OCR
Oxford Cambridge and RSA

GCE

Geography

Unit **H081/02:** Geographical debates

Advanced Subsidiary GCE

Mark Scheme for June 2017

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

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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.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

Annotations

Annotation	Meaning
L1	Level 1
L2	Level 2
L3	Level 3
L4	Level 4
SEEN	Point seen and noted
^	Omission mark
EVAL	Evaluation point
DEV	Development
	Draw attention to a section of the response. Use in conjunction with another stamp e.g. EVAL or IRRL
IRRL	Irrelevant (this can also be used to indicate unused additional pages)
	Unclear
NE	No example
R	Rubric infringement
BP	Blank page within an answer booklet and any additional objects where there is no candidate response

Subject-specific Marking Instructions

INTRODUCTION

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

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

You should ensure that you have copies of these materials.

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

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

USING THE MARK SCHEME

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

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

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

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

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

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

LEVELS OF RESPONSE QUESTIONS:

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

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

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

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

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

Be prepared to use the full range of marks. Do not reserve (e.g.) highest level marks 'in case' something turns up of a quality you have not yet seen. If an answer gives clear evidence of the qualities described in the level descriptors, reward appropriately.

Quality of extended response will be assessed in questions marked with an (*). Quality of extended response is not attributed to any single assessment objective but instead is assessed against the entire response for the question.

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

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

Question			Answer	Marks	Guidance
1	(a)		**Explain how solar output influences climate change.** • Energy emitted by the Sun varies due to sunspots (✓) • Sunspots appear on the Earth's surface caused by intense magnetic storms (✓) • These storms blast more solar radiation towards the Earth raising temperatures on the Earth (✓) • There are well known cycles in sunspot activity (✓)	4	**AO1 – 4 marks** 4 x 1 mark (✓) for each correct explanatory point. Focus should be on the knowledge and understanding of the relationship between solar output and climate change.
	(b)		**Suggest how the natural greenhouse effect is enhanced by the addition of greenhouse gases** **Level 3 (5-6 marks)** Demonstrates **thorough** knowledge and understanding of the natural greenhouse effect and how it is enhanced by the addition of greenhouse gases (AO1). Demonstrates **thorough** application of knowledge and understanding to provide clear, accurate and developed analysis as to how the addition of greenhouse gases enhances the natural greenhouse effect (AO2). Place specific details should be accurate with the amount helping determine where within the level the response lies. **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of the natural greenhouse effect and how it is enhanced by the addition of greenhouse gases (AO1). Demonstrates **reasonable** application of knowledge and	6	**AO1 – 3 marks** Knowledge and understanding of the natural greenhouse effect could potentially include; • GHGs e.g. water vapour, CO_2, CH_4 occur naturally in atmosphere • these bring about a warming effect as largely transparent to incoming short-wave radiation but absorb outgoing long-wave radiation • natural greenhouse effect results in average surface temperature of Earth being c. 34^{o}C higher than it would be without the GHGs **AO2 – 3 marks** Application of knowledge and understanding to analyse how the natural greenhouse effect is enhanced by the addition of greenhouse gases could potentially include; • since early 19th century volume of GHGs ↑

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td></td><td></td><td></td><td>understanding to provide a sound analysis showing some accuracy and development as to how the addition of greenhouse gases enhances the natural greenhouse effect (AO2).
Place specific material is present which is partially accurate with the amount helping determine where within the Level the response lies.

Level 1 (1-2 marks)
Demonstrates basic knowledge and understanding of the natural greenhouse effect and how it is enhanced by the addition of greenhouse gases (AO1).
Demonstrates basic application of knowledge and understanding to provide a simple analysis showing limited accuracy and little development as to how the addition of greenhouse gases enhances the natural greenhouse effect (AO2).
Little or no place specific material is present and or is inaccurate.

0 marks
No material worthy of credit.</td><td></td><td>rapidly
• CO_2 ↑ by one third – 280 ppm → c. 400 ppm
• methane (CH_4) ↑ just over double – 0.8 ppm → 1.72
• other GHGs e.g. CFCs, HFCs and nitrous oxides also ↑
• aerosol particles e.g. from fossil fuel burning + natural emissions e.g. volcanic eruptions also enhance greenhouse effect
• long-wave absorption ↑ and raises global temperatures
• ↑ in evaporation → more water vapour in atmosphere
• ↑ in atmospheric temperatures → permafrost melting → release of methane hydrates</td></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td>Study Table 1, which shows annual methane gas emissions from human activities 1860 – 2010.

