consult your Team Leader by telephone, email or via the RM Assessor messaging system.

5. Crossed-Out Responses

Where a candidate has crossed out a response and provided a clear alternative then the crossed-out response is not marked. Where no alternative response has been provided, examiners may give candidates the benefit of the doubt and mark the crossed-out response where legible.

Rubric Error Responses – Optional Questions

Where candidates have a choice of question across a whole paper or a whole section and have provided more answers than required, then all responses are marked and the highest mark allowable within the rubric is given. Enter a mark for each question answered into RM Assessor, which will select the highest mark from those awarded. *(The underlying assumption is that the candidate has penalised themselves by attempting more questions than necessary in the time allowed.)*

Multiple-Choice Question Responses

When a multiple-choice question has only a single, correct response and a candidate provides two responses (even if one of these responses is correct), then no mark should be awarded (as it is not possible to determine which was the first response selected by the candidate).

When a question requires candidates to select more than one option/multiple options, then local marking arrangements need to ensure consistency of approach.

Contradictory Responses

When a candidate provides contradictory responses, then no mark should be awarded, even if one of the answers is correct.

Short Answer Questions (requiring only a list by way of a response, usually worth only one mark per response)

Where candidates are required to provide a set number of short answer responses then only the set number of responses should be marked. The response space should be marked from left to right on each line and then line by line until the required number of responses have been considered. The remaining responses should not then be marked. Examiners will have to apply judgement as to whether a 'second response' on a line is a development of the 'first response', rather than a separate, discrete response. *(The underlying assumption is that the candidate is attempting to hedge their bets and therefore getting undue benefit rather than engaging with the question and giving the most relevant/correct responses.)*

Short Answer Questions (requiring a more developed response, worth two or more marks)

If the candidates are required to provide a description of, say, three items or factors and four items or factors are provided, then mark on a similar basis – that is downwards (as it is unlikely in this situation that a candidate will provide more than one response in each section of the response space).

Longer Answer Questions (requiring a developed response)

Where candidates have provided two (or more) responses to a medium or high tariff question which only required a single (developed) response and not crossed out the first response, then only the first response should be marked. Examiners will need to apply professional judgement as to whether the second (or a subsequent) response is a 'new start' or simply a poorly expressed continuation of the first response.

6. Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there, then add the annotation 'SEEN' to confirm that the work has been seen and mark any responses using the annotations in section 11.
7. There is a NR (**No Response**) option. Award NR (No Response):
 - if there is nothing written at all in the answer space

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- OR if there is a comment which does not in any way relate to the question (e.g., 'can't do', 'don't know')
- OR if there is a mark (e.g., a dash, a question mark) which is not an attempt at the question.

Note: Award 0 marks – for an attempt that earns no credit (including copying out the question).

8. The RM Assessor **comments box** is used by your Team Leader to explain the marking of the practice responses. Please refer to these comments when checking your practice responses. **Do not use the comments box for any other reason.**
9. *Assistant Examiners will send a brief report on the performance of candidates to their Team Leader (Supervisor) via email by the end of the marking period. The report should contain notes on particular strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.*
10. For answers marked by levels of response: Not applicable in F501
To determine the level – start at the highest level and work down until you reach the level that matches the answer
To determine the mark within the level, consider the following

Descriptor	Award mark
On the borderline of this level and the one below	At bottom of level
Just enough achievement on balance for this level	Above bottom and either below middle or at middle of level (depending on number of marks available)
Meets the criteria but with some slight inconsistency	Above middle and either below top of level or at middle of level (depending on number of marks available)
Consistently meets the criteria for this level	At top of level

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11. Annotations

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

Question	Answer	Mark	Guidance
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1	(a)	Explain how <u>two</u> geoengineering strategies might reduce the risks of climate change. Geoengineering, the use of technology to modify the environment on a large scale. Possible geoengineering strategies include: - Reducing the amount of insolation absorbed by the Earth and its atmosphere (✓) by reflecting solar radiation, placing huge reflecting plates in orbit or on Earth, the amount of energy absorbed and converted to heat could be reduced (DEV) - Removing CO₂ from the atmosphere (✓); fertilising oceans with nutrients, such as iron, might stimulate the growth of phytoplankton so that more CO₂ is extracted from the air via photosynthesis (DEV) - Enhanced weathering (✓); crushing large amounts of rock, exposing silicate minerals to air, might produce a reaction that absorbs CO₂ (DEV) - Extracting CO₂ from the atmosphere using 'artificial trees' (✓) a plastic resin is used to capture CO₂ which is subsequently compressed and stored (DEV)	4 AO1x4	AO1 – 4 marks 2 x 1 mark (✓) for each possible geoengineering strategy. 2 x 1 mark (DEV) for each explanation of how the geoengineering strategy might reduce the risks of climate change. Focus should be on knowledge and understanding of how the geoengineering strategies might reduce the risks.
	(b)	Examine how past climate reveals periods of icehouse Earth. Level 3 (5-6 marks) Demonstrates thorough knowledge and understanding of how past climate reveals periods of icehouse Earth (AO1). Where appropriate, place specific details should be accurate. Demonstrates thorough application of knowledge and understanding to provide an accurate, clear and developed analysis as to how past climate reveals periods of icehouse Earth (AO2).	6 AO1x3 AO2x3	Indicative content AO1 - 3 marks Knowledge and understanding of how past climate reveals periods of icehouse Earth could potentially include: - long term change: transition to colder global climate conditions includes a relatively rapid transition to colder conditions at the start of the Oligocene 35m years ago – a change linked to a significant reduction in GHGs, especially CO₂ - glaciation of Antarctica a descent from subtropical – icehouse conditions (35 mya) into a permanent icehouse state caused by: - o abrupt drop in CO₂ levels - o continental drift towards the south pole

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		Level 2 (3-4 marks) Demonstrates reasonable knowledge and understanding of how past climate reveals periods of icehouse Earth (AO1). Where appropriate, place specific material is present which is partially accurate. Demonstrates reasonable application of knowledge and understanding to provide a sound analysis showing some accuracy and development as to how past climate reveals periods of icehouse Earth (AO2). Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of how past climate reveals periods of icehouse Earth (AO1). If appropriate, little or no place specific material is present and / or is inaccurate. Demonstrates basic application of knowledge and understanding to provide a simple analysis showing limited accuracy and little development as to how past climate reveals periods of icehouse Earth (AO2). 0 marks No response or no material worthy of credit.		- o Antarctic Circumpolar Current insulates Antarctica from warmer water further north - o South Sandwich Islands submerged volcanic arc isolates Antarctica from warmer water • quaternary glaciation: cyclic changes in climate have included long cold glacials typically lasting 100,000 years – in Europe annual average temperatures well below zero and a third of the continent covered by snow and ice. AO2 - 3 marks Application of knowledge and understanding to analyse how past climate reveals periods of icehouse Earth could potentially include: • periods of icehouse Earth are revealed by evidence of fluctuation in the Earth's climate • fluctuations in CO₂ levels, global temperatures and extent of ice cover • long term fluctuations between greenhouse and icehouse conditions over hundreds of millions of years • short term fluctuations between glacials and inter-glacials • examples of specific evidence include: - o geological and fossil record, reveals past environmental conditions. - o chemical composition of sea floor sediments used to reconstruct past climates. - o ice cores, reveal gaseous composition of the atmosphere in the past - o post-glacial landforms revealed during inter-glacials
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1	(c)	(i)	Study Fig.1 which shows the decreasing extent of Arctic sea ice. With reference to Fig.1 describe the changes in extent of Arctic sea ice shown. • overall decrease of approximately 25-30% in area (✓) • greatest decrease is in the area north of Russia and Alaska approx. 5-600 km (✓) • least change / smallest decrease is off northern Greenland and north Canadian islands (✓) • limited decrease in the areas north of Russia and Scandinavia ~100 km (✓) • some Canadian islands not connected by ice (✓) • the ice cap is thinning around its edge's concentration of ice down to 15% for approx.100 km (✓)	4 AO3x4	AO3 – 4 marks 4 x 1 mark (✓) for each piece of evidence from Fig.1 that describes the changes in extent of Arctic Sea ice shown.
1	(c)	(ii)	Using evidence from Fig.1 suggest possible reasons for changes in the extent of Arctic sea ice. Level 3 (5-6 marks) Demonstrates thorough application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to possible reasons for changes in the extent of Arctic sea ice shown in Fig.1 (AO2). Demonstrates thorough investigation and interpretation of the resource to fully evidence changes in extent of Arctic Sea ice. There must be strong ideas linking resource evidence to the possible reasons for changes in the extent of Arctic sea ice shown in Fig.1 (AO3). Level 2 (3-4 marks) Demonstrates reasonable application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to possible reasons for changes in the extent of Arctic sea ice shown in Fig.1 (AO2).	6 AO2x3 AO3x3	Indicative content AO2 - 3 marks Application of knowledge and understanding to analyse possible reasons for changes in the extent of Arctic sea ice shown in Fig.1 could potentially include: • influx of warmer waters: e.g. warm ocean currents flowing into the Arctic from other seas to the south e.g. North Atlantic Drift. • changing quality of ice: more resistant 'old ice' largely from snow precipitation being replaced by 'new ice' containing more salt water, more subject to melting. • diminishing albedo as area of white ice decreases and area of darker sea increases absorbing more incoming solar radiation creating positive feedback AO3 - 3 marks Evidence from investigation and interpretation of the data in Fig.1 could potentially include:

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		Demonstrates reasonable investigation and interpretation of the resource to fully evidence changes in extent of Arctic sea ice. There must be good ideas linking resource evidence to the possible reasons for changes in the extent of Arctic sea ice shown in Fig.1 (AO3). Level 1 (1-2 marks) Demonstrates basic application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to possible reasons for changes in the extent of Arctic sea ice shown in Fig.1 (AO2). Demonstrates basic investigation and interpretation of the resource to fully evidence changes in extent of Arctic sea ice. There must be some ideas linking resource evidence to the possible reasons for changes in the extent of Arctic sea ice shown in Fig.1 (AO3).		- Fig. 1 shows overall decrease in both extent and thickness of sea ice; result of global warming / climate change / warmer air temperatures - Fig.1 shows locations where the sea ice edges are directly affected by warm water flowing into the area such as the effects of the North Atlantic Drift off the coast of northwest Russia - Fig.1 shows extensive areas of significant thinning of ice, especially off the coast of Russia / Siberia; these are now areas of 'salty new ice' that are less resilient to melting than 'snowy older ice' - extensive areas of the Arctic Ocean not covered by ice are shown at the end of the summer in Fig.1 emphasising reduced albedo in the Arctic Candidates can reach the top of L2 when no reference to the figure.
1	(d)	The Intergovernmental Panel on Climate Change provides the most significant human response to climate change. Discuss. Level 4 (10–12 marks) Demonstrates comprehensive and accurate knowledge and understanding of the role of the Intergovernmental Panel on Climate Change and other human responses to climate change (AO1). Demonstrates comprehensive application of knowledge and understanding to provide a detailed and convincing evaluation offering secure judgements leading to rational conclusions that are evidence based as to the role of the Intergovernmental Panel on Climate Change and other human responses to climate change (AO2). Level 3 (7-9 marks) Demonstrates thorough and mainly accurate knowledge and understanding of the role of the Intergovernmental Panel on	12 AO1x6 AO2x6	Indicative content AO1 - 6 marks Knowledge and understanding of the role of the Intergovernmental Panel on Climate Change and other human responses to climate change could potentially include: - IPCC (est in 1988 between UNEP and WMO): - objective, science-based reports - understanding of climate change risks - options for mitigation and adaptation - reports inform policy makers based on accepted research of rising GHGs - highly influential information that shapes policies at all scales - warnings re urgency of consequences - information has encouraged a new legally binding international agreement - Kyoto Protocol (international agreement limiting carbon emissions)

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		Climate Change and other human responses to climate change (AO1). Demonstrates thorough application of knowledge and understanding to provide a detailed evaluation offering generally secure judgements with some link between rational conclusions and evidence as to the role of the Intergovernmental Panel on Climate Change and other human responses to climate change (AO2). Level 2 (4-6 marks) Demonstrates reasonable and some accurate knowledge and understanding of the role of the Intergovernmental Panel on Climate Change and other human responses to climate change (AO1). Demonstrates reasonable application of knowledge and understanding to provide a sound evaluation offering generalised judgements and conclusions with limited links to evidence as to as to the role of the Intergovernmental Panel on Climate Change and other human responses to climate change (AO2). Level 1 (1-3 marks) Demonstrates basic and/or inaccurate knowledge and understanding of the role of the Intergovernmental Panel on Climate Change and other human responses to climate change (AO1). Demonstrates basic application of knowledge and understanding offering either unsupported or minimal if any evaluation. Judgements and conclusions, if any, are simplistic as to the role of the Intergovernmental Panel on Climate Change and other human responses to climate change (AO2). 0 marks No response or no material worthy of credit.		- o not supported by all countries - o only some countries have reached targets - o flawed because largest carbon emitting countries have failed to ratify the treaty Other international directives: • EU Climate Directive - o targets to reduce GHG emissions - o more effective than if member states had been left to pursue their own policies - o successful carbon trading scheme - o limited progress re energy efficiency - o some states slow to implement the policies Carbon trading and carbon credits - o EU Emissions Trading System (EUETS) – a ‘cap and trade’ system where polluters either cut emissions or incur extra costs - o involves power stations, industries, aviation (50% of emitters) across Europe but not agriculture and transport National and sub-national policies – such as those specific to Denmark and California AO2 - 6 marks Application of knowledge and understanding to analyse and evaluate the role of the Intergovernmental Panel on Climate Change and other human responses to climate change could potentially include: • evaluation of IPCC and / or Kyoto Protocol in terms of objectives, research-based evidence, scale, outcomes • evaluation of other human responses in terms of their level ratification and responses to set targets • consideration of effectiveness of human responses at scales from international to sub-national • consideration of how effectiveness of human responses changes over time • understanding of the geopolitics involved in
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					implementing policies • idea that success might depend on co-operation at all scales
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Question			Answer	Mark	Guidance
2	(a)		Explain how nature has provided conditions for <u>two</u> different medicines used to treat disease. Mainly medicines from wild / cultivated plants such as:	4 AO1x4	AO1 – 4 marks 2 x 1 mark (✓) for each correct medicine from nature. 2 x 1 mark (DEV) for each explanation of how nature has provided conditions for each medicine.