<table><tr><td>Year</td><td>Methane gas emissions[1]</td></tr><tr><td>1860</td><td>79</td></tr><tr><td>1880</td><td>98</td></tr><tr><td>1900</td><td>95</td></tr><tr><td>1920</td><td>137</td></tr><tr><td>1940</td><td>162</td></tr></table></td><td>4
AO3x4</td><td>AO3 – 4 marks
• median value stated - 1 mark (✓)
• addition of data - 1 mark (✓)
• division of their summed data by 9 - 1 mark (✓)
• mean value stated - 1 mark (✓)</td></tr>
</table>

Question			Answer	Marks	Guidance
			<table><tr><td>1960</td><td>221</td></tr><tr><td>1980</td><td>319</td></tr><tr><td>2000</td><td>389</td></tr><tr><td>2010</td><td>442</td></tr></table> [1] Methane gas production in teragrams (Tg) 1 teragram = 1 billion kilograms **Using the methane gas emissions data above, calculate the median and mean values. You must show your working. Give your answer correct to 1 decimal place for the value of the mean.** Median value = 162 Mean value = 215.8 (1942 / 9)		
		(ii)	**With reference to the data in the table above, analyse reasons for changes in methane gas emitted from human activities.** **Level 3 (5-6 marks)** Demonstrates **thorough** application of knowledge and understanding, with a clear, accurate and developed analysis regarding contrasts in methane gas emissions from human activities. (AO2) Demonstrates **thorough** investigation and interpretation of the resource to evidence fully contrasts in methane emissions. There are good ideas linking resource evidence to the possible causes of the contrasts in methane gas	**6** AO2x3 AO3x3	**AO2 – 3 marks** Application of knowledge and understanding to analyse the contrasts in methane emissions could potentially include: • ↑ in global population since mid-19th century • very significant population ↑ 1960 onwards • ↑ in methane from agriculture e.g. rice + livestock • ↑ in methane from industry e.g. mining + oil and gas production • ↑ in methane from landfill

Question			Answer	Marks	Guidance
			emissions from human activities. (AO3) **Level 2 (3-4 marks)** Demonstrates **reasonable** application of knowledge and understanding with a sound analysis showing some accuracy regarding contrasts in methane gas emissions from human activities. (AO2) Demonstrates **reasonable** investigation and interpretation of the data resource offering some evidence of the contrasts in methane emissions. There are sound ideas linking resource evidence to the possible causes of the contrasts in methane gas emissions from human activities. (AO3) **Level 1 (1-2 marks)** Demonstrates **basic** application of knowledge and understanding with a simple analysis showing limited accuracy regarding the contrasts in methane gas emissions from human activities. (AO2) Demonstrates **basic** investigation and interpretation of the data resource providing limited evidence of the contrasts in methane emissions. There are limited ideas linking resource evidence to the possible causes of the contrasts in methane gas emissions from human activities. (AO3) **0 marks** No material worthy of credit		**AO3 – 3 marks** Evidence from interpretation of the data could potentially include: • sustained ↑ in methane emitted across the time period –1860 to 2010 79 to 442 Tg • up to mid 20th century emissions rose steadily (apart from slight decrease 1880 – 1900) • post-mid 20th century, emissions doubled 1960 221Tg → 2010 442Tg • last time period only half that of the others and still a significant ↑ of 53 Tg
	(d)		**'Dealing with the human causes of climate change relies on international agreements.' How far do you agree with this statement?**	**12** AO1x6 AO2x6	**AO1 – 6 marks** Knowledge and understanding of international agreements could potentially include:

Question	Answer	Marks	Guidance
	Level 4 (10–12 marks) Demonstrates **comprehensive** and accurate knowledge and understanding of international agreements regarding climate change. (AO1) Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and convincing evaluation. Evidenced based secure judgements lead to rational conclusions regarding the extent to which international agreements can deal with human causes of climate change. (AO2) **Level 3 (7-9 marks)** Demonstrates **thorough** and mainly accurate knowledge and understanding of international agreements regarding climate change. (AO1) Demonstrates **thorough** application of knowledge and understanding to provide an effective evaluation. Some evidence supports generally secure judgements which lead to rational conclusions regarding the extent to which international agreements can deal with human causes of climate change. (AO2) **Level 2 (4-6 marks)** Demonstrates **reasonable** and some accurate knowledge and understanding of international agreements regarding climate change. (AO1) Demonstrates **reasonable** application of knowledge and		• UN Framework Convention on Climate Change UNFCC (1992) with 41 countries joining – originated at Earth Summit held in Rio de Janeiro • Kyoto Protocol (1997) arose from UNCFF with 192 countries agreeing to have legally binding targets for GHG emissions • First Kyoto protocol ran until 2012, a second one runs until 2020 • International climate change conferences held every year e.g. Marrakech 2016, Paris 2015, Lima 2014, Warsaw 2013 • EU has its European Climate Change Programme ECCP first launched 2000 setting targets to reduce GHG emissions • EU established the Emissions Trading System - cap and trade scheme – e.g. 21% reduction in GHG from power stations, industry + aviation by 2020 • EU has binding targets for reducing GHG emissions from agriculture, housing, waste e.g. landfill and transport • EU set targets for increasing contributions from renewable energy + improving energy efficiency

Question			Answer	Marks	Guidance
			understanding to provide a sound evaluation. Limited evidence leads to generalised judgements and conclusions regarding the extent to which international agreements can deal with human causes of climate change. (AO2) **Level 1 (1-3 marks)** Demonstrates **basic** and/or inaccurate knowledge and understanding of international agreements regarding 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 regarding the extent to which international agreements can deal with human causes of climate change. (AO2) **0 marks** No material worthy of credit.		• Comments about Intergovernmental Panel on Climate Change IPCC informing policy makers relevant **AO2 – 6 marks** Application of knowledge and understanding to analyse and evaluate the extent to which international agreements can deal with human causes of climate change could potentially include: • underlying principle of the 'tragedy of the commons' – no-one owns the atmosphere but all countries use it • global emissions of GHGs increased by just over a third 1992 – 2007 • although Kyoto and other agreements are well supported by many ACs, together they only amount to c. 14% of carbon emissions • USA, Russia, Japan, Canada are not signed up to the second Kyoto commitment running from 2013 – 2020 • China and India, two major emitters of CO_2 and other GHGs, like other EDCs and LIDCs are exempt – prioritise economic development over climate change • EDCs and LIDCs argue that ACs have a moral

Question			Answer	Marks	Guidance
					responsibility to deal with a problem caused by their historic emissions over past two hundred years • Individual actions also required to reduce GHG emissions as well as those of organisations e.g. businesses, schools, hospitals

Question			Answer	Marks	Guidance
2	(a)		**Explain how contagious and non-contagious diseases spread.** • contagious spread by physical contact (✓) • contagious spread either by direct physical contact between people or casual contact e.g. touching the same object or airborne e.g. typhoid / ebola (✓) • credit for type of diffusion e.g. contagious (Hägerstrand) / relocation / expansion / hierarchical ✓) • non-contagious not transmitted by direct contact nor indirectly through a vector (✓) • non-contagious inherited / behavioural factors / environmental e.g. diabetes / cancers (✓)	**4** AO1x4	**AO1 – 4 marks** 4 x 1 mark (✓) for each correct explanatory point. Focus should be on the knowledge and understanding of how each of the two categories of disease spread