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		• morphine used to relieve pain (✓) sourced from dried latex from seed pods of opium poppy that grow in warm (days 30+C) humid conditions (DEV) • quinine used to kill malarial parasites (✓) extracted from the dried bark of cinchonas evergreen tree requiring average temperatures above 20C, high rainfall and no frost (DEV) • aspirin, based on salicin, used for pain relief (✓) isolated from bark of white willow tree, found on riverbanks / wetlands in temperate regions (DEV) • nicotine used in drugs to treat wounds, Alzheimer's, depression (✓) obtained from the tobacco plant requiring mean daily temps of 20-30C, regular rainfall, frost free conditions (DEV) • rosy periwinkle contains alkaloids used in treatment of cancers (✓) a small evergreen shrub common in tropical and sub-tropical regions (DEV) • digitalis used in treatment of dropsy and heart failure (✓) sourced from foxglove a plant found in temperate climatic conditions (DEV)		Focus should be on the knowledge and understanding of how provision of specific medicines can be linked to nature.
2	(b)	Examine how international organisations respond to the diffusion of disease. Level 3 (5-6 marks) Demonstrates thorough knowledge and understanding of how international organisations respond to the diffusion of disease (AO1). Where appropriate, place specific details should be accurate. Demonstrates thorough application of knowledge and understanding to provide an accurate, clear and developed analysis as to how international organisations respond to the diffusion of disease (AO2).	6 AO1x3 AO2x3	Indicative content AO1 - 3 marks Knowledge and understanding of how international organisations respond to the diffusion of disease could potentially include: • predicting diseases • gathering data • research • support programmes • working with agencies and governments AO2 - 3 marks Application of knowledge and understanding to analyse how international organisations respond to the diffusion of disease could potentially include:

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			Level 2 (3-4 marks) Demonstrates reasonable knowledge and understanding of how international organisations respond to the diffusion of disease (AO1). Where appropriate, place specific material is present which is partially accurate. Demonstrates reasonable application of knowledge and understanding to provide a sound analysis showing some accuracy and development as to how international organisations respond to the diffusion of disease (AO2). Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of how international organisations respond to the diffusion of disease (AO1). If appropriate, little or no place specific material is present and / or is inaccurate. Demonstrates basic application of knowledge and understanding to provide a simple analysis showing limited accuracy and little development as to how international organisations respond to the diffusion of disease (AO2). 0 marks No response or no material worthy of credit.		- predicting the spread of diseases is an important part of the work of international organisations such as WHO / UNICEF / NGOs; based on awareness of epidemics and disease outbreaks using data collected and the experience of other agencies / governments - health statistics are collected from most countries, compiled and published annually by WHO; this data can inform national authorities about health risks in each country, mortality rates from different types of disease and government spending on health care - research is conducted by WHO's health research groups e.g. on influenza, tropical diseases, mental health, and vaccines; they often collaborate with other international agencies such as 'Stop TB Partnership' - support programmes are delivered to countries where emergency health services (e.g. Drs without borders) might be needed such as mobile medical units and large-scale vaccination programmes to control the spread of disease - international organisations work closely with each other; for example, the WHO (which is the directing and co-ordinating authority on international health for the UN) works with other agencies such as UNICEF, the World Bank and NGOs Reference to specific international organisations such as the World Health Organisation or the International Red Cross might help to support a response.
2	(c)	(i)	Study Fig.2 which shows diabetes prevalence among adults, ages 20-79, in Africa, 2021. With reference to Fig.2 describe the spatial pattern of diabetes prevalence in Africa. - higher rates in North Africa, 8% - >20% (✓) - high rates in South Africa, 10% - 15% (✓) - higher rates in east-central Africa, 10% - 15% (✓) - higher rates in northeast Africa, 8% - 20% (✓) - highest prevalence in Egypt, >20% (✓)	4 AO3x4	AO3 – 4 marks 4 x 1 mark (✓) for each piece of evidence from Fig.2 that describes a feature of the spatial pattern of diabetes prevalence in Africa.

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			• lower rates in West Africa, <2% - 6% (✓) • lowest prevalence in Benin, <2% (✓) • Sudan, 17.5% - 20%, highest in Sub-Saharan Africa (✓)		
2	(c)	(ii)	Using evidence from Fig.2, suggest possible reasons for the variation in diabetes prevalence. Level 3 (5-6 marks) Demonstrates thorough application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to possible reasons for variation in diabetes prevalence shown in Fig.2 (AO2). Demonstrates thorough investigation and interpretation of the resource to fully evidence variation in diabetes prevalence. There must be strong ideas linking resource evidence to the possible reasons for variation in diabetes prevalence shown in Fig.2 (AO3). Level 2 (3-4 marks) Demonstrates reasonable application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to possible reasons for variation in diabetes prevalence shown in Fig.2 (AO2). Demonstrates reasonable investigation and interpretation of the resource to fully evidence variation in diabetes prevalence. There must be good ideas linking resource evidence to the possible reasons for variation in diabetes prevalence shown in Fig.2 (AO3). Level 1 (1-2 marks) Demonstrates basic application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to possible reasons for variation in diabetes prevalence shown in Fig.2 (AO2).	6 AO2x3 AO3x3	Indicative content AO2 - 3 marks Application of knowledge and understanding to analyse possible reasons for variation in diabetes prevalence shown in Fig.2 could potentially include: • higher prevalence of diabetes is found among more elderly populations; this demographic factor is linked to a country's population age-structure • higher prevalence of diabetes is linked to lifestyle, particularly to unhealthy diet and obesity in places / societies where access to nutritious food is limited • prevalence of diabetes is related to physical inactivity; this may be a behavioural factor in the more developed countries where a higher proportion of population live in urban areas with possibly a more sedentary lifestyle than in rural areas • higher prevalence where strategies are less well developed / governments less wealthy; e.g. where lower levels of investment in public health and education • higher prevalence in countries where access to health care services is poor; this might lead to less likelihood of diagnosis or obtaining treatment early enough • higher prevalence where other contributory factors include genetic factors, environmental factors such as air pollution and poverty AO3 - 3 marks Evidence from investigation and interpretation of the data in Fig.2 could potentially include: • higher %s in more developed countries / EDCs such as Egypt or S Africa and lower %s in LIDCs of west Africa such as Benin or Mali can be related to their population age-structures • higher %s in some LIDCs such as Sudan – where

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		Demonstrates basic investigation and interpretation of the resource to fully evidence variation in diabetes prevalence shown in Fig.2. There must be some ideas linking resource evidence to the possible reasons for variation in diabetes prevalence shown in Fig.2 (AO3).		less wealthy governments or poverty amongst population or conflict has led to poor access to health care • higher %s in some LIDCs of eastern Africa e.g. Somalia, Tanzania – where less effective strategies for provision of services such as health care and education • lower %s in some Sub Saharan LIDCs such as Mali, Mauritania, Mozambique where higher proportion of rural populations with less sedentary lifestyles than country's with greater urban populations such as S Africa and Egypt Candidates can reach the top of L2 when no reference to the figure.
2	(d)	‘Human factors affect the spread of disease following a natural hazard more than environmental factors.’ Discuss in the context of <u>one</u> country. Level 4 (10–12 marks) Demonstrates comprehensive and accurate knowledge and understanding of human and environmental factors that have affected the spread of disease following a natural hazard in one country (AO1). Demonstrates comprehensive application of knowledge and understanding to provide a detailed and convincing evaluation offering secure judgements leading to rational conclusions that are evidence based as to the extent that human and environmental factors have affected the spread of disease following a natural hazard in one country (AO2). Level 3 (7-9 marks) Demonstrates thorough and mainly accurate knowledge	12 AO1x6 AO2x6	Indicative content AO1 - 6 marks Knowledge and understanding of human and environmental factors that have affected the spread of disease following a hazard in one country could potentially include: Human factors: - o population – density, rural / urban e.g. age - o displacement of population – internal migration - o levels of poverty – households and / or governments - o access to sanitation and clean drinking water - o ability of national government to respond in both short and long term e.g. strategies in place, immunisation programme, availability of medical supplies - o accessibility – to medical facilities and aid workers - o international strategies – e.g. aid supplies/workers Environmental factors: • climate – factors such as temperature, rainfall, relative humidity that might influence habitats of

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		and understanding of human and environmental factors that have affected the spread of disease following a hazard in one country (AO1). Demonstrates thorough application of knowledge and understanding to provide a detailed evaluation offering generally secure judgements with some link between rational conclusions and evidence as to the extent that human and environmental factors have affected the spread of disease following a hazard in one country (AO2). Level 2 (4-6 marks) Demonstrates reasonable and some accurate knowledge and understanding of human and environmental factors that have affected the spread of disease following a hazard in one country (AO1). Demonstrates reasonable application of knowledge and understanding to provide a sound evaluation offering generalised judgements and conclusions with limited links to evidence as to the extent that human and environmental factors have affected the spread of disease following a hazard in one country (AO2). Level 1 (1-3 marks) Demonstrates basic and/or inaccurate knowledge and understanding of human and environmental factors that have affected the spread of disease following a hazard in one country (AO1). Demonstrates basic application of knowledge and understanding offering either unsupported or minimal if any evaluation. Judgements and conclusions, if any, are simplistic as to the extent that human and environmental factors have affected the spread of disease following a hazard in one country (AO2).		disease vectors • altitude and relief – factors that might influence temperature and rainfall regimes and seasonal variation in disease incidence • extent and geographical nature of the area covered by the hazard – scale. AO2 - 6 marks Application of knowledge and understanding to analyse and evaluate the extent that human and environmental factors have affected the spread of disease following a hazard in one country could potentially include: • evaluation of the effects of human factors • evaluation of the effects of environmental factors • idea that disease may be caused by a combination of factors following a natural hazard • consideration that these factors can change over time • consideration that factors can vary in importance at different scales within the country • the relative effects of human factors on the spread of disease might be viewed in terms of: - o size / extent of area affected - o number of people affected - o wealth of the population - o housing - o access to medical care - o government and NGO responses at national / international scales - o shorter-term / longer-term effects Examples of case study material could include Bangladesh – following flooding, or Haiti – following the 2010 earthquake.
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			0 marks No response or no material worthy of credit.		
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Question			Answer	Mark	Guidance
3	(a)		Explain <u>two</u> impacts on indigenous peoples resulting from changes in extent of sea ice in the Arctic region. Possible references to Inuit and Chukchi peoples: • hunting and fishing less reliable (✓) loss of summer sea ice, shorter hunting season (DEV) increase in shipping traffic / noise, drives away seals (DEV) thinning ice, difficulty in travel to hunt / fish (DEV)	4 AO1x4	AO1 – 4 marks 2 x 1 mark (✓) for each correct impact 2 x 1 mark (DEV) for each explanatory point. Focus should be on the knowledge and understanding of the impacts on indigenous peoples as a result of changes in extent of sea ice in the Arctic region.

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			- health in decline, via malnutrition / susceptibility to infectious diseases (✓) reduced availability and diversity of traditional / subsistence foods (DEV) increased food insecurity (DEV) - culture / traditional knowledge loss (✓) way of life / traditional livelihoods changing / migration to urban areas (DEV) - economic decline / impoverishment / social problems (✓) relocation of communities in coastal locations affected by marine erosion (DEV)		
3	(b)		Examine how pollution can spread around the globe via oceanic circulation. Level 3 (5-6 marks) Demonstrates thorough knowledge and understanding of how pollution can spread around the globe via oceanic circulation (AO1). Where appropriate, place specific details should be accurate. Demonstrates thorough application of knowledge and understanding to provide an accurate, clear and developed analysis as to how pollution can spread around the globe via oceanic circulation (AO2). Level 2 (3-4 marks) Demonstrates reasonable knowledge and understanding of how pollution can spread around the globe via oceanic circulation (AO1). Where appropriate, place specific material is present which is partially accurate. Demonstrates reasonable application of knowledge and understanding to provide a sound analysis showing some accuracy and development as to how pollution can spread	6 AO1x3 AO2x3	Indicative content AO1 - 3 marks Knowledge and understanding of how pollution can spread around the globe via oceanic circulation could potentially include: - pollutants enter the oceanic system from a wide variety of land / atmospheric derived sources e.g. rivers, beaches, vessels - much of the marine debris, mainly plastic, is not biodegradable; it is a persistent pollutant that becomes available to be transported in the oceans - most pollutants can float at or just below the surface therefore transported easily by ocean currents - ocean currents can disperse pollutants; e.g. micro-plastics found on shorelines of all continents / islands - ocean gyres cause accumulation of pollutants / marine debris on a large scale; e.g. North Pacific gyre AO2 - 3 marks Application of knowledge and understanding to analyse how pollution can spread around the globe via oceanic circulation could potentially include: - sources of pollution enter oceanic systems from geographically widespread areas from all parts of

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			around the globe via oceanic circulation (AO2). Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of how pollution can spread around the globe via oceanic circulation (AO1). If appropriate, little or no place specific material is present and / or is inaccurate. Demonstrates basic application of knowledge and understanding to provide a simple analysis showing limited accuracy and little development as to how pollution can spread around the globe via oceanic circulation (AO2). 0 marks No response or no material worthy of credit.		the globe including industrial / urban areas of ACs, EDCs and LIDCs - larger plastic items, micro-plastics / plastic nurdles, and other marine debris are not biodegradable, they remain in the system and are moved by ocean currents over long distances / long periods of time - floating pollutants / plastics are transported by every ocean current and in directions that relate to the effects of solar heating, wind and Coriolis force - pollution is dispersed by ocean currents, e.g. spread by those flowing adjacent to continental land masses such as Brazilian, Benguela, Peruvian currents; low level radiation from Fukushima has been detected off NW USA - pollution is concentrated by ocean currents e.g. by circular currents forming gyres such as the 'Great Pacific Garbage Patch' which is calm at its centre and accumulates vast amounts of marine debris Knowledge of specific surface ocean currents / circulation might help to support a response.
3	(c)	(i)	Study Fig.3 which shows the distribution of USA naval strongholds in the Indo-Pacific region, 2023. Using the data in Fig.3 describe the distribution of USA naval strongholds shown. - most are located around the Pacific Rim (✓) - fewer located in and around the Indian Ocean (✓) - largest cluster of 7 / 8 is found on west coast of USA / California (✓) - smaller cluster of 3 / 4 located in the Japan – South Korea area - small group of 2 / 3 located in Hawaiian Islands - small group of 2 / 3 located on the USA- Canadian border	4 AO3x4	AO3 – 4 marks 4 x 1 mark (✓) for each piece of evidence from Fig.3 that describes a feature of the distribution of USA naval strongholds in the Indo-Pacific region.

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			dispersed pattern in the area between the Philippines Sea to the east and The Gulf to the west		
3	(c)	(ii)	Using evidence from Fig.3, analyse possible reasons for the distribution of naval strongholds. Level 3 (5-6 marks) Demonstrates thorough application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to possible reasons for the distribution of naval strongholds (AO2). Demonstrates thorough investigation and interpretation of the resource to fully evidence possible reasons for the distribution of naval strongholds. There must be strong ideas linking resource evidence to possible reasons for the distribution of naval strongholds (AO3). Level 2 (3-4 marks) Demonstrates reasonable application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to possible reasons for the distribution of naval strongholds (AO2). Demonstrates reasonable investigation and interpretation of the resource to fully evidence possible reasons for the distribution of naval strongholds. There must be good ideas linking resource evidence to possible reasons for the distribution of naval strongholds (AO3). Level 1 (1-2 marks) Demonstrates basic application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to possible reasons for the distribution of naval strongholds (AO2).	6 AO2x3 AO3x3	Indicative content AO2 - 3 marks Application of knowledge and understanding to analyse possible reasons for the distribution of naval strongholds could potentially include: - defence of homeland territory - defence / control of interests abroad - rapid response in conflict - protection of shipping / trade routes - protection of commercial fishing activity - geopolitical reasons / security of allies - response to piracy AO3 - 3 marks Evidence from investigation and interpretation of Fig.3 could potentially include: - security: e.g. naval strongholds on the US west coast help protect the homeland; these are relatively secure locations that provide access to the Pacific - economic importance: e.g. naval strongholds across the Indo-Pacific region help protect USA's interests in the region for its trade via major Pacific shipping routes and in the South China Sea - strategic geopolitical importance: e.g. naval strongholds in Hawaii / Japan / South Korea help the USA as a superpower to exert that power across the Pacific, Pacific Rim and beyond via the oceans - more rapid response in crises / conflict / delivery of aid is possible with more distant bases, e.g. the US navy can operate further away from home having