Question	Answer	Marks	Guidance
(b)	**Suggest why outbreaks of some diseases are influenced by climatic seasons.** **Level 3 (5-6 marks)** Demonstrates **thorough** knowledge and understanding of outbreaks of disease and of climatic seasons (AO1). **Place specific details** should be accurate with the amount helping determine where within the Level the response lies. Demonstrates **thorough** application of knowledge and understanding to provide an accurate, clear and developed analysis as to why some outbreaks of disease are influenced by climatic seasons (AO2). **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of outbreaks of disease and of climatic seasons (AO1). **Place specific** material is present which is partially accurate with the amount helping determine where within the Level the response lies. Demonstrates **reasonable** application of knowledge and understanding to provide a **sound** analysis showing some accuracy and development as to why some outbreaks of disease are influenced by climatic seasons (AO2). **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of outbreaks of disease and of climatic seasons (AO1). Little or no place specific material is present and or is inaccurate. Demonstrates **basic** application of knowledge and understanding to provide a **simple** analysis showing limited	**6** AO1x3 AO2x3	**AO1 – 3 marks** Knowledge and understanding of disease outbreaks in relation to climatic seasons could potentially include: • many diseases show clear peaks and troughs temporally as regards the numbers affected • variations in numbers of people affected occurs across the globe in all types of climates • in temperate regions e.g. much of Western Europe and North America, colds and influenza show marked increases during the winter months (December – February / March) • in tropics and sub-tropics e.g. much of sub-Saharan Africa and South-East Asia vector-borne diseases transmitted by mosquitoes, flies, ticks, fleas, worms tend to peak in association with rainy / monsoon season **AO2 – 3 marks** Application of knowledge and understanding to analyse why outbreaks of some diseases are influenced by climatic seasons could potentially include; • colds + influenza – transmission of flu virus most efficient at lower temperatures and when atmospheric humidity lower, conditions found in temperate climate winters • rainy seasons in sub-tropical + tropical climates

Question			Answer	Marks	Guidance
			accuracy and little development as to why some outbreaks of disease are influenced by climatic seasons (AO2). **0 marks** No material worthy of credit.		offer more stagnant water for insects to breed → e.g. outbreaks of malaria + yellow fever • rainy seasons can give very intense rainfall which overwhelms sewage infrastructure – diseases such as typhoid + cholera more easily spread • links between outbreaks + climate not straightforward – other variables play a role e.g. virulence of a particular strain of flu virus; seasonal migrations of animals; population movements e.g. transhumance, refugees; deforestation leads to open space where pools of water can accumulate acting as breeding sites • availability of food often associated with climatic seasons especially in some LIDCs → under-nourishment + mal-nourishment linked to disease outbreaks

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td>Study Table 2, which shows the % of infants (< 5 years) vaccinated against hepatitis B[1] in selected countries in 2014.

<table><tr><td>Country</td><td>% infants vaccinated</td></tr><tr><td>Belgium</td><td>98</td></tr><tr><td>Chad</td><td>46</td></tr><tr><td>Equatorial Guinea</td><td>24</td></tr><tr><td>Malaysia</td><td>96</td></tr><tr><td>Mexico</td><td>84</td></tr><tr><td>Nigeria</td><td>66</td></tr><tr><td>Pakistan</td><td>73</td></tr><tr><td>USA</td><td>90</td></tr><tr><td>Zambia</td><td>86</td></tr></table>
[1] hepatitis B is an infectious disease which affects the liver. It can cause both acute and chronic infection.

Using the vaccination data above, calculate the median and mean values. You must show your working. Give your answer correct to 1 decimal place for the value of the mean.

Median value = 84

Mean value = 73.7 (663 / 9)</td><td>4
AO3x4</td><td>AO3 – 4 marks

• median value stated - 1 mark (✓)

• addition of data - 1 mark (✓)

• division of their summed data by 9 - 1 mark (✓)

• mean value stated - 1 mark (✓)</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Using evidence from the table above, analyse reasons for contrasts in % of infants vaccinated.

Level 3 (5-6 marks)</td><td>6
AO2x3
AO3x3</td><td>AO2 – 3 marks
Application of knowledge and understanding to</td></tr>
</table>