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			Demonstrates basic investigation and interpretation of the resource to fully evidence possible reasons for the distribution of naval strongholds. There must be some ideas linking resource evidence to possible reasons for the distribution of naval strongholds (AO3).		strongholds in Japan, South Korea, Singapore and The Gulf - political importance: strongholds around or relatively near a marine conflict zone e.g. the South China Sea reflect USA's interests in the region for protection of long-standing allies such as South Korea and Taiwan - prevention of piracy via military surveillance and patrols; this has been a problem in the western Indian Ocean and Southeast Asia, especially in the Malacca and Singapore Straits; the USA for example is part of a maritime coalition of countries involved Candidates can reach the top of L2 when no reference to the figure.
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3	(d)	‘Effective management is the key to sustainable use of biological resources within oceans.’ Discuss in the context of <u>one</u> renewable biological resource within oceans. Level 4 (10–12 marks) Demonstrates comprehensive and accurate knowledge and understanding of effective management of one renewable biological resource within oceans (AO1). Demonstrates comprehensive application of knowledge and understanding to provide a detailed and convincing evaluation offering secure judgements leading to rational conclusions that are evidence based as to as to whether effective management is the key to sustainable use of biological resources within oceans (AO2). Level 3 (7-9 marks) Demonstrates thorough and mainly accurate knowledge and understanding of effective management of one renewable biological resource within oceans (AO1). Demonstrates thorough application of knowledge and understanding to provide a detailed evaluation offering generally secure judgements with some link between rational conclusions and evidence as to whether effective management is the key to sustainable use of biological resources within oceans (AO2). Level 2 (4-6 marks) Demonstrates reasonable and some accurate knowledge and understanding of effective management of one renewable biological resource within oceans (AO1). Demonstrates reasonable application of knowledge and understanding to provide a sound evaluation offering generalised judgements and conclusions with limited links	12 AO1x6 AO2x6	Indicative content AO1 - 6 marks Knowledge and understanding of effective management of one renewable biological resource within oceans could potentially include: Effective management: • setting thresholds for sustainable harvesting of the resource and establishing a total allowable catch (TAC) • agreements made between countries to stop harvesting / fishing in the most sensitive areas • establishing conservation groups to monitor and regulate commercial interests • collection of data / surveys to keep check on fish / biological resource stocks • research to improve understanding of breeding areas / feeding habits • avoid overfishing in locations where there are dense populations of the biological resource Alternative view: • large scale / numbers of a biological resource • resilience of biological resources • no scientific evidence that commercial fishing is a threat AO2 - 6 marks Application of knowledge and understanding to analyse and evaluate whether effective management is the key to sustainable use of biological resources within oceans could potentially include: • the high level of demand for and considerable financial gain from ocean biological resources necessitates effective management e.g. krill are processed for human consumption and animal feed
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		to evidence as to as to whether effective management is the key to sustainable use of biological resources within oceans (AO2). Level 1 (1-3 marks) Demonstrates basic and/or inaccurate knowledge and understanding of effective management of one renewable biological resource within oceans (AO1). Demonstrates basic application of knowledge and understanding offering either unsupported or minimal if any evaluation. Judgements and conclusions, if any, are simplistic as to whether effective management is the key to sustainable use of biological resources within oceans (AO2). 0 marks No response or no material worthy of credit.		- the attitude of some commercial fishing companies that their activities are not a threat to marine ecosystems necessitates effective management e.g. agreement in 2018 by 5 companies to form the Association of Responsible Krill Harvesting - scale is a factor; indigenous peoples harvest just what they need to live more sustainably than some large companies that exploit ocean resources for commercial gain - time is a factor; attitudes have begun to change - previous indiscriminate exploitation is being replaced by strategies for more sustainable harvesting e.g. the work of the Commission for the Conservation of the Antarctic Marine Living Resources since 1982 - the need for effective management is heightened since the resilience of some biological resources is being weakened by changes to their habitat as a result of climate change e.g. increase in temperature in upper ocean / loss of ice shelves - effective management is essential since all biological resources in oceans are part of a complex ecosystem; over-exploitation of one species can have devastating effects on food chains / webs especially in more fragile environments Renewable biological resources could include marine animals such as shellfish, krill, whales, seal, tuna and other fish stocks. Sustainable use of biological resources – balancing social, economic and environmental needs i.e. harvesting the ocean's biological resources such that their recovery for the future is assured, and the rest of their ecosystems are not adversely affected.
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Question			Answer	Mark	Guidance
4	(a)		Explain <u>two</u> ways that globalisation can influence the food industry. - developments in transport, communications and refrigeration technology (✓) have enabled development of global food chains (DEV) perishable products can now be transported over long distances (DEV) - greater interconnectedness now exists between producers and consumers (✓) food production networks including flows of people, goods and information have become increasingly transnational (DEV) - demand for food has changed / grown (✓) as incomes have risen through economic growth in some countries / regions (DEV) and where populations have become more urbanised (DEV) - food tastes are changing across the world (✓) especially in the more affluent markets e.g. Europe, North America (DEV) - a wide variety of foods is now available from across the globe (✓) consumers do not have to wait for seasonality of foodstuffs because they can be sourced all year round (DEV)	4 AO1x4	AO1 – 4 marks 2 x 1 mark (✓) for each appropriate way. 2 x 1 mark (DEV) for each explanatory point. Focus should be on the knowledge and understanding of ways that globalisation can influence the food industry.
4	(b)		Examine the role of agribusiness in influencing the global food system. Level 3 (5-6 marks) Demonstrates thorough knowledge and understanding of the role of agribusiness in influencing the global food system (AO1). Where appropriate, place specific details should be accurate.	6 AO1x3 AO2x3	Indicative content AO1 - 3 marks Knowledge and understanding of the role of agribusiness in influencing the global food system could potentially include: - economic – large scale production of food at lower costs - economic – ability to distribute and sell food products globally

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		Demonstrates thorough application of knowledge and understanding to provide an accurate, clear and developed analysis as to the role of agribusiness in influencing the global food system (AO2) Level 2 (3-4 marks) Demonstrates reasonable knowledge and understanding of the role of agribusiness in influencing the global food system (AO1). Where appropriate, place specific material is present which is partially accurate. Demonstrates reasonable application of knowledge and understanding to provide a sound analysis showing some accuracy and development as to the role of agribusiness in influencing the global food system (AO2). Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of the role of agribusiness in influencing the global food system (AO1). If appropriate, little or no place specific material is present and / or is inaccurate. Demonstrates basic application of knowledge and understanding to provide a simple analysis showing limited accuracy and little development as to the role of agribusiness in influencing the global food system (AO2). 0 marks No response or no material worthy of credit.	• environmental – responsibility for stewardship of rural environments • socio-economic – support integration of small holders into value chains in developing countries • socio-economic – help to improve food security AO2 - 3 marks Application of knowledge and understanding to analyse the role of agribusiness in influencing the global food system could potentially include: • economic; agribusiness is able to integrate its involvement at all stages of the food chain from production to market and to operate globally – benefit from economies of scale • economic; agribusiness promotes ancillary industries involved in the global food system such as in processing, transport and retail • economic; ability to supply / export agricultural products at home and abroad - generates income which can help development in developing countries • environmental; responsibility to minimise negative impacts of large-scale production such as effects of monoculture, use of chemicals, loss of hedgerows, use of large scale machinery • socio-economic; working with governments, and CSOs within public policy to support fair trade and small –scale local producers in LIDCs / EDCs • socio-economic; role in the development process by supporting integration of small holders with improved access to markets - helps generate employment and poverty reduction in rural households in developing countries Examples of large agribusiness companies involved in these processes include John Deere, Bayer, ADM, Yara International, Cargill, DuPont
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4	(c)	(i)	Study Fig.4 which shows the Global Hunger Index for countries of Africa, 2023. Using the data in Fig.4 describe the spatial pattern shown by the Global Hunger Index. - lowest index values, <9.9, least hunger in NW Africa / Morocco, Algeria, Tunisia (✓) 'low' to 'moderate' index values, <9.9–19.9, in North Africa in a belt from Morocco to Egypt (✓) 'moderate' index values, 10–19.9, in Southern Africa / S Africa, Namibia, Botswana (✓) 'moderate' index values, 10–19.9, in parts of West Africa / incl Gambia, Ghana and Gabon (✓) 'alarming' / highest index values, 35-49.9, in central / equatorial Africa / CAR, DRC and S Sudan (✓) - mostly 'serious' index values, 20-34.9, throughout sub-Saharan Africa	4 AO3x4	AO3 – 4 marks 4 x 1 mark (✓) for each piece of evidence from Fig.4 that describes a feature of the spatial pattern shown by the global food security index.
4	(c)	(ii)	Using evidence from Fig.4, suggest possible reasons for variation in the Global Hunger Index. Level 3 (5-6 marks) Demonstrates thorough application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to possible reasons for variation in the Global Hunger Index (AO2). Demonstrates thorough investigation and interpretation of the resource to fully evidence economic factors that account for variation in food security. There must be strong ideas linking resource evidence to possible reasons for variation in the Global Hunger Index (AO3). Level 2 (3-4 marks) Demonstrates reasonable application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to possible reasons for variation in the Global Hunger Index (AO2).	6 AO2x3 AO3x3	Indicative content AO2 - 3 marks Application of knowledge and understanding to analyse possible reasons for variation in the Global Hunger Index could potentially include: - poverty / wealth of households / communities / governments - political stability / military conflict - level of economic development of a country - environmental degradation - level of food security / access to nutritious diet - population structure / % of under 5yr olds AO3 - 3 marks Evidence from investigation and interpretation of Fig.4 could potentially include: - north Africa – 'low' or 'moderate' levels of hunger; all 5 countries classified as EDCs of greater wealth,

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		Demonstrates reasonable investigation and interpretation of the resource to fully evidence economic factors that account for variation in food security. There must be good ideas linking resource evidence to possible reasons for variation in the Global Hunger Index (AO3). Level 1 (1-2 marks) Demonstrates basic application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to possible reasons for variation in the Global Hunger Index (AO2). Demonstrates basic investigation and interpretation of the resource to fully evidence economic factors that account for variation in food security. There must be some ideas linking resource evidence to possible reasons for variation in the Global Hunger Index (AO3).		access to nutritious diet and food security than most of sub-Saharan Africa • countries of central / equatorial Africa – ‘alarming’ / highest hunger index values; low levels of economic development, political instability / conflict, high % of vulnerable population under 5yrs, poverty • sub-Saharan Africa – countries stretching from Niger in the north to Madagascar in the southeast mostly ‘serious’ levels of hunger; household and government poverty, unable to meet needs of fast-growing population with high % under 5 vulnerable, poor food security • Niger, Somalia, South Sudan – ‘alarming’ levels of hunger; countries affected by multiple factors including environmental degradation / climate change, difficulties of food production in the Sahel, political instability with inadequate governmental support / limited access to food aid and high levels of poverty Candidates can reach the top of L2 when no reference to the figure.
4	(d)	‘Risks to food security in dryland areas are influenced mainly by worsening factors.’ Discuss in the context of <u>one</u> dryland area. Level 4 (10–12 marks) Demonstrates comprehensive and accurate knowledge and understanding of worsening and other factors that influence food security in one dryland area (AO1). Demonstrates comprehensive application of knowledge and understanding to provide a detailed and convincing evaluation offering secure judgements leading to rational conclusions that are evidence based as to whether food security is influenced mainly by worsening or other factors in one dryland area (AO2).	12 AO1x6 AO2x6	Indicative content AO1 - 6 marks Knowledge and understanding of worsening and other factors that influence food security in one dryland area could potentially include: Worsening factors: • population change. - o population may increase rapidly beyond a region’s capacity to feed itself - o population and settlement growth may lead to increased deforestation for fuelwood, leading to increased wind and water erosion of soil and loss of organic matter

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		Level 3 (7-9 marks) Demonstrates thorough and mainly accurate knowledge and understanding of worsening and other factors that influence food security in one dryland area (AO1). Demonstrates thorough application of knowledge and understanding to provide a detailed evaluation offering generally secure judgements with some link between rational conclusions and evidence as to whether food security is influenced mainly by worsening or other factors in one dryland area (AO2). Level 2 (4-6 marks) Demonstrates reasonable and some accurate knowledge and understanding of worsening and other factors that influence food security in one dryland area (AO1). Demonstrates reasonable application of knowledge and understanding to provide a sound evaluation offering generalised judgements and conclusions with limited links to evidence as to whether food security is influenced mainly by worsening or other factors in one dryland area (AO2). Level 1 (1-3 marks) Demonstrates basic and/or inaccurate knowledge and understanding of worsening and other factors that influence food security in one dryland area (AO1). Demonstrates basic application of knowledge and understanding offering either unsupported or minimal if any evaluation. Judgements and conclusions, if any, are simplistic as to whether food security is influenced mainly by worsening or other factors in one dryland area (AO2). 0 marks No response or no material worthy of credit.		- o population growth may lead to overuse of marginal land for agriculture/overgrazing/over-cultivation leading to desertification, erosion, soil fertility and loss of productivity - o population growth may lead to increased demand for irrigation water and possible impact on soil quality through salinisation • land grabbing; where agribusinesses have displaced indigenous farmers with no legal land tenure or negotiating rights; this may cause scarcity of productive farmland, low yields, food insecurity • changes in farming practices from nomadic pastoralism to more sedentary / intensive practices have over time led to desertification through depletion of soil quality, loss of productivity and food insecurity • where increased political instability / conflict has weakened a governments ability to divert sufficient attention / funding to food security e.g. South Sudan • climate change. - o reduced reliability of rainfall, greater incidence of droughts and extreme storm events affecting soil fertility/productivity - o variability in amount, type and seasonal timing of rainfall make crop production and livestock farming uncertain - o exposure to high winds which can increase evapotranspiration and soil erosion - o infertile / depleted soils as a result of lack of vegetation / organic matter reduces productivity and increases food insecurity Other factors: • specific natural characteristics of the ecosystem, climate and hydrology that inherently influence food security risks – such as low and unreliable rainfall,
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					periodic drought, high rates of evapotranspiration, exposure to high winds, infertile soils AO2 - 6 marks Application of knowledge and understanding to analyse and evaluate whether food security is influenced mainly by worsening or other factors in one dryland area could potentially include: • evaluation of the influence on food security risk of factors that have worsened significantly in the shorter term • evaluation of the influence on food security risk of other factors inherent over long periods of time because of their natural environmental dryland characteristics • food security risk can be worsened by economic, social, environmental, political factors. • understanding that worsening, often human, factors and other, often physical, factors rarely operate in isolation; often it is their interaction that might worsen food security • food security can vary spatially and at different scales even within one dryland area due to different human activities or environmental differences • food security in a dryland area can vary from time to time, short- or long-term
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Question		Answer	Mark	Guidance
5	(a)	Explain the fossil evidence for continental drift. - o Similar types of fossils of plants and animals have been found in rocks of similar age that are now long distances apart in separate continents suggesting these were once joined - o Similar fossil brachiopods (marine shellfish) found in Australian and Indian limestones. - o Similar fossil animals found in South America and Australia, especially marsupials. - o Fossils from rocks younger than Carboniferous period in places such as Australia and India show fewer similarities suggesting they follow different evolutionary paths.	4 AO1x4	AO1 – 4 marks 2 x 1 mark (✓) for each appropriate piece of fossil evidence. 2 x 1 mark (DEV) for each explanation of how it relates to continental drift.
5	(b)	Examine how fossil records provide evidence for theories of continental drift and plate tectonics. Level 3 (5-6 marks) Demonstrates thorough knowledge and understanding of the fossil evidence for continental drift (AO1) Where appropriate, place specific details should be accurate. Demonstrates thorough application of knowledge and understanding to provide an accurate, clear and developed analysis as to the fossil evidence for continental drift and plate tectonics (AO2). Level 2 (3-4 marks) Demonstrates reasonable knowledge and understanding of the fossil evidence for continental drift and plate tectonics (AO1). Where appropriate, place specific material is present	6 AO1x3 AO2x3	Indicative content AO1 - 3 marks Knowledge and understanding of the fossil evidence for continental drift could potentially include: • Wegener suggested that in the Carboniferous period one large single continent, Pangaea, existed that slowly broke apart with continental movement continuing to the present day • fossil evidence supports both Wegener's ideas of continental drift based on observations of their jigsaw fit and the later theory of tectonic plate movement based on sea floor spreading • similar types of fossils of plants and animals have been found in rocks of similar age that are now long distances apart in separate continents suggesting these were once joined AO2 - 3 marks Application of knowledge and understanding to analyse the fossil evidence for continental drift could potentially

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			which is partially accurate. Demonstrates reasonable application of knowledge and understanding to provide a sound analysis showing some accuracy and development as to the fossil evidence for continental drift and plate tectonics (AO2). Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of the fossil evidence for continental drift and plate tectonics (AO1) If appropriate, little or no place specific material is present and / or is inaccurate. Demonstrates basic application of knowledge and understanding to provide a simple analysis showing limited accuracy and little development as to the fossil evidence for continental drift and plate tectonics (AO2). 0 marks No response or no material worthy of credit.		include: • similar fossils of marine shellfish (brachiopods) have been found in limestones in Australia and India • in rocks younger than the Carboniferous (i.e. after the continents began to separate) fossils in Australia and India show fewer similarities suggesting they followed different evolutionary paths • fossils of a fern (Glossopteris) are found in all the southern continents showing they were once joined • fossils of a land reptile (Lystrosaurus) that was unable to swim have been found in Africa, India and Antarctica – now separated by ocean. In the Triassic period when this reptile lived these present-day continents were still in one large continent, Pangaea • fossils of a freshwater reptile (Mesosaurus) that could only swim in freshwater have been found in Brazil and South Africa, now separated by the Atlantic Ocean
5	(c)	(i)	Study Fig.5 which shows plates and plate boundaries in the southeast Pacific. Describe the pattern of plates and plate boundaries. • largest plates are the Pacific Plate to the west of the map area and the Antarctic Plate to the south • Nazca Plate located between the Pacific Plate to its west and the South American Plate to its east • the smaller Cocos Plate is located immediately to the north of the Nazca Plate • the Antarctic Plate is located immediately to the south of the Nazca Plate • the western (East Pacific Rise), southern (Chile Rise) and northern boundaries of the Nazca Plate are all spreading plate boundaries	4 AO3x4	AO3 – 4 marks 4 x 1 mark (✓) for each piece of evidence from Fig.5 that describes a feature of the pattern of plates and plate boundaries.

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			- the eastern boundary of the Nazca Plate is a converging plate boundary - the northern boundary of the South American Plate is a converging boundary		
5	(c)	(ii)	Using evidence from Fig.5 suggest possible reasons for features and processes associated with the <u>convergent</u> plate boundaries shown. Level 3 (5-6 marks) Demonstrates thorough application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to features and processes associated with convergent plate boundaries (AO2). Demonstrates thorough investigation and interpretation of the resource to fully evidence features associated with convergent plate boundaries. There must be strong ideas linking resource evidence to processes associated with convergent plate boundaries (AO3). Level 2 (3-4 marks) Demonstrates reasonable application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to features and processes associated with convergent plate boundaries (AO2). Demonstrates reasonable investigation and interpretation of the resource to fully evidence features associated with convergent plate boundaries. There must be good ideas linking resource evidence to processes associated with convergent plate boundaries (AO3). Level 1 (1-2 marks) Demonstrates basic application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to features and processes associated with convergent plate boundaries (AO2).	6 AO2x3 AO3x3	Indicative content AO2 - 3 marks Application of knowledge and understanding to analyse features and processes associated with convergent plate boundaries shown in Fig.5 could potentially include: - convergence: oceanic plate (Nazca) and continental plate (South American) move towards each other - subduction: denser oceanic plate is forced under the continental plate - formation of oceanic trench: ocean deepens at plate boundary forming a long, narrow depression often thousands of metres deep, along zone of subduction - slab pull: where oceanic crust descends into asthenosphere along zone of subduction the rest of the oceanic plate is pulled with it - fold mountain building: sediments / rock adjacent to the continent, crumple, fold and uplift as the plates converge and as the continental crust is buckled and uplifted molten material is injected into it - vulcanicity: where rising magma reaches the surface it forms volcanoes - earthquakes: energy is released as a result of friction and fracturing of descending material in the Benioff zone AO3 - 3 marks Evidence from investigation and interpretation of the data in Fig.5 could potentially include: - convergence shown by direction of movement of Nazca plate - line of subduction shown parallel to South American

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			Demonstrates basic investigation and interpretation of the resource to fully evidence features associated with convergent plate boundaries. There must be some ideas linking resource evidence to processes associated with convergent plate boundaries (AO3).		coast - oceanic trench named as Peru-Chile trench, shown parallel to line of subduction - fold mountain chain – Andes – named and located parallel to the line of subduction - distribution of major active volcanoes shown in linear pattern within Andean Mountain range Candidates can reach the top of L2 when no reference to the figure.
5	(d)		‘Mitigation against vulnerability is the only effective strategy to manage hazards from volcanic activity.’ Discuss. Level 4 (10–12 marks) Demonstrates comprehensive and accurate knowledge and understanding of mitigation against vulnerability and other strategies to manage hazards from volcanic activity (AO1). Demonstrates comprehensive application of knowledge and understanding to provide a detailed and convincing evaluation offering secure judgements leading to rational conclusions that are evidence based as to mitigation against vulnerability and other strategies to manage hazards from volcanic activity (AO2). Level 3 (7-9 marks) Demonstrates thorough and mainly accurate knowledge and understanding of mitigation against vulnerability and other strategies to manage hazards from volcanic activity (AO1). Demonstrates thorough application of knowledge and understanding to provide a detailed evaluation offering generally secure judgements with some link between rational conclusions and evidence as to mitigation against	12 AO1x6 AO2x6	Indicative content AO1 - 6 marks Knowledge and understanding of mitigation against vulnerability and other strategies to manage hazards from volcanic activity could potentially include: - attempts to mitigate against vulnerability - natural hazard investigation centres / volcano risk services provide accurate information working closely with local / national governments / emergency services - seismometers / tilt meters / satellite surveys monitor gas emissions, earthquake activity, heat detection and threat of lahars - advice on mitigation of vulnerability / community preparedness is given by these authorities on location of residential areas, house construction, evacuation / alert-level sequence, airport closure - attempts to mitigate against the event - slowing and diverting lava flows – earth barriers / concrete blocks, channels to divert flowing lava - land use zoning - attempts to mitigate against losses - emergency services / military capable of

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		vulnerability and other strategies to manage hazards from volcanic activity (AO2). Level 2 (4-6 marks) Demonstrates reasonable and some accurate knowledge and understanding of mitigation against vulnerability and other strategies to manage hazards from volcanic activity (AO1). Demonstrates reasonable application of knowledge and understanding to provide a sound evaluation offering generalised judgements and conclusions with limited links to evidence as to mitigation against vulnerability and other strategies to manage hazards from volcanic activity (AO2). Level 1 (1-3 marks) Demonstrates basic and/or inaccurate knowledge and understanding of mitigation against vulnerability and other strategies to manage hazards from volcanic activity (AO1) Demonstrates basic application of knowledge and understanding offering either unsupported or minimal if any evaluation. Judgements and conclusions, if any, are simplistic as to mitigation against vulnerability and other strategies to manage hazards from volcanic activity (AO2). 0 marks No response or no material worthy of credit.		search and rescue - o use of temporary shelters in safe zones - o volcanic material cleared from river channels is used in road building and rebuilding houses - o wealthier governments able to compensate individuals and businesses and restore infrastructure AO2 - 6 marks Application of knowledge and understanding to analyse and evaluate attempts to mitigate against vulnerability and other strategies to manage hazards from volcanic activity could potentially include: • evaluation of mitigation against vulnerability in terms of protection of local populations and their property and services, the accuracy of monitoring a volcano, nature of the event itself, and speed of evacuation • evaluation of mitigation against the hazard event in terms of technology available and effectiveness of strategies against such powerful events • evaluation of mitigation against losses in terms of government ability to compensate, efficiency of emergency services, accessibility by aid agencies • consideration of the contrasts in strategies between LIDCs/EDCs such as Indonesia and ACs such as Italy in terms of preparedness and technology / resources available • understanding the difficulties faced by local farming communities in some LIDCs, especially where after a hazard event families return, rebuild and accept the risks
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Question		Answer	Mark	Guidance
6	(a)	With reference to Fig.6, suggest how the importance of the carbon cycle to climate change might influence players that drive economic change. Level 3 (6-8 marks) Demonstrates thorough knowledge and understanding of the importance of the carbon cycle to climate change and players that drive economic change (AO1). Demonstrates thorough application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how the importance of the carbon cycle to climate change might influence players that drive economic change (AO2). This will be shown by including well-developed ideas linking resource evidence of the importance of the carbon cycle to climate change and players that drive economic change. There are clear attempts to make synoptic links between content from different parts of the course of study. Level 2 (3-5 marks) Demonstrates reasonable knowledge and understanding of the importance of the carbon cycle to climate change and players that drive economic change (AO1). Demonstrates reasonable application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how the importance of the carbon cycle to climate change might influence players that drive economic change (AO2). This will be shown by including developed ideas linking resource evidence of the importance of the carbon cycle to climate change and players that drive economic change. There are some attempts to make synoptic links between	8 AO1 x4 AO2 x4	Indicative content AO1 - 4 marks Knowledge and understanding of the importance of the carbon cycle to climate change and players that drive economic change could potentially include: Carbon cycle – slow and fast - stores of carbon (oceans, atmosphere, carbonate rocks, fossil fuels, soil, terrestrial biomass) and flows of carbon between these stores (photosynthesis, respiration, decomposition, combustion, chemical weathering). Importance of carbon cycle to climate change – maintains balance of carbon in the atmosphere, water and soil; imbalance results from human activity causing an enhanced greenhouse effect. Players driving economic change – local, national and transnational governments and organisations (e.g. World Bank, IMF) all economic activity e.g. primary, secondary tertiary sectors. AO2 – 4 marks Application of knowledge and understanding to interpret how the importance of the carbon cycle to climate change might influence players that drive economic change could potentially include: • since early 19th century the volume of GHGs in the Earth's atmosphere has increased rapidly; Fig 6 shows combustion. • Fig 6 also shows respiration from plants and animals; deforestation and other land use changes also add to the enhanced greenhouse effect raising global temperatures through increase of atmospheric CO₂

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		content from different parts of the course of study but these are not always relevant. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of the importance of the carbon cycle to climate change and players that drive economic change (AO1). Demonstrates basic application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how the importance of the carbon cycle to climate change might influence players that drive economic change (AO2). There will be simple ideas linking resource evidence of the importance of the carbon cycle to climate change and players that drive economic change. 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.		- knowledge of the importance of the carbon cycle to climate change may influence strategies of drivers to cut GHG emissions from combustion and land use changes shown in Fig.6 such as: - government policies to decarbonise include construction of energy efficient housing, attempts to reduce energy consumption and consumption of fossil fuels and increase the contribution of renewables in the energy mix - international institutions such as the UN and the EU promote policies to conserve forests, reduce vehicle emissions, and encourage carbon trading - Fig.6 shows both photosynthesis and plant respiration as part of the carbon cycle; in these flows, plants take in CO₂ from the atmosphere and use sunlight to turn it into energy and oxygen; they release CO₂ to the atmosphere in respiration. Knowledge of these flows of carbon might influence management strategies of drivers of economic change, such as governments, for afforestation, wetland restoration, and urban greening - Fig.6 shows mineral carbon in the ocean; oceans store carbon through sequestration of carbon from the atmosphere, but human activity is causing acidification of oceans. Drivers of economic change are influenced in their strategies to reduce use of fossil fuels, or to fish responsibly such as limiting the krill catch.
6	(b)	Examine how the shrinking of valley glaciers and ice sheets might affect people's perception of places. Level 3 (6-8 marks) Demonstrates thorough knowledge and understanding of shrinking of valley glaciers and ice sheets and people's perception of places (AO1). Demonstrates thorough application of knowledge and understanding to provide a clear and developed analysis	8 AO1 x4 AO2 x4	Indicative content AO1 - 4 marks Knowledge and understanding of shrinking of valley glaciers and ice sheets and people's perception of places could potentially include: Shrinking of valley glaciers and ice sheets:

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		that shows accuracy of how shrinking of valley glaciers and ice sheets might affect people's perception of places (AO2). There must be well-developed ideas of how shrinking of valley glaciers and ice sheets might affect people's perception of places. There are clear attempts to make synoptic links between content from different parts of the course of study. Level 2 (3-5 marks) Demonstrates reasonable knowledge and understanding of shrinking of valley glaciers and ice sheets and people's perception of places (AO1). Demonstrates reasonable application of knowledge and understanding to provide a sound analysis that shows some accuracy of how shrinking of valley glaciers and ice sheets might affect people's perception of places (AO2). There must be developed ideas of how shrinking of valley glaciers and ice sheets might affect people's perception of places. There are some attempts to make synoptic links between content from different parts of the course of study, but these are not always relevant. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of shrinking of valley glaciers and ice sheets and people's perception of places (AO1). Demonstrates basic application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how shrinking of valley glaciers and ice sheets might affect people's perception of places (AO2). This will be shown by including simple ideas of how		- valley glaciers have retreated, thinned and even disappeared completely in the past century – the alps and Himalayas. - continental ice sheets are melting in polar regions at an accelerating rate. - causes include warming of the atmosphere, increased velocity of glacier flow and calving into oceans, ocean warming. People's perception of places is influenced by: - their personal characteristics such as age, gender, sexuality, religion and role in society - how people experience the world and how their perceptions might change over time AO2 - 4 marks Application of knowledge and understanding to analyse how shrinking of valley glaciers and ice sheets might affect people's perception of places could potentially include: - indigenous peoples living in the Arctic traditionally hunt and fish; their perception of native areas now is of thinning ice and decreasing ice cover; this has profound impacts on food security, culture and ways their societies operate. Migration south is perceived as providing greater opportunity e.g. Inuit populations in Canadian cities such as Ottawa - government perception of depleting water resources as Himalayan glaciers retreat has added to conflict between Pakistan and Indian governments over Kashmir and the Siachen Glacier; glaciers store and provide water for domestic and agricultural use - shipping companies perceive the loss of Arctic Sea ice as an economic / trading opportunity to reduce costs by using the North-West Passage and the Northern Sea Route
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		shrinking of valley glaciers and ice sheets might affect people's perception of places. There are limited attempts to make synoptic links between content from different parts of the course of study.		glacier tourism stakeholders perceive the shrinking / loss of valley glaciers such as the Aletsch Glacier, a UNESCO World Heritage Site, or the Mer de Glace, near Chamonix, as having a significant impact on future tourism strategies in these areas
		0 marks No response or no response worthy of credit.		