Question	Answer	Marks	Guidance
	Demonstrates **thorough** application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to contrasts in % of infants vaccinated. (AO2) Demonstrates **thorough** investigation and interpretation of the quantitative data resource to fully evidence contrasts % of infants vaccinated. There are good ideas linking resource evidence to the possible causes of contrasts in % of infants vaccinated. (AO3) **Level 2 (3-4 marks)** Demonstrates **reasonable** application of knowledge and understanding with a sound analysis showing some accuracy regarding contrasts in % of infants vaccinated. (AO2) Demonstrates **reasonable** investigation and interpretation of the quantitative data resource offering some evidence of the contrasts in % of infants vaccinated. There are sound ideas linking resource evidence to the possible causes of contrasts in % of infants vaccinated. (AO3) **Level 1 (1-2 marks)** Demonstrates **basic** application of knowledge and understanding with a simple analysis that showing limited accuracy regarding contrasts in % of infants vaccinated. (AO2) Demonstrates **basic** investigation and interpretation of the quantitative data resource providing limited evidence of contrasts in % of infants vaccinated. There are limited ideas linking resource evidence to possible causes of the contrasts in % of infants vaccinated. (AO3)		analyse the reasons for contrasts in % of infants vaccinated could potentially include: • basic contrast amongst countries AC → EDC → LIDC • but pattern not a straightforward three fold grouping • level of health care able to be provided in each country • number of health care workers • ability to store and distribute vaccine • level of health education in each country • personal incomes - afford health care or not • high activity levels of NGOs in some countries **AO3 – 3 marks** Evidence from interpretation of the data could potentially include: • very wide disparity in %s – Belgium 98 + Malaysia 96 → Chad 46 + Equatorial Guinea 24 • some LIDCs achieving quite high % e.g. Zambia 86%

Question			Answer	Marks	Guidance
			0 marks No material worthy of credit		• significant gap between sub-Saharan pair (Chad and Equatorial Guinea) and third lowest Nigeria although Chad is as far above Equatorial Guinea as it is below Nigeria
	(d)		**'The spread of a communicable disease is mainly due to environmental factors.' To what extent do you agree with this statement?** **Level 4 (10–12 marks)** Demonstrates **comprehensive** and accurate knowledge and understanding of the role of environmental factors in the spread of communicable disease. (AO1). Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and convincing evaluation. Evidenced based secure judgements lead to rational conclusions regarding the extent to which the spread of a communicable disease is mainly due to environmental factors. (AO2). **Level 3 (7-9 marks)** Demonstrates **thorough** and mainly accurate knowledge and understanding of the spread of communicable disease. (AO1). Demonstrates **thorough** application of knowledge and understanding to provide an effective evaluation. Some evidence supports generally secure judgements which lead to rational conclusions regarding the extent to which the spread of a communicable disease is mainly due to environmental factors. (AO2).	**12** AO1x6 AO2x6	**AO1 – 6 marks** Knowledge and understanding of the role of environmental factors in the spread of communicable disease could potentially include: • candidates only have to study ONE communicable disease in detail and at a national scale; a focus at this scale will therefore allow a response to reach top of Level 4 • communicable disease includes examples such as malaria, tuberculosis and HIV/AIDS • environmental factors influencing the spread of communicable disease include, water availability, conditions allowing vectors such as insects to thrive, migration of animals, atmospheric conditions • environmental factors include physical factors such as mountain ranges • environmental conditions can include housing conditions • non-environmental conditions include socio-economic e.g. diet, health programmes,

Question	Answer	Marks	Guidance
	Level 2 (4-6 marks) Demonstrates **reasonable** and some accurate knowledge and understanding of the spread of communicable disease. (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation offering generalised judgements and conclusions with limited links to evidence as to the extent to which the spread of a communicable disease is mainly due to environmental factors. (AO2). **Level 1 (1-3 marks)** Demonstrates **basic** and/or inaccurate knowledge and understanding of the spread of communicable disease. (AO1). Demonstrates **basic** application of knowledge and understanding offering either unsupported or minimal if any evaluation. Judgements and conclusions, if any, are simplistic regarding the extent to which the spread of a communicable disease is mainly due to environmental factors. (AO2). **0 marks** No material worthy of credit.		cultural attitudes, migration **AO2 – 6 marks** Application of knowledge and understanding to analyse and evaluate the extent to which the spread of communicable disease is mainly due to environmental factors could potentially include: • acknowledgement of the fundamental role of environmental causes such as stagnant water for insects e.g. mosquitoes to breed • some environmental factors can slow and or prevent communicable disease spread e.g. remoteness, physical barrier • role of human causes can interact with environmental but can be separate from these • population movements – sometimes associated with livestock movements in search of pasture (tstse fly – sleeping sickness) or harvest; moving from a region free of a disease to one where it is prevalent e.g. between upland and lowland areas – malaria free → malaria common • irrigation projects can offer more breeding opportunities for insects or spread of vectors e.g. schistosomiasis (bilharzia) spread by snails hosting parasitic flatworms • lack of / inadequate / broken sewage

Question			Answer	Marks	Guidance
					infrastructure allowing spread of diseases e.g. cholera + typhoid • over-crowded housing conditions encourage spread of diseases e.g. tuberculosis + measles both spread by coughing + sneezing • cultural factors can allow / encourage spread e.g. HIV/AIDS • dysfunctional government can allow / encourage spread of disease e.g. Zimbabwe cholera outbreak 2008

Question			Answer	Marks	Guidance
3	(a)		**Explain the pattern of circulation in the North Atlantic.** • warm water flows north-eastwards across the surface of the N. Atlantic – Gulf Stream (✓) • water cools as it travels north-eastwards (✓) • cooler water ↑ in density + sinks (✓) • this water returns southwards as a deep current (✓) • cold Labrador Current flows southwards from Arctic past north-east America (✓)	**4** AO1x4	**AO1 – 4 marks** 4 x 1 mark (✓) for each correct explanatory point. Focus should be on the knowledge and understanding of the movements of the waters of the North Atlantic

Question			Answer	Marks	Guidance
			• warm water enters Atlantic from Mediterranean (✓)		
	(b)		**Suggest why ocean acidification has impacts for people.** **Level 3 (5-6 marks)** Demonstrates **thorough** knowledge and understanding of ocean acidification's impacts for people (AO1). Place specific details should be accurate with the amount helping determine where within the Level the response lies. Demonstrates **thorough** application of knowledge and understanding to provide an accurate, clear and developed analysis as to why ocean acidification has impacts for people (AO2). **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of ocean acidification's impacts for people (AO1). Place specific material is present which is partially accurate with the amount helping determine where within the Level the response lies. Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis showing some accuracy and development as to why ocean acidification has impacts for people (AO2). **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of ocean acidification's impacts for people (AO1). Little or no place specific material is present and or is inaccurate. Demonstrates **basic** application of knowledge and	**6** AO1x3 AO2x3	**AO1 – 3 marks** Knowledge and understanding of impacts of ocean acidification for people could potentially include: • average global surface pH ↓ c. 30% in past 200 years to about 8.1 • forecast for pH to be 7.8 / 7.9 by 2100 – a doubling in acidity • acidification results in ocean organisms less able to accumulate calcium carbonate ($CaCO_3$) so more difficult to build skeletons and shells – a likely indicator of Level 3 response • may lead to some species thriving e.g. some jellyfish pushing local ecosystems into disequilibrium **AO2 – 3 marks** Application of knowledge and understanding to analyse why ocean acidification has impacts for people could potentially include; • reduction in populations of marine shellfish, crustacea and fish • these organisms are provisioning ecosystem services • c.200 million tonnes of seafood produced

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td></td><td></td><td></td><td>understanding to provide a simple analysis showing limited accuracy and little development as to why ocean acidification has impacts for people (AO2).

0 marks
No material worthy of credit.</td><td></td><td>annually

• some of the countries most dependent on seafood for fresh protein include LIDCs and EDCs e.g. The Gambia + Bangladesh

• islands especially have very limited alternative sources for protein production

• some ACs also receive significant provisioning services from seafood e.g. Canada, Japan + Norway

• loss of coral impacts on populations living along coasts protected from storm waves by reefs</td></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td>Study Table 3, which shows the number of observed oil slicks in the Baltic Sea for selected years 1990 – 2015

<table>
<tr><th>Year</th><th>Number of observed oil slicks</th></tr>
<tr><td>1990</td><td>415</td></tr>
<tr><td>1995</td><td>650</td></tr>
<tr><td>2000</td><td>480</td></tr>
<tr><td>2003</td><td>280</td></tr>
<tr><td>2005</td><td>220</td></tr>
<tr><td>2008</td><td>202</td></tr>
<tr><td>2010</td><td>150</td></tr>
<tr><td>2012</td><td>145</td></tr>
<tr><td>2015</td><td>130</td></tr>
</table>

Using the oil slick data above, calculate the median and mean values. You must show your working. Give your</td><td>4
AO3x4</td><td>AO3 – 4 marks

• median value stated - 1 mark (✓)

• addition of data - 1 mark (✓)

• division of their summed data by 9 - 1 mark (✓)