Question		Answer	Mark	Guidance
7	(a)	With reference to Fig.7, suggest how the global distribution of tuberculosis can be linked to spatial patterns of social inequalities. Level 3 (6-8 marks) Demonstrates thorough knowledge and understanding of the global distribution of tuberculosis and spatial patterns of social inequalities (AO1). Demonstrates thorough application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how the global distribution of tuberculosis can be linked to spatial patterns of social inequalities (AO2). This will be shown by including well-developed ideas linking resource evidence of the global distribution of tuberculosis and spatial patterns of social inequalities. There are clear attempts to make synoptic links between content from different parts of the course of study. Level 2 (3-5 marks) Demonstrates reasonable knowledge and understanding of the global distribution of tuberculosis and spatial patterns of social inequalities (AO1). Demonstrates reasonable application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how the global distribution of tuberculosis can be linked to spatial patterns of social inequalities (AO2). This will be shown by including developed ideas linking resource evidence of the global distribution of tuberculosis and spatial patterns of social inequalities. There are some attempts to make	8 AO1 x4 AO2 x4	Indicative content AO1 - 4 marks Knowledge and understanding of the global distribution of tuberculosis and spatial patterns of social inequalities could potentially include: Global distribution of tuberculosis (incidence and / or death rates) • present in all global regions, an infectious and highly contagious communicable respiratory disease • 95% of deaths occur in low- and middle-income countries • Africa has by far the highest number of TB deaths, especially sub-Saharan Africa • TB mortality rates are high in many parts of SE Asia • TB incidence is lower in Europe, the Middle East, North America, Australia, New Zealand, southern cone of S America Spatial patterns of social inequalities • the distribution of resources is not evenly spread within and between places • social inequality can be measured and mapped using indices such as housing, healthcare, education, employment and access to services • spatial patterns of inequality vary both within and between places • evidence of social inequality can be found in housing, environmental quality, crime rates, digital divide • factors that influence people's social inequality include income, health, personal mobility and education AO2 - 4 marks Application of knowledge and understanding to interpret how the global distribution of tuberculosis can be linked to spatial patterns of social inequalities could potentially include: • ACs of Europe and North America have lower TB incidence

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		synoptic links between content from different parts of the course of study but these are not always relevant. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of the global distribution of tuberculosis and spatial patterns of social inequalities (AO1). Demonstrates basic application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how the global distribution of tuberculosis can be linked to spatial patterns of social inequalities (AO2). There will be simple ideas linking resource evidence of the global distribution of tuberculosis and spatial patterns of social inequalities. 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.		than LIDCs/EDCs of Africa and Southeast Asia e.g. UK (AC) 6.3, South Sudan (LIDC) 227, India (EDC) 210 as shown in Fig.7 where better access to education and health care • TB linked to spatial patterns of social inequalities where poor communities with high population densities, overcrowding and poorly ventilated houses, e.g. high incidence in slum / squatter settlements in LIDCs / EDCs of Southeast Asia, e.g. Indonesia 354, Bangladesh 221 – shown in Fig.7 • TB linked to social inequalities where introduced among large migrant populations in refugee / IDP camps e.g. South Sudan 227 – shown in Fig.7 • incidence of TB related to ability of a government to provide adequate health care services e.g. South Sudan 227, CAR 540, - shown in Fig.7 where lack of government wealth and the problems of political conflict are factors • incidence of TB linked to spatial inequalities where household poverty restricts ability to secure adequate housing conditions, education, and access to health care as in many LIDCs/EDCs e.g. sub-Saharan Africa, Gabon 513 – as shown in Fig.7 • social practices / traditions in some areas may increase the spread of disease e.g. in some parts of sub-Saharan Africa such as CAR 540, Gabon 513 • correlation between incidence of TB and the spatial patterns of social inequalities related to incidence of other diseases e.g. HIV, malnutrition, diabetes where an individual's immune system is compromised such as in sub-Saharan Africa • figures for TB in some countries conceal wide disparity in social inequalities e.g. Brazil an EDC, 48, as shown in Fig.7 • wide variation within the WHO regions e.g. relatively low prevalence in Western Pacific overall but China 55 moderately high whereas Australia 6.5 / Japan 11 much lower – Fig.7 / also Afghanistan relatively high 189 within the Eastern Mediterranean region
7	(b)	Examine how the socio-economic impacts of communicable diseases can influence characteristics	8 AO1 x4	Indicative content

		of place profiles. Level 3 (6-8 marks) Demonstrates thorough knowledge and understanding of socio-economic impacts of communicable diseases and characteristics of place profiles (AO1). Demonstrates thorough application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how socio-economic impacts of communicable diseases can influence characteristics of place profiles (AO2). There must be well-developed ideas of how socio-economic impacts of communicable diseases can influence characteristics of place profiles. There are clear attempts to make synoptic links between content from different parts of the course of study. Level 2 (3-5 marks) Demonstrates reasonable knowledge and understanding of socio-economic impacts of communicable diseases and characteristics of place profiles (AO1). Demonstrates reasonable application of knowledge and understanding to provide a sound analysis that shows some accuracy of how socio-economic impacts of communicable diseases can influence characteristics of place profiles (AO2). There must be developed ideas of how socio-economic impacts of communicable diseases can influence characteristics of 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 (1-2 marks)	AO2 x4	AO1 - 4 marks Knowledge and understanding of socio-economic impacts of communicable diseases and characteristics of place profiles could potentially include: Socio-economic impacts of communicable diseases: • increased mortality and morbidity rates • unemployment / household income • reinforcement of cycle of poverty • increased costs to health service • national / regional slowdown of economic growth • food insecurity Characteristics of place profiles: • demography / population structure / out-migration • socio-economic e.g. employment, income, housing • built environment • natural environment • shifting flows of people, resources, and money AO2 - 4 marks Application of knowledge and understanding to analyse how socio-economic impacts of communicable diseases can influence characteristics of place profiles could potentially include: • communicable diseases such as Malaria, HIV/AIDS, and TB, can cause high rates of mortality and morbidity; these dominate mortality in the world's poorest countries. This is also true of infections such as cholera and covid-19. Their prevalence can influence demographic structure of places with significant losses in specific age groups depending on scale • the demographic impact of communicable disease on places can have multiple effects - ability to work, reduction in household income and reinforced cycle of poverty; the poor are often the hardest hit • socio-economic impact of communicable diseases can include greater cost to public health services; this may affect political
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		Demonstrates basic knowledge and understanding of socio-economic impacts of communicable diseases and characteristics of place profiles (AO1). Demonstrates basic application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how socio-economic impacts of communicable diseases can influence characteristics of place profiles (AO2). This will be shown by including simple ideas of how socio-economic impacts of communicable diseases can influence characteristics of place profiles. 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.		place profile e.g. economic impact on LIDC national government • a socio-economic impact of the covid-19 pandemic was the rolling out of a nationwide vaccination programme in ACs; at local scale one effect included the use of buildings such as school halls temporarily as vaccination centres • the socio-economic impact of malaria, where endemic, influences place profiles since it holds back development of agriculture e.g. in the western lowlands of Ethiopia, affecting food security. As a result, in the malaria-free highlands where population densities are higher over-exploitation of farming resources has affected place profile causing land degradation • socio-economic impacts of communicable diseases, where multiple / negative, influence place profiles through shifting flows of people, resources and money e.g. in LIDCs / EDCs this might drive rural-urban migration, and in areas suffering from epidemics inflows of aid workers, medicines and food / water / shelter e.g. refugee camps, would affect place profiles
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Question		Answer	Mark	Guidance
8	(a)	With reference to Fig.8, suggest how the use of ocean energy resources can influence people's perception of places in different ways. Level 3 (6-8 marks) Demonstrates thorough knowledge and understanding of the use of ocean energy resources and people's perception of places in different ways (AO1). Demonstrates thorough application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how the use of ocean energy resources can influence people's perception of places in different ways (AO2). This will be shown by including well-developed ideas linking resource evidence of use of ocean energy resources and people's perception of places in different ways. There are clear attempts to make synoptic links between content from different parts of the course of study. Level 2 (3-5 marks) Demonstrates reasonable knowledge and understanding of the use of ocean energy resources and people's perception of places in different ways (AO1). Demonstrates reasonable application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how the use of ocean energy resources can influence people's perception of places in different ways (AO2). This will be shown by including developed ideas linking resource evidence of use of ocean energy resources and people's perception of places in different ways. There are	8 AO1 x4 AO2 x4	Indicative content AO1 - 4 marks Knowledge and understanding of use of ocean energy resources and people's perception of places in different ways could potentially include: Use of ocean energy resources: - oil and gas (non-renewable resources) - use of energy resources is a contested issue People's perception of places: - how and why people perceive places in different ways based on their identity, including age, gender, sexuality, religion and role - people see, experience and understand place in different ways and this can change over time AO2 - 4 marks Application of knowledge and understanding to interpret how the use of ocean energy resources can influence people's perception of places in different ways could potentially include: - might be viewed positively by people of working age as possible employment potential e.g. in oil drilling offshore on deep water rigs, construction and maintenance of oil-rigs, or in ancillary industries – as shown in Fig.8 - might be viewed negatively by local residents of the area as potential for noise, traffic congestion, air pollution - shown in Fig 8 - positive perception such as creation of jobs in environmental management / conservation of marine and coastal ecosystems – all arising from the 'threats' to the environment created by industrial developments shown in Fig 8 - negative perception in the local area for potential impact on the environment such as visual impact on natural coastal / wetland

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		some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of the use of ocean energy resources and people's perception of places in different ways (AO1). Demonstrates basic application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how the use of ocean energy resources can influence people's perception of places in different ways (AO2). There will be simple ideas linking resource evidence of use of ocean energy resources and people's perception of places in different ways. 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.		environment shown in Fig.8 • negative perception in the local area for potential impact on natural wetland ecosystem which include seabird habitat / breeding as shown in foreground of Fig.8 • perception by coastal engineers / local authorities involved in shoreline management re impact on erosion / flows of energy and materials / current / sediment and possible knock-on effects further along the Gulf coast as shown in Fig.8 • oil company positive perception that there is demand for oil, profit to be made, sustain local economy, and oil has a contribution to USA energy security – shown by scale of investment / large size of deepwater oil rig in Fig.8
8	(b)	Examine how the direction and type of trade across oceans can be influenced by past connections. Level 3 (6-8 marks) Demonstrates thorough knowledge and understanding of the direction and type of trade across oceans and past connections (AO1). Demonstrates thorough application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how the direction and type of trade across oceans can be influenced by past connections (AO2). There must be well-developed ideas of how the direction	8 AO1 x4 AO2 x4	Indicative content AO1 - 4 marks Knowledge and understanding of the direction and type of trade across oceans and past connections could potentially include: Direction and type of trade across oceans: • merchandise / commodities / goods include manufactured goods (secondary), fuels and mining products and agricultural products (primary) • flows of merchandise, imports and exports between areas of supply / producers and demand / consumers • globally, there are core routes and secondary routes for bulk products transported by shipping

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		and type of trade across oceans can be influenced by past connections. There are clear attempts to make synoptic links between content from different parts of the course of study. Level 2 (3-5 marks) Demonstrates reasonable knowledge and understanding of the direction and type of trade across oceans and past connections (AO1). Demonstrates reasonable application of knowledge and understanding to provide a sound analysis that shows some accuracy of how the direction and type of trade across oceans can be influenced by past connections (AO2). There must be developed ideas of how the direction and type of trade across oceans can be influenced by past connections. There are some attempts to make synoptic links between content from different parts of the course of study, but these are not always relevant. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of the direction and type of trade across oceans and past connections (AO1). Demonstrates basic application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how the direction and type of trade across oceans can be influenced by past connections (AO2). This will be shown by including simple ideas of how the direction and type of trade across oceans can be influenced by past connections. There are limited attempts to make synoptic links between content from different parts of the course of study.		Past connections: • long established economic interdependence • historic Suez and Panama Canals preserve / allow shipping routes still in use today • some old colonial ports are still in use where handling facilities allow e.g. for containers • some trade agreements / trade partnerships between nations continue • long established major industrial areas benefit from traditional trade routes enhanced by modernised handling facilities AO2 - 4 marks Application of knowledge and understanding to analyse how the direction and type of trade across oceans can be influenced by past connections could potentially include: • economic interdependence between UK and USA involves manufactured goods flowing in both directions across the Atlantic using a long-established core shipping route; this direction/type of trade is founded on past trading connections as economic partners • a core shipping route between Southeast Asia and Europe in a wide variety of primary and secondary goods makes use of the Suez Canal which has influenced the direction / route of trade since 1869 • shipping of oil from producing and exporting countries of the Middle East to European markets plus a wide variety of global markets is long established especially since the end of the second world war • shipping of merchandise between UK and India follows long established sea routes using old colonial ports such as Chennai especially since accessibility by rail and road in their hinterlands is an advantage • Long established bilateral trade agreements between countries such as UK and India show that past connections influence the direction of trade, imports and exports between two countries
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			0 marks No response or no response worthy of credit.		A core east-west shipping corridor links North America, Europe and Pacific Asia via the Suez Canal, the Straits of Malacca and the Panama Canal; this links industrial areas that have traded in manufactured goods historically
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Question		Answer	Mark	Guidance
9	(a)	With reference to Fig.9, suggest how shocks that impact food security can be affected by climate change in <u>one</u> landscape system you have studied. Level 3 (6-8 marks) Demonstrates thorough knowledge and understanding of shocks that impact food security and climate change in one landscape system (AO1). Demonstrates thorough application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how shocks that impact food security can be affected by climate change in one landscape system (AO2). This will be shown by including well-developed ideas linking resource evidence on attempts to increase food production and place identity. There are clear attempts to make synoptic links between content from different parts of the course of study. Level 2 (3-5 marks) Demonstrates reasonable knowledge and understanding of shocks that impact food security and climate change in one landscape system (AO1). Demonstrates reasonable application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how shocks that impact food security can be affected by climate change in one landscape system (AO2). This will be shown by including developed ideas linking resource evidence on shocks that impact food security and climate change in one landscape system.	8 AO1 x4 AO2 x4	Indicative content AO1 - 4 marks Knowledge and understanding of shocks that impact food security and climate change in one landscape system could potentially include: Shocks that impact food security: - extreme weather events such as wild fire, El Nino, floods and drought which can affect food production - water scarcity can exacerbate food production issues - tectonic hazards can influence food production and distribution Climate change in one landscape system you have studied: - Coastal landscapes Climate change has significant impact on sea levels; warming climate causes sea level rise and submergent landscapes - Glaciated landscapes Rising temperature causes rapid glacier and permafrost melting; this will have significant impact on water supply for agriculture - Dryland landscapes Rising temperature and increasing aridity have impact on agriculture as a result of desertification / water supply issues; this affects both crop production and nomadic pastoralism AO2 - 4 marks Application of knowledge and understanding to interpret how shocks that impact food security can be affected by climate change in one landscape system could potentially include: Coastal landscapes: - rising sea level in low lying coastal areas increases the risk of flooding / waterlogged soils /incursion by salt water and

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		There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of shocks that impact food security and climate change in one landscape system (AO1). Demonstrates basic application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how shocks that impact food security can be affected by climate change in one landscape system (AO2). There will be simple ideas linking resource evidence on shocks that impact food security and climate change in one landscape system. There are limited attempts to make synoptic links between content from different parts of the course of study. 0 marks No response or no response worthy of credit.		subsequent damage to crops and livestock Fig.9 shows global production losses of 19% through flood - increase in frequency / energy of storms as sea levels rise and water temperatures increase causes erosion, further flooding and damage in coastal areas with loss of crop yields and livestock shown in Fig.9 with total global losses for storms 18% Glaciated landscapes: - in glaciated landscapes rising temperatures cause melting of glaciers; in the short term may cause loss of crop and livestock production through floods 19% loss and landslides / mass movements 13% as shown in Fig.9 particularly in glaciated valleys - in the longer term in glaciated landscapes loss of water supply is likely to affect millions of poor farming communities in the basins of rivers such as Ganges, Indus and Yangtze who depend on water reliant crops such as rice; already Fig.9 shows that drought is a serious shock resulting in 34% loss Dryland landscapes: - in dryland landscapes climate change affects temperature, evaporation rates and rainfall regimes; this can cause shocks such as desertification, dust storms, issues of water supply and irrigation with subsequent impact on both crop production and nomadic herding. Fig.9 shows losses through pestilence and disease 9%, extreme temperatures 6%, storms 18%, drought 34% and wildfire 1% all of which are increasingly frequent shocks in dryland landscapes
9	(b)	Examine how people whose food security is most at risk across the development spectrum can affect shifting flows of people. Level 3 (6-8 marks) Demonstrates thorough knowledge and understanding of people whose food security is most at risk across the development spectrum and shifting flows of people (AO1) Demonstrates thorough application of knowledge and	8 AO1 x4 AO2 x4	Indicative content AO1 - 4 marks Knowledge and understanding of people whose food security is most at risk across the development spectrum and shifting flows of people could potentially include: People whose food security is most at risk across the development spectrum: - rural dwellers mainly in villages in Asia and Africa - farmers in small-scale farming communities

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		understanding to provide a clear and developed analysis that shows accuracy of how people whose food security is most at risk across the development spectrum can affect shifting flows of people (AO2). There must be well-developed ideas of how people whose food security is most at risk across the development spectrum can affect shifting flows of people. There are clear attempts to make synoptic links between content from different parts of the course of study. Level 2 (3-5 marks) Demonstrates reasonable knowledge and understanding of people whose food security is most at risk across the development spectrum and shifting flows of people (AO1). Demonstrates reasonable application of knowledge and understanding to provide a sound analysis that shows some accuracy of how people whose food security is most at risk across the development spectrum can affect shifting flows of people (AO2). There must be developed ideas of how people whose food security is most at risk across the development spectrum can affect shifting flows of people. There are some attempts to make synoptic links between content from different parts of the course of study, but these are not always relevant. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of people whose food security is most at risk across the development spectrum and shifting flows of people (AO1). Demonstrates basic application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how people whose food security is most at risk across the development spectrum can affect	• children mainly under 5 years old, underweight / stunted growth • women as primary food producers in many LIDCs • people affected by natural disasters and / or political instability • people affected by climate change • people living in the region and countries of sub-Saharan Africa Shifting flows of people: • internal migration mainly rural-urban • international migration mainly south-north but increasingly south-south • environmental / political refugees • inflows of aid workers such as UN and NGOs AO2 - 4 marks Application of knowledge and understanding to analyse how people whose food security is most at risk across the development spectrum can affect shifting flows of people could potentially include: • rural dwellers: 75% of hungry people live in rural areas; they are vulnerable because they are dependent on agriculture and have no alternative income. Many migrate within their country and increasingly internationally e.g. Africa to Europe • farmers in small-scale farming communities: half the world's hungry people depend on crop yields from marginal land prone to drought and flooding; food insecurity may drive the flows of people from rural to urban areas • children under 5yrs old are vulnerable to food insecurity; globally in 2018 52m were underweight and 155m had stunted growth. Flows of aid workers into affected areas and communities from a wide range of charities / NGOs include Oxfam, MSF, UNICEF, Save the Children • women are affected by hunger and poverty more than men, especially in patriarchal societies; this impacts on maternal and infant mortality rates and low birth-weight children. Flows of aid workers into local communities where women are particularly vulnerable provide female education, nutrition and support including ICRW, Amref Health Africa, Womankind, Action Aid,
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		shifting flows of people (AO2). This will be shown by including simple ideas of how people whose food security is most at risk across the development spectrum can affect shifting flows of people. 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.		UN Women – many working for gender equality • conflict has serious socio-economic impacts on countries such as Yemen including food insecurity and natural hazards / disasters such as the effects of earthquakes in Nepal receive aid workers / food assistance • increasingly refugees from areas of conflict and environmental impacts on food security such as drought in the Sahel are forced to migrate away
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Question		Answer	Mark	Guidance
10	(a)	With reference to Fig.10, suggest how tsunamis generated by earthquakes can influence flows of money and investment. Level 3 (6-8 marks) Demonstrates thorough knowledge and understanding of tsunamis generated by earthquakes and flows of money and investment (AO1). Demonstrates thorough application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how tsunamis generated by earthquakes can influence flows of money and investment (AO2). This will be shown by including well-developed ideas linking resource evidence of tsunamis generated by earthquakes and flows of money and investment. There are clear attempts to make synoptic links between content from different parts of the course of study. Level 2 (3-5 marks) Demonstrates reasonable knowledge and understanding of tsunamis generated by earthquakes and flows of money and investment (AO1). Demonstrates reasonable application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how tsunamis generated by earthquakes can influence flows of money and investment (AO2). This will be shown by including developed ideas linking resource evidence of tsunamis generated by earthquakes and flows of money and investment There are some attempts to make synoptic links	8 AO1 x4 AO2 x4	Indicative content AO1 - 4 marks Knowledge and understanding of tsunamis generated by earthquakes and flows of money and investment could potentially include: Tsunamis generated by earthquakes: - tsunamis generated by earthquakes are associated with sea-bed uplift and underwater landslides - powerful waves are produced at the ocean surface and these spread out at high velocity from the epicentre - wave height increases greatly as they approach the shore / enter shallow water, often exceeding 25m in height Flows of money and investment: - inward flow of money in the short term / immediate response from government support / foreign aid - inward investment over longer term to redevelop housing, businesses, coastal defences, tsunami warning systems, provision of emergency services AO2 - 4 marks Application of knowledge and understanding to interpret how tsunamis generated by earthquakes can influence flows of money and investment could potentially include: - the impact of tsunamis can be one of total devastation as shown in Fig.10 where property has been destroyed and lives lost; the inflow of money in the first instance would be for relief work from government / foreign aid to help in the immediate aftermath, finding survivors, creating accommodation nearby - Fig.10 shows the geographical extent of the tsunami damage in this low-lying coastal area; investment inflows over time in attempts to rebuild homes, places of work, services such as schools and hospitals as the community rebuilds. This may

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		between content from different parts of the course of study but these are not always relevant. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of tsunamis generated by earthquakes and flows of money and investment (AO1). Demonstrates basic application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how tsunamis generated by earthquakes can influence flows of money and investment (AO2). There will be simple ideas linking resource evidence of tsunamis generated by earthquakes and flows of money and investment. 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.		come from national government funds, international agencies such as CERF and UNDRR, charitable support and / or large businesses such as TNCs - the area shown in Fig.10 is coastal and subject to possible further tsunami events; inflow of investment would be necessary to enhance any tsunami barriers and emplace tsunami warning systems - the extent and nature of the damage shown in Fig.10 suggests the speed of the hazard event and shows the damage to communication lines – roads / telecommunications; flows of investment / money would be essential to redesign structures and access so that evacuation procedures might be improved
10	(b)	Examine how volcanic eruptions of tephra and ash can affect place identity. Level 3 (6-8 marks) Demonstrates thorough knowledge and understanding of volcanic eruptions of tephra and ash and place identity (AO1). Demonstrates thorough application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how volcanic eruptions of tephra and ash can affect place identity (AO2). There must be well-developed ideas of how volcanic eruptions of tephra and ash can affect place identity. There are clear attempts to make synoptic links between	8 AO1 x4 AO2 x4	Indicative content AO1 - 4 marks Knowledge and understanding of volcanic eruptions of tephra and ash and place identity could potentially include: Volcanic eruptions of tephra and ash: - material ejected into the air from an eruption that varies in size from very fine ash to large volcanic bombs (>6cm across) - buries farmland / destroys crops - transport disrupted on the ground and in the air (material rises high into stratosphere) - buildings caused to collapse by the weight of material - can cause respiratory diseases in local populations

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		content from different parts of the course of study. Level 2 (3-5 marks) Demonstrates reasonable knowledge and understanding of volcanic eruptions of tephra and ash and place identity (AO1). Demonstrates reasonable application of knowledge and understanding to provide a sound analysis that shows some accuracy of how volcanic eruptions of tephra and ash can affect place identity (AO2). There must be developed ideas of how volcanic eruptions of tephra and ash can affect place identity. There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of volcanic eruptions of tephra and ash and place identity (AO1). Demonstrates basic application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how volcanic eruptions of tephra and ash can affect place identity (AO2). This will be shown by including simple ideas of how volcanic eruptions of tephra and ash can affect place identity. 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.		- ash deposits may contribute to lahars Place identity can be shaped by characteristics such as: - demographic - socio-economic - cultural - political - built environment - natural environment AO2 - 4 marks Application of knowledge and understanding to analyse how volcanic eruptions of tephra and ash can affect place identity could potentially include: - eruptions of tephra and ash are potentially very hazardous to local populations; casualties and evacuation may lead to total loss of population numbers - where farmland and businesses are buried by this range of volcanic material the socio-economic characteristics are severely affected, and it may be impossible to return to these activities even after long periods of time - vehicles and transport routes are severely affected by fine ash material and volcanic bombs which not only affect evacuation but also restrict any rescue and search - the built environment is destroyed having a severe impact on place identity in the short term, although in the longer-term redevelopment may be possible that restores cultural characteristics typical of the original towns and rural settlements - the physical characteristics / shape of the volcano itself and the surrounding area may be affected by the eruption and the tephra / ash deposits Both historical and contemporary examples relevant.
Question		Answer	Mark	Guidance
11*		'The impacts of climate change differ according to a country's stage of economic development.'	20 AO1 x10	Indicative content

		To what extent do you agree? AO1 Level 4 (8-10 marks) Demonstrates comprehensive knowledge and understanding of the impacts of climate change relative to stage of economic development and other factors. Level 3 (5-7 marks) Demonstrates thorough knowledge and understanding of the impacts of climate change relative to stage of economic development and other factors. Level 2 (3-4 marks) Demonstrates reasonable knowledge and understanding of the impacts of climate change relative to stage of economic development and other factors. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of the impacts of climate change relative to stage of economic development and other factors. AO2 Level 4 (8-10 marks) Demonstrates comprehensive application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of the differing impacts of climate change relative to stage of economic development and other factors. Demonstrates comprehensive application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based on the differing impacts of climate change relative to stage of economic development and other factors. Level 3 (5-7 marks)	AO2 x10 AO1 - 10 marks Knowledge and understanding of the impacts of climate change relative to stage of economic development and other factors could potentially include: Impacts of climate change in an LIDC (Bangladesh): • exposure to storm surges and river floods • exposure to cyclone disasters • abandonment of homes / land lost to the sea • salinised agricultural land • threats to coastal ecosystems • many poor communities with limited ability to adapt • increased burden from water-borne disease • vulnerability increased by government lack of wealth Impacts of climate change in an AC (UK): • increased probability of river flooding • sea level rise / frequency of named storms • loss of property in areas of high flood risk / coastal erosion • loss of intertidal and freshwater habitats • increased mortality in elderly, vulnerable to hot weather • opportunities - increased agricultural productivity / jobs in green economy Credit responses that refer to any one country and its improved ability to cope with impacts of climate change as it develops over time. AO2 - 10 marks Application of knowledge and understanding to analyse and evaluate the extent to which the impacts of climate change differ in relation to stage of economic development and other factors could potentially include: • evaluation of stage of economic development as a factor in terms of wealth of government, poverty in local communities, and ability of national / local authorities to
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		Demonstrates thorough application of knowledge and understanding to provide a clear and developed analysis of the differing impacts of climate change relative to stage of economic development and other factors. Demonstrates thorough application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence on the differing impacts of climate change relative to stage of economic development and other factors. Level 2 (3-4 marks) Demonstrates reasonable application of knowledge and understanding to provide a sound analysis of the differing impacts of climate change relative to stage of economic development and other factors. Demonstrates reasonable application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence on the differing impacts of climate change relative to stage of economic development and other factors. Level 1 (1-2 marks) Demonstrates basic application of knowledge and understanding to provide a simple analysis of the differing impacts of climate change relative to stage of economic development and other factors. Demonstrates basic application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions on the differing impacts of climate change relative to stage of economic development and other factors. 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		establish mitigation / adaptation strategies to the impacts of climate change • evaluation of other factors that might affect the impacts of climate change in terms of physical and demographic characteristics of a country such as latitude, relief / altitude, type of climate, and population distribution, growth rate, and age structure • understanding that for any one country the impacts of climate change may depend on a combination of a country's stage of economic development and its physical / demographic characteristics • recognition that the impacts of climate change tend to be mainly negative and more seriously devastating in countries of lower levels of economic development, whereas in more advanced countries whilst some effects are just as devastating there is often greater ability to mitigate and adapt • consideration of the idea that the impacts of climate change can be socio-economic, environmental and political • understanding that ability to cope with impacts of climate change can improve over time for any one country as its economic development moves through different stages
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		There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. Level 2 The information has some relevance and is presented with limited structure. The information is supported by limited evidence. Level 1 The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		
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Question		Answer	Mark	Guidance
12*		‘Adaptation strategies are the most effective ways of reducing and managing the risks of climate change.’ Discuss. AO1 Level 4 (8-10 marks) Demonstrates comprehensive knowledge and understanding of adaptation and other strategies to reduce and manage the risks of climate change. Level 3 (5-7 marks) Demonstrates thorough knowledge and understanding of adaptation and other strategies to reduce and manage the risks of climate change. Level 2 (3-4 marks) Demonstrates reasonable knowledge and understanding of adaptation and other strategies to reduce and manage the risks of climate change. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of adaptation and other strategies to reduce and manage the	20 AO1 x10 AO2 x10	Indicative content AO1 - 10 marks Knowledge and understanding of adaptation and other strategies to reduce and manage the risks of climate change could potentially include: Adaptation strategies: - a framework of adaptation in response to future implications of climate change across the development continuum; this might include strategies of: - retreat such as coastal managed realignment, land use zoning. - accommodation such as increasing reservoir capacity, drilling inexpensive tube wells. - protection such as coastal hard engineering, afforestation - adaptations specific to homes, offices, cities, transport and economies in the 21st century Other strategies: - Climate modelling to understand possible future climate mechanisms and impacts such as:

		risks of climate change. AO2 Level 4 (8-10 marks) Demonstrates comprehensive application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of adaptation and other strategies to reduce and manage the risks of climate change. Demonstrates comprehensive application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based on adaptation and other strategies to reduce and manage the risks of climate change. Level 3 (5-7 marks) Demonstrates thorough application of knowledge and understanding to provide a clear and developed analysis of adaptation and other strategies to reduce and manage the risks of climate change. Demonstrates thorough application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence on adaptation and other strategies to reduce and manage the risks of climate change. Level 2 (3-4 marks) Demonstrates reasonable application of knowledge and understanding to provide a sound analysis of adaptation and other strategies to reduce and manage the risks 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		- o carbon cycle - o influence of positive and negative feedback - o future emissions and their impact on global temperatures and sea levels • Mitigation strategies such as: - o energy efficiency / conservation - o fuel shifts and low-carbon energy - o carbon capture and storage - o forestry - o geoengineering - o AO2 - 10 marks Application of knowledge and understanding to analyse and evaluate the effectiveness of adaptation and other strategies to reduce and manage the risks of climate change could potentially include: • evaluation of adaptation strategies in terms of their applicability for communities across the development continuum, and the ability of governments to apply adaptation strategies such as the UK government's National Adaptation Programme • evaluation of other strategies to reduce risks in terms of mitigation strategies which might depend on political factors such as government commitment to possible strategies • evaluation of other ways humans can respond to climate change such as climate modelling to understand what the future will hold • understanding that effectiveness of strategies would depend on scale and their application to different areas such local settlements / communities, coastal zones, regions or entire national populations especially in the case of island communities such as The Maldives • understanding that reducing and managing the risks might depend on a combination of political, economic, social and
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		evidence on adaptation and other strategies to reduce and manage the risks of climate change. Level 1 (1-2 marks) Demonstrates basic application of knowledge and understanding to provide a simple analysis of adaptation and other strategies to reduce and manage the risks of climate change. Demonstrates basic application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions on adaptation and other strategies to reduce and manage the risks of climate change. 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.		environmental factors specific to a particular locality such as the six pillars of the Bangladesh Climate Change Strategy and Action Plan (2009), or the strategies that underpin the UK's Climate Change Act (2008)
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Question	Answer	Mark	Guidance
13*	To what extent is the prevalence of disease influenced by seasonal variations in climate? AO1 Level 4 (8-10 marks) Demonstrates comprehensive knowledge and understanding of the influence of seasonal variations in climate and other factors on the prevalence of disease. Level 3 (5-7 marks) Demonstrates thorough knowledge and understanding of the influence of seasonal variations in climate and other factors on the prevalence of disease. Level 2 (3-4 marks) Demonstrates reasonable knowledge and understanding of the influence of seasonal variations in climate and other factors on the prevalence of disease. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of the influence of seasonal variations in climate and other factors on the prevalence of disease. AO2 Level 4 (8-10 marks) Demonstrates comprehensive application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of the influence of seasonal variations in climate and other factors on the prevalence of disease. Demonstrates comprehensive application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based on the influence of seasonal variations in climate and other factors on the	20 AO1 x10 AO2 x10	Indicative content AO1 - 10 marks Knowledge and understanding of the influence of seasonal variations in climate and other factors on the prevalence of disease could potentially include: Seasonal variations in climate and prevalence of disease: • seasonality of temperature / rainfall regimes in tropical latitudes influences prevalence of vector-borne infectious diseases such as malaria and sleeping sickness since this affects vector / parasite habitats • in winter in temperate latitudes transmission of the influenza virus is more efficient at lower temperatures and lower atmospheric humidity • the pre-monsoon and end of monsoon periods in South Asia influence prevalence of diarrhoeal disease • rainy seasons in the tropics, sub-tropics and southern Europe affect prevalence of leishmaniasis, transmitted when sandflies are most abundant • seasonal precipitation and temperatures in the range 10-30C in sub-tropical and tropical regions affect prevalence of bilharzia; infection rates follow life cycles of freshwater snails closely linked these seasons • seasonal drought affects air quality - dust particles increase prevalence of respiratory diseases. Drinking contaminated water causes cholera / typhoid; stagnant water allows mosquitos to breed causing WNV Other factors and prevalence of disease: • lifestyle - prevalence of some non-communicable diseases is not seasonal e.g. diabetes, influenced more by lifestyle than seasonal variations in climate • human behavioural activity - prevalence of infectious diseases such as HIV/AIDS and TB may be attributed to seasonal climatic change through human