• mean value stated - 1 mark (✓)</td></tr>
</table>

Question			Answer	Marks	Guidance
			answer correct to 1 decimal place for the value of the mean. Median value = 220 Mean value = 296.9 (2672 / 9)		
		(ii)	**Using evidence from the table above, analyse reasons for changes in the number of oil slicks observed.** **Level 3 (5-6 marks)** Demonstrates **thorough** application of knowledge and understanding to provide clear and developed analysis that shows accuracy as to contrasts in oil slicks observed. (AO2) Demonstrates **thorough** investigation and interpretation of the quantitative data resource to fully evidence the contrasts in oil slicks observed. There are good ideas linking resource evidence to possible causes of contrasts in oil slicks observed. (AO3) **Level 2 (3-4 marks)** Demonstrates **reasonable** application of knowledge and understanding with a sound analysis that shows some accuracy as to contrasts in oil slicks observed. (AO2) Demonstrates **reasonable** investigation and interpretation of the data resource offering some evidence of contrasts in oil slicks observed. There are sound ideas linking resource	**6** AO2x3 AO3x3	**AO2 – 3 marks** Application of knowledge and understanding to analyse the reasons for changes in the number of oil slicks observed could potentially include: • increase in number and extent of rules / regulations applied to vessels using Baltic • comments regarding spills from oil drilling valid • improvement in rigour of observations (satellite, surface, aerial) especially through technology • increasing likelihood of vessels being caught so level of deliberate discharge lowered • improved marine technology results in less accidental leakage – some inevitable as accidents will always happen • improved marine technology reduced number of collisions between vessels + vessels running aground / sinking • reason for high in 1995 might be ↑ in number of

Question			Answer	Marks	Guidance
			evidence to possible causes of the contrasts in oil slicks observed. (AO3) **Level 1 (1-2 marks)** Demonstrates **basic** application of knowledge and understanding with a simple analysis showing limited accuracy regarding contrasts in oil slicks observed. (AO2) Demonstrates **basic** investigation and interpretation of the data resource providing limited evidence of contrasts in oil slicks observed. There are limited ideas linking resource evidence possible causes of contrasts in oil slicks observed. (AO3) **0 marks** No material worthy of credit		vessels or journeys **AO3 – 3 marks** Evidence from interpretation of the data could potentially include: • sustained decrease in number of observed oil slicks – 1990 415 to 2015 130 apart from a high in 1995 of 650 • significant decrease in early years of 21st century 2000 480 → 2008 202 • levelling off in annual number 2012 145 → 2015 130
	(d)		**To what extent can ocean resources be managed by governments?** **Level 4 (10–12 marks)** Demonstrates **comprehensive** and accurate knowledge and understanding of ways governments can manage ocean resources (AO1). Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and convincing evaluation. Evidenced based secure judgements lead to rational conclusions regarding the extent to which governments can manage ocean resources. (AO2)	**12** AO1x6 AO2x6	**AO1 – 6 marks** Knowledge and understanding of the ways governments can manage ocean resources could potentially include: • governments to include trans-national governments e.g. United Nations (UN) and European Union (EU) as well as national governments • United Nations Convention on the Law of the Sea (UNCLOS) came into force 1994 – as of June 2016 167 countries + EU have joined the Convention. • various zones extending out from a country's

Question	Answer	Marks	Guidance
	Level 3 (7-9 marks) Demonstrates **thorough** and mainly accurate knowledge and understanding of ways governments can manage ocean resources (AO1). Demonstrates **thorough** application of knowledge and understanding to provide an effective evaluation. Some evidence supports generally secure judgements which lead to rational conclusions regarding the extent to which governments can manage ocean resources (AO2). **Level 2 (4-6 marks)** Demonstrates **reasonable** and some accurate knowledge and understanding of ways governments can manage ocean resources (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation. Limited evidence leads to generalised judgements and conclusions regarding the extent to which governments can manage ocean resources (AO2). **Level 1 (1-3 marks)** Demonstrates **basic** and/or inaccurate knowledge and understanding of ways governments can manage ocean resources (AO1). Demonstrates **basic** application of knowledge and understanding offering either unsupported or minimal if any evaluation. Judgements and conclusions, if any, are simplistic regarding the extent to which governments can manage		coastline recognised – territorial waters - contiguous zone, together these account for 24 nautical miles (c.44 km) – exclusive economic zone (EEZ) from outer edge of territorial up to 200 nautical miles (370 km) • these zones give various powers and rights e.g. territorial waters – a government can set laws regarding, regulate use of and use any resource; EEZ – a country has sole exploitation rights over all natural resources • many treaties exist governing issues such as laying sea-floor cables, dumping waste and fishing and International Whaling Commission **AO2 – 6 marks** Application of knowledge and understanding to analyse and evaluate the extent to which governments can manage ocean resources could potentially include: • idea of global commons (Earth's shared resources) and or tragedy of the commons (metaphor illustrating how individuals can over-exploit a resource in common ownership e.g. oceans) very relevant – likely indicator of top of Level 2 + Level 3 response • countries dispute in detail the system of coastal zones affecting them e.g. disputing exact boundaries and historical claims e.g. South

Question			Answer	Marks	Guidance
			ocean resources (AO2). **0 marks** No material worthy of credit.		China Sea • some species move across zones and so are either regulated or not depending on where they are at any one point in time • fishing in deep oceans (high seas beyond EEZ) not covered • no agreement on underwater noise which can seriously impact some species e.g. whales + dolphins

Question			Answer	Marks	Guidance
4	(a)		**Explain the differences between intensive and extensive methods of food production.** • intensive – usually small scale, extensive – usually large scale (✓) • intensive – high level of inputs (capital and/or labour) extensive – low levels of inputs (capital and/or labour) (✓) • intensive - high yields per unit area, extensive - low yields per unit area (✓) but yields per capita can be high (✓)	**4** AO1x4	**AO1 – 4 marks** 4 x 1 mark (✓) for each correct difference. Focus should be on the knowledge and understanding of each of the two methods of food production.
	(b)		**Suggest why systems of land ownership impact on food security.**	**6** AO1x3 AO2x3	**AO1 – 3 marks** Knowledge and understanding of systems of land

Question	Answer	Marks	Guidance
	Level 3 (5-6 marks) Demonstrates **thorough** knowledge and understanding of impact of systems of land ownership on food security (AO1). Place specific details should be accurate with the amount helping determine where within the Level the response lies. Demonstrates **thorough** application of knowledge and understanding to provide an accurate, clear and developed analysis as to why systems of land ownership impact on food security (AO2). **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of impact of systems of land ownership on food security (AO1). Place specific material is present which is partially accurate with the amount helping determine where within the Level the response lies. Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis showing some accuracy and development as to why systems of land ownership impact on food security (AO2). **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of impacts of systems of land ownership on food security (AO1). Little or no place specific material is present and or is inaccurate. Demonstrates **basic** application of knowledge and understanding to provide a simple analysis showing limited accuracy and little development as to why systems of land ownership impact on food security (AO2).		ownership in relation to food security could potentially include: • land ownership systems – basic divide between private and state • private – owner-occupier; tenant – variety of types including paying rent or share-cropping (farmer pays a % of crop to landlord sometimes in exchange for seed, fertiliser, machinery) • state – variety of commune / co-operatives / collectives • subsistence – while not a system of landownership it is a category of food production relevant to the question – farmers producing to satisfy food and living requirements of themselves and their families • food security – when all people at all times have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life **AO2 – 3 marks** Application of knowledge and understanding to analyse why food security can be impacted on by systems of land ownership could potentially include; • state ownership systems – tend not to be as

Question	Answer	Marks	Guidance
	0 marks No material worthy of credit.		productive as private. Past examples of gross under-production e.g. Great Leap Forward, China 1958 – 61 when famine led to between 36 to 45 million deaths – official Chinese figure is 20 million • private ownership including tenancies e.g. most of western Europe, North America, Australia and New Zealand led to high levels of food productivity as the basis for food security in these regions; greater risk taking as regards investment and agricultural practices and entrepreneurial attitudes generate higher yields • share cropping – when the % share returned to the landlord is high, food security for the farmer often low. Often this system involves absentee landlords who simply want as much return as possible • subsistence farming – emphasis is on self-sufficiency and can lead to good level of food security. But most have very limited if any reserves to fall back on when crops / livestock fail. At mercy of weather, disease, natural hazards • North Korea – tragic example of state centralised control of agriculture – food shortages and famine are ever-present made worse