		prevalence of disease. Level 3 (5-7 marks) Demonstrates thorough application of knowledge and understanding to provide a clear and developed analysis of the influence of seasonal variations in climate and other factors on the prevalence of disease. Demonstrates thorough application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence on the influence of seasonal variations in climate and other factors on the prevalence of disease. Level 2 (3-4 marks) Demonstrates reasonable application of knowledge and understanding to provide a sound analysis of the influence of seasonal variations in climate and other factors on the prevalence of disease. Demonstrates reasonable application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence on the influence of seasonal variations in climate and other factors on the prevalence of disease. Level 1 (1-2 marks) Demonstrates basic application of knowledge and understanding to provide a simple analysis of the influence of seasonal variations in climate and other factors on the prevalence of disease. Demonstrates basic application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions on the influence of seasonal variations in climate and other factors on the prevalence of disease. Quality of extended response Level 4		behavioural activity such as people crowding indoor during colder winter months - air pollution, access to healthy diet, clean water and sanitation, social behaviour, obesity, and inactivity influence prevalence of non-communicable diseases more than seasonal variation in climate AO2 - 10 marks Application of knowledge and understanding to analyse and evaluate the extent to which seasonal variations in climate and other factors influence the prevalence of disease could potentially include: - understanding that seasonal variation in climate involves the effects of temperature, rainfall and humidity regimes, including monsoons, and droughts - understanding that seasonal variation in climate influences prevalence of communicable diseases more than non-communicable diseases - prevalence of non-communicable diseases can be influenced by seasonal variation in climate, but the influence of human behavioural activity and human factors are strong influences - ability of governments and / or NGOs to mitigate against prevalence of disease by their strategies e.g. influenza vaccination programmes is another influence - understanding that factors affecting prevalence of disease may not only be environmental (climatic), but also social, economic and political - prevalence of disease might be considered at different scales from local to continental / global and in different localities / latitudes / types of countries – ACs such as UK / LIDCs such as Bangladesh, Ethiopia - understanding that prevalence of disease can change over time irrespective of seasonal variation in climate or any other factor; climate change is a consideration.
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		There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. Level 3 There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. Level 2 The information has some relevance and is presented with limited structure. The information is supported by limited evidence. Level 1 The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		
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Question	Answer	Mark	Guidance
14*	‘National solutions provide the best way of dealing with incidences of cancers.’ Discuss in the context of <u>one</u> country experiencing air pollution. AO1 Level 4 (8-10 marks) Demonstrates comprehensive knowledge and understanding of national and other solutions for dealing with incidences of cancers. Level 3 (5-7 marks) Demonstrates thorough knowledge and understanding of national and other solutions for dealing with incidences of cancers. Level 2 (3-4 marks) Demonstrates reasonable knowledge and understanding of national and other solutions for dealing with incidences of cancers. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of national and other solutions for dealing with incidences of cancers. AO2 Level 4 (8-10 marks) Demonstrates comprehensive application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of national and other solutions for dealing with incidences of cancers. Demonstrates comprehensive application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based on national and other solutions for	20 AO1 x10 AO2 x10	Indicative content AO1 - 10 marks Knowledge and understanding of national and other solutions for dealing with incidences of cancers could potentially include: National solutions: • national clean air programmes. • air quality monitoring. • investment in public transport. • Promotion of electric vehicles (EVs). • restrictions on stubble burning in rural areas. • investment in modern technology for mass screening, early diagnosis and intervention. • promoting shift from use of fossil fuels in domestic heating and transport. • Congestions charge, traffic free zones in neighbourhoods. Global strategies: • reduction in CO₂ and other GHG emissions under the UN Kyoto Protocol • regional funding to support air quality measures e.g. within the EU’s Climate Change Programme • investment in clean transport projects e.g. rail • carbon cap-and-trade schemes e.g. within the EU’s Emissions Trading System • targets for expanding renewable energy AO2 - 10 marks Application of knowledge and understanding to analyse and evaluate national and other solutions for dealing with incidences of cancers in <u>one</u> country experiencing air pollution. could potentially include:

	dealing with incidences of cancers in <u>one</u> country experiencing air pollution. Level 3 (5-7 marks) Demonstrates thorough application of knowledge and understanding to provide a clear and developed analysis of national and other solutions for dealing with incidences of cancers. Demonstrates thorough application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence on national and other solutions for dealing with incidences of cancers in <u>one</u> country experiencing air pollution. Level 2 (3-4 marks) Demonstrates reasonable application of knowledge and understanding to provide a sound analysis of national and other solutions for dealing with incidences of cancers. Demonstrates reasonable application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence on national and other solutions for dealing with incidences of cancers in <u>one</u> country experiencing air pollution. Level 1 (1-2 marks) Demonstrates basic application of knowledge and understanding to provide a simple analysis of national and other solutions for dealing with incidences of cancers. Demonstrates basic application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions on national and other solutions for dealing with incidences of cancers in <u>one</u> country experiencing air pollution. Quality of extended response Level 4		• evaluation of the purpose and effectiveness of strategies at national scale (which could include local strategies within a national plan). E.g. Indian government slow progress in controlling air pollution • evaluation of the purpose and effectiveness of strategies at other scales such as global. E.g. USA / China major GHG emitters not ratifying treaties • the idea that national strategies more suitably target circumstances within the country depending on the incidence of cancers and their underlying causes • the idea that solutions are best achieved by strategies operating at different scales in combination – national, global, regional, local • understanding that strategies can be direct, such as investment in modern technology, and indirect, such as education re changes in lifestyle. • understanding that national strategies might differ in their effectiveness in the long-term or short-term. • the idea that solutions / strategies and their effectiveness may change / improve over time.
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		There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. Level 3 There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. Level 2 The information has some relevance and is presented with limited structure. The information is supported by limited evidence. Level 1 The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		
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Question	Answer	Mark	Guidance
15*	‘Governments and communities of small island states meet the threat of rising sea level mainly by long term adaptations.’ Discuss in the context of <u>one</u> island community. AO1 Level 4 (8-10 marks) Demonstrates comprehensive knowledge and understanding of long-term adaptations and other ways that the threat of rising sea level is met by governments and communities of small island states. Level 3 (5-7 marks) Demonstrates thorough knowledge and understanding of long-term adaptations and other ways that the threat of rising sea level is met by governments and communities of small island states. Level 2 (3-4 marks) Demonstrates reasonable knowledge and understanding of long-term adaptations and other ways that the threat of rising sea level is met by governments and communities of small island states. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of long-term adaptations and other ways that the threat of rising sea level is met by governments and communities of small island states. AO2 Level 4 (8-10 marks) Demonstrates comprehensive application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of long-term adaptations and other ways that the threat of rising sea level is met by	20 AO1 x10 AO2 x10	Indicative content AO1 - 10 marks Knowledge and understanding of long-term adaptations and other ways that the threat of rising sea level is met by governments and communities of small island states could potentially include: Long term adaptations: • creating new islands / constructing elevated areas on existing islands • scaling up methods of water supply • installing early weather warning systems • establishing a national adaptation programme to include prioritised mitigation strategies • aiming to achieve sustainable economic development • plans for floating settlements • external migration / environmental refugees Other strategies / Short term adaptations: • hard and soft shoreline management • internal resettlement programmes to higher land or other islands • building flood barriers to protect infrastructure • land reclamation / wetland development AO2 - 10 marks Application of knowledge and understanding to analyse and evaluate long-term adaptations and other ways that the threat of rising sea level is met by governments and communities of small island states could potentially include: Long term: • small island states are developing nations; long term adaptations such as building of new islands

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		governments and communities of small island states. Demonstrates comprehensive application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based on long-term adaptations and other ways that the threat of rising sea level is met by governments and communities of small island states. Level 3 (5-7 marks) Demonstrates thorough application of knowledge and understanding to provide a clear and developed analysis of long-term adaptations and other ways that the threat of rising sea level is met by governments and communities of small island states. Demonstrates thorough application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence on long-term adaptations and other ways that the threat of rising sea level is met by governments and communities of small island states. Level 2 (3-4 marks) Demonstrates reasonable application of knowledge and understanding to provide a sound analysis of long-term adaptations and other ways that the threat of rising sea level is met by governments and communities of small island states. Demonstrates reasonable application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence on long-term adaptations and other ways that the threat of rising sea level is met by governments and communities of small island states. Level 1 (1-2 marks) Demonstrates basic application of knowledge and		depend on funding; the Climate Trust Fund for the Maldives has been set up by the EU and the World Bank - the governments of small island states are pro-active in drawing up long-term national plans, e.g. the National Adaptation Programme of Action (NAPA) for the Maldives which include co-ordinated mitigation strategies - most small island states through the UNDP are aiming to achieve the difficult combination in the long-term of resilience to climate change and sustainable development - detailed plans and funding for scaling-up water supply is an important long-term adaptation for domestic and agricultural use / food security involving rainwater harvesting, desalination and groundwater recharge - international co-operation with Dutch engineers to build floating settlements that rise as SL rises Short term: - installation of automatic weather stations for early warning against storms is important both in the short- and long-term - building of flood barriers, dykes and sea walls may have only short-term effectiveness because of the rapid rise in sea levels and the increasing frequency and energy of storms - many islands are low-lying, in the Maldives 80% of the land is < 1m above SL; even with shoreline defences they are vulnerable to rapidly rising sea level in the short term - the islands are small therefore relocation of housing, farms or changing of land use is likely to be effective only in the short term where population densities are already high - idea that basing economic growth on tourism is a short-sighted strategy since tourism itself adds to
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		understanding to provide a simple analysis of the success of long-term adaptations and other ways that the threat of rising sea level is met by governments and communities of small island states. Demonstrates basic application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions on long-term adaptations and other ways that the threat of rising sea level is met by governments and communities of small island states. 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.		further global warming and sea level rise argument that a combination of short- and long-term adaptations are necessary – in the long-term to achieve sustainability of island economies, natural environments, population and culture – in the short-term to protect against hazard events such as tsunamis and storms
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Question	Answer	Mark	Guidance
16*	'Changes in nutrient supply influence the biodiversity of ocean ecosystems more than any other factor.' To what extent do you agree? AO1 Level 4 (8-10 marks) Demonstrates comprehensive knowledge and understanding of nutrient supply and other factors that influence the biodiversity of ocean ecosystems. Level 3 (5-7 marks) Demonstrates thorough knowledge and understanding of nutrient supply and other factors that influence the biodiversity of ocean ecosystems. Level 2 (3-4 marks) Demonstrates reasonable knowledge and understanding of nutrient supply and other factors that influence the biodiversity of ocean ecosystems. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of nutrient supply and other factors that influence the biodiversity of ocean ecosystems. AO2 Level 4 (8-10 marks) Demonstrates comprehensive application of knowledge and understanding to provide a clear, developed analysis of how changes in nutrient supply and other factors influence the biodiversity of ocean ecosystems. Demonstrates comprehensive application of knowledge and understanding to provide detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence on whether changes in	20 AO1 x10 AO2 x10	Indicative content AO1 - 10 marks Knowledge and understanding of nutrient supply and other factors that influence the biodiversity of ocean ecosystems could potentially include: Nutrient supply: • a variety of nutrients such as nitrogen, iron and zinc is needed by all organisms • inter-tidal areas / coastal regions have greatest supply of dissolved nutrients derived from land / rivers; net primary productivity (NPP) is high • deep oceans such as the sub-tropical gyres have virtually no supply of dissolved nutrients and are comparatively unproductive 'biological deserts' Other factors that influence biodiversity: • light and temperature affect the growth of most marine organisms / biodiversity in ecosystems; light levels and temperatures are highest in shallow water and in equatorial regions; they both decrease with depth and distance from the equator • acidification threatens biodiversity affecting feeding levels within ocean ecosystems • warming oceans threatens biodiversity in episodes of bleaching of coral ecosystems • pollution such as oil and plastic AO2 - 10 marks Application of knowledge and understanding to analyse and evaluate whether changes in nutrient supply influence the biodiversity of ocean ecosystems more than other factors could potentially include: • understand the importance of nutrient supply in inter-

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		nutrient supply influence the biodiversity of ocean ecosystems more than other factors. Level 3 (5-7 marks) Demonstrates thorough application of knowledge and understanding to provide a clear, developed analysis of how changes in nutrient supply and other factors influence the biodiversity of ocean ecosystems. Demonstrates thorough application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence on whether changes in nutrient supply influence the biodiversity of ocean ecosystems more than other factors. Level 2 (3-4 marks) Demonstrates reasonable application of knowledge and understanding to provide a sound analysis of how changes in nutrient supply and other factors influence the biodiversity of ocean ecosystems. Demonstrates reasonable application of knowledge and understanding to provide a sound evaluation that offers generalised judgements, with limited use of links between conclusions and evidence on whether changes in nutrient supply influences the biodiversity of ocean ecosystems more than other factors. Level 1 (1-2 marks) Demonstrates basic application of knowledge and understanding to provide a simple analysis of how changes in nutrient supply and other factors influence the biodiversity of ocean ecosystems. Demonstrates basic application of knowledge and understanding to provide an un-supported evaluation that offers simple use of links between conclusions and		tidal ocean ecosystems e.g. in salt marshes where land derived nutrients are used by primary producers in the lowest trophic levels, and plant succession develops over time as do the food chains and webs • understand that whilst some deep oceans are relatively unproductive others such as Antarctic can develop complex food chains and webs based on nutrients being transported to the surface by less dense water; these nutrients allow phytoplankton, the key oceanic producers, to grow • other physical factors that influence ocean ecosystem biodiversity include light, important for photosynthesis, and temperature near the surface, important for growth of producers and consumers in the trophic levels • evaluation of human factors that threaten biodiversity of ocean ecosystems; including the effects of human activity on oceanic habitats especially global warming and oil spills and other pollutants that enter food chains / webs • understand that some factors can influence biodiversity at a large global scale / long term whereas others may threaten local ecosystems in the shorter term • understanding that the term 'changes' in nutrient supply could be viewed in the context of spatial variation at global and local scales, at differing oceanic depths, and through transportation / flows of nutrients over time
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		evidence on whether changes in nutrient supply influence the biodiversity of ocean ecosystems more than other factors. Quality of extended response Level 4 There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. Level 3 There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. Level 2 The information has some relevance and is presented with limited structure. The information is supported by limited evidence. Level 1 The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		
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Question	Answer	Mark	Guidance
17*	‘Strategies and techniques used to ensure food security depend on level of development.’ To what extent do you agree? AO1 Level 4 (8-10 marks) Demonstrates comprehensive knowledge and understanding of strategies and techniques used to ensure food security at differing levels of development. Level 3 (5-7 marks) Demonstrates thorough knowledge and understanding of strategies and techniques used to ensure food security at differing levels of development. Level 2 (3-4 marks) Demonstrates reasonable knowledge and understanding of strategies and techniques used to ensure food security at differing levels of development. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of strategies and techniques used to ensure food security at differing levels of development. AO2 Level 4 (8-10 marks) Demonstrates comprehensive application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of strategies and techniques used to ensure food security at differing levels of development. Demonstrates comprehensive application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based on the strategies and techniques used	20 AO1 x10 AO2 x10	Indicative content AO1 - 10 marks Knowledge and understanding of strategies and techniques used to ensure food security at differing levels of development could potentially include: Developed countries: • ability to import wide range of foods that are not produced domestically • investment in infrastructure supporting the food chain • high level of inputs into the farming system which can increase crop yields per hectare • environmental impact on water, soil, nutrients minimised through research and education for producers into sustainable farming practices • information and education of consumers into healthy diet and nutritional content of food • national policies for agriculture and farming subsidies Developing countries: • short term relief / international food aid • work of NGOs and UN / WFP in education / assistance in small scale farming practices • capacity building and system redesign in LIDCs/EDCs • small-scale bottom-up approaches • introduction of appropriate technology • co-operative farming • government projects AO2 - 10 marks Application of knowledge and understanding to analyse and evaluate strategies and techniques used to ensure food security at differing levels of development could potentially include:

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		to ensure food security at differing levels of development. Level 3 (5-7 marks) Demonstrates thorough application of knowledge and understanding to provide a clear and developed analysis of strategies and techniques used to ensure food security at differing levels of development. Demonstrates thorough application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence on the strategies and techniques used to ensure food security at differing levels of development. Level 2 (3-4 marks) Demonstrates reasonable application of knowledge and understanding to provide a sound analysis of strategies and techniques used to ensure food security at differing levels of development. Demonstrates reasonable application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence on the strategies and techniques used to ensure food security at differing levels of development. Level 1 (1-2 marks) Demonstrates basic application of knowledge and understanding to provide a simple analysis of strategies and techniques used to ensure food security at differing levels of development. Demonstrates basic application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions on strategies and techniques used to ensure food security at differing levels of development. Quality of extended response Level 4		• evaluation of strategies used in developed countries / ACs such as the wealth / investment enabling development of transport infrastructure in the UK or large-scale hi-tech grain harvesters in the USA and political strength in making trade agreements • evaluation of strategies used in developing countries / LIDCs and EDCs such as the importance of food aid donations in emergencies e.g. Nepal or the impact of deep displacement fertilizer programmes in Nigeria • understanding of the significant difference in ability of countries at different levels of development to access global markets for food; the fair-trade network is raising the standard of living of small-scale farmers in LIDCs enabling improvement in their own family food security • understanding the effects on food security / productivity of differences between ACs and LIDCs to invest in multiple factors e.g. technology, machinery, GM crops, irrigation, environmental sustainability, infrastructure • consideration of the importance of co-operative farming organisations in developing countries where many small-scale farmers benefit from membership e.g. in the organiponicos of Cuba • understanding of how changes in land tenure, which may differ significantly between some countries in the development spectrum, can be a significant factor in agricultural production giving greater incentives for production at smaller scale in developing countries • the role of government is an important factor in differing levels of food security; contrast the impact of CAP on food productivity in Europe with that of the input / poverty / focus of governments in developing countries experiencing natural hazards or conflict
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		There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. Level 3 There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. Level 2 The information has some relevance and is presented with limited structure. The information is supported by limited evidence. Level 1 The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		
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Question	Answer	Mark	Guidance
18*	'Attempts to increase food production have mainly long-term impacts rather than short-term impacts on the physical environment.' Discuss. AO1 Level 4 (8-10 marks) Demonstrates comprehensive knowledge and understanding of long-term and short-term impacts on the physical environment of attempts to increase food production. Level 3 (5-7 marks) Demonstrates thorough knowledge and understanding of long-term and short-term impacts on the physical environment of attempts to increase food production. Level 2 (3-4 marks) Demonstrates reasonable knowledge and understanding of long-term and short-term impacts on the physical environment of attempts to increase food production. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of long-term and short-term impacts on the physical environment of attempts to increase food production. AO2 Level 4 (8-10 marks) Demonstrates comprehensive application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of long-term and short-term impacts on the physical environment of attempts to increase food production. Demonstrates comprehensive application of knowledge and understanding to provide detailed and substantiated	20 AO1 x10 AO2 x10	Indicative content AO1 - 10 marks Knowledge and understanding of long-term and short-term impacts on the physical environment of attempts to increase food production could potentially include: Depending on understanding of relative time identified as long- or short-term: Long-term impacts: • soil erosion / nutrient leaching / salinisation • loss of ecosystem biodiversity • terracing of slopes • loss of hedgerows • wetland drainage • water quality / depletion / agrochemical pollution • carbon cycle / CO₂ emission / water cycle • desertification Short-term impacts: • where impacts are small scale e.g. indigenous / subsistence economies where population growth is relatively low such as rainforest shifting cultivators • where impacts can be rectified in the short-term through effective management such as issues of soil compaction / silting of streams / field size / wetlands • where national, regional and local policies ensure sustainability of the physical environment, such as woodland management or environmental stewardship under Common Agricultural Policy AO2 - 10 marks

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		evaluation that offers secure judgements leading to rational conclusions that are evidence based as to whether the impacts on the physical environment of attempts to increase food production are mainly long-term or short-term. Level 3 (5-7 marks) Demonstrates thorough application of knowledge and understanding to provide a clear and developed analysis of the effectiveness of long-term and short-term strategies in improving food security. Demonstrates thorough application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to as to whether the impacts on the physical environment of attempts to increase food production are mainly long-term or short-term. Level 2 (3-4 marks) Demonstrates reasonable application of knowledge and understanding to provide a sound analysis of the effectiveness of long-term and short-term strategies in improving food security. Demonstrates reasonable application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence as to whether the impacts on the physical environment of attempts to increase food production are mainly long-term or short-term. Level 1 (1-2 marks) Demonstrates basic application of knowledge and understanding to provide a simple analysis of the effectiveness of long-term and short-term strategies in improving food security. Demonstrates basic application of knowledge and		Application of knowledge and understanding to analyse and evaluate long-term and short-term impacts on the physical environment of attempts to increase food production could potentially include: Long-term: • evaluation of the long-term impacts on the physical environment of attempts to increase food production e.g. impact on soils of irrigation-induced salinisation such as in Draa Valley, Morocco or Khushab, Pakistan • other examples include impacts of deforestation for agriculture in response to increased demand for soybeans in Cerrado, Brazil where biodiversity loss is due to large monoculture plantations or for palm oil in Sumatra where species and their habitats such as orangutans are endangered • in areas of the UK such as parts of Suffolk, long-term changes to the landscape to increase food production have resulted in larger field sizes and removal of hedgerows which can contribute to soil erosion and loss of habitats whilst growth in the built environment of farmsteads has become more intrusive • rainforest deforestation, annual loss of 30m ha, for food production has an impact on both water and carbon cycles e.g. flows of carbon in a rainforest can change carbon sink to carbon source, at this scale having a long-term effect on global climate change • desertification in dryland landscapes through over-exploitation of soil, vegetation and water resources such as in Nara, western Mali or northern China, a long-term impact on the environment difficult to reverse Short-term: • evaluation of the short-term impacts on the physical
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		understanding to provide an un-supported evaluation that offers simple conclusions as to whether the impacts on the physical environment of attempts to increase food production are mainly long-term or short-term. . 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.		environment of attempts to increase food production e.g. the short-term impact of indigenous subsistence peoples such as limited effects of shifting cultivators in the Amazon, or hunting, herding, fishing in the Arctic • use of micro dams and water conservation techniques in Ethiopia create sustainable water supply and have minimal environmental impact; part of the MERET programme between WFP and Ethiopian government • restoration of former wetlands especially in temperate areas where formerly used for agriculture can restore use of the land for carbon storage (in time), increase biodiversity and manage flooding • small scale systems of urban agriculture in developing countries have limited impact on the physical environment such as organiponicos of Havana, Cuba that support the ethos of permaculture – food production in a closed loop that is sustainable, and ‘sack farming’ in Kibera, Kenya • the UK government’s Sustainable Farming Incentive is designed to support farmers with an agreement to enhance productivity and the environment i.e. to have very limited / short-term impacts on the physical environment while attempting to increase food production
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Question	Answer	Mark	Guidance
19*	‘People only choose to live in tectonically active locations for economic reasons.’ Discuss. AO1 Level 4 (8-10 marks) Demonstrates comprehensive knowledge and understanding of economic and other reasons why people choose to live in tectonically active locations. Level 3 (5-7 marks) Demonstrates thorough knowledge and understanding of economic and other reasons why people choose to live in tectonically active locations. Level 2 (3-4 marks) Demonstrates reasonable knowledge and understanding of economic and other reasons why people choose to live in tectonically active locations. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of economic and other reasons why people choose to live in tectonically active locations. AO2 Level 4 (8-10 marks) Demonstrates comprehensive application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of economic and other reasons why people choose to live in tectonically active locations. Demonstrates comprehensive application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based on economic and other reasons why people choose to live in tectonically	20 AO1 x10 AO2 x10	Indicative content AO1 - 10 marks Knowledge and understanding of economic and other reasons why people choose to live in tectonically active locations could potentially include: Economic reasons: • employment e.g. tourism, agriculture • high fertility of volcanic soils • expensive to leave the area / poverty • exploitation of geothermal energy • mineral extraction e.g. sulphur Social reasons: • family home • emotional attachment to place, belonging, friends • high population densities supported • no alternative place to live in crowded islands • perception of risk such as complacency where hazard events infrequent / not in people’s lifetime • confidence in resilience of built environment / effectiveness of monitoring and warning systems / efficiency of emergency services / evacuation procedure AO2 - 10 marks Application of knowledge and understanding to analyse and evaluate economic and other reasons why people choose to live in tectonically active locations could potentially include: • evaluation of the importance of economic reasons in terms of the range of different types of employment opportunities, income from agriculture, tourism, energy such as geothermal in Iceland, and mineral sources

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		active locations. Level 3 (5-7 marks) Demonstrates thorough application of knowledge and understanding to provide a clear and developed analysis of economic and other reasons why people choose to live in tectonically active locations. Demonstrates thorough application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence on economic and other reasons why people choose to live in tectonically active locations. Level 2 (3-4 marks) Demonstrates reasonable application of knowledge and understanding to provide a sound analysis of economic and other reasons why people choose to live in tectonically active locations. Demonstrates reasonable application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence on economic and other reasons why people choose to live in tectonically active locations. Level 1 (1-2 marks) Demonstrates basic application of knowledge and understanding to provide a simple analysis of economic and other reasons why people choose to live in tectonically active locations. Demonstrates basic application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions on economic and other reasons why people choose to live in tectonically active locations. Quality of extended response Level 4 There is a well-developed line of reasoning which is clear		• evaluation of the importance of social factors in terms of attachment to a place through a sense of belonging, the family home and the existence of long-established communities such as Indonesian islands • understanding of reasons why many people in LIDCs choose to return to a hazard affected area after evacuation – a combination of environmental reasons (soil fertility), social reasons (emotional attachment to place of birth / home / family and friends) and economic reasons (poverty e.g. subsistence farming / costs of moving away) such as Java, Indonesia • understanding of reasons why people in ACs choose to live in tectonically active locations also can be for a combination of reasons such as employment plus leisure opportunities such as in California, plus the complacent attitude that emergency services, building design, zoning of land use can minimise the impacts, and major hazard events can be infrequent – whilst able to live with frequent smaller tremors • the idea in some places that the level of government investment / commitment to mitigation and adaptation strategies can be sufficiently effective to significantly reduce vulnerability to the risks such as Japan, New Zealand
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		and logically structured. The information presented is relevant and substantiated. Level 3 There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. Level 2 The information has some relevance and is presented with limited structure. The information is supported by limited evidence. Level 1 The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		
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Question	Answer	Mark	Guidance
20*	‘Ability to deal with the problems presented by tectonic hazards has never really changed.’ How far do you agree? AO1 Level 4 (8-10 marks) Demonstrates comprehensive knowledge and understanding of ability to deal with the problems presented by tectonic hazards and how this might change over time. Level 3 (5-7 marks) Demonstrates thorough knowledge and understanding of ability to deal with the problems presented by tectonic hazards and how this might change over time. Level 2 (3-4 marks) Demonstrates reasonable knowledge and understanding of ability to deal with the problems presented by tectonic hazards and how this might change over time. Level 1 (1-2 marks) Demonstrates basic knowledge and understanding of ability to deal with the problems presented by tectonic hazards and how this might change over time. AO2 Level 4 (8-10 marks) Demonstrates comprehensive application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of ability to deal with the problems presented by tectonic hazards and how this might change over time. Demonstrates comprehensive application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based on ability to deal with	20 AO1 x10 AO2 x10	Indicative content AO1 - 10 marks Knowledge and understanding of ability to deal with the problems presented by tectonic hazards and how this might change over time could potentially include: Ability to deal with problems presented by tectonic hazards is influenced by: • type, magnitude and frequency of the hazard • population size / distribution in the area • attempts to mitigate against – the hazard event itself, people’s vulnerability and losses • wealth of governments, local authorities, communities and families • ability to predict a hazard event / organise evacuation • location of communities in relation to volcanic eruptions, earthquake epicentres and related hazards • perception of risk Ability to deal with problems presented by tectonic hazards might not change where: • a hazard event is of greater magnitude than expected • investment in mitigation is limited • the hazard recurrence interval is frequent • earthquake prediction is very difficult • primary hazard events have significant secondary effects Ability to deal with problems presented by tectonic hazards might change where: • governments prioritise more funds for mitigation • emergency services / evacuations become more effective • ability to monitor and predict is enhanced by improved research and technology AO2 - 10 marks

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		the problems presented by tectonic hazards and how this might change over time. Level 3 (5-7 marks) Demonstrates thorough application of knowledge and understanding to provide a clear and developed analysis of ability to deal with the problems presented by tectonic hazards and how this might change over time. Demonstrates thorough application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence on ability to deal with the problems presented by tectonic hazards and how this might change over time. Level 2 (3-4 marks) Demonstrates reasonable application of knowledge and understanding to provide a sound analysis of ability to deal with the problems presented by tectonic hazards and how this might change over time. Demonstrates reasonable application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence on ability to deal with the problems presented by tectonic hazards and how this might change over time. Level 1 (1-2 marks) Demonstrates basic application of knowledge and understanding to provide a simple analysis of ability to deal with the problems presented by tectonic hazards and how this might change over time. Demonstrates basic application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions on ability to deal with the problems presented by tectonic hazards and how this		Application of knowledge and understanding to analyse and evaluate ability to deal with the problems presented by tectonic hazards and how this might change over time could potentially include: • evaluation of factors that restrict ability to deal with the problems over time, such as increasing frequency of events and /or magnitude of events that might override any other factor such as the Haiti earthquake 2010 • evaluation of factors that lead to improvement in ability to deal with the problems over time such as mitigation strategies and adaptation such as in Japan • understanding that ability to deal with the problems over time depends on economic, social, environmental and political factors which can affect people's vulnerability to the risks from tectonic hazards such as differences in this ability between an LIDC, Haiti and an AC, USA • evaluation of the significance of a community's geographical location in relation to potential hazard events such as proximity to fault lines / previous epicentres or to active volcanoes such as the Japan or Indonesia tectonic settings • consideration of the idea that changes in ability to deal with the problems over time depends on a combination of factors • consideration of the idea that ability to deal with the problems over time may depend on a country's level of economic development; for example, this might affect levels of government / local authority investment, education / training, evacuation / emergency procedures, contrast Haiti and Japan/USA • consideration of the fact that whilst tectonic events may not have increased in frequency over the last 50 years, there has been an increase in the number of disasters in terms of fatalities and economic costs; this may be related to population size or urban growth
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		might change over time. 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.		such as impacts of Merapi eruptions • social / spatial inequalities within a country might influence the relative abilities of people/families to deal with the problems, for example in level of community preparedness such as urban–rural contrasts • understanding that over time ability to predict some hazard events through scientific research, monitoring, use of modern technology may help to improve ability to deal with the problems by responding to early warnings such as Italy’s Volcanic Risk Service
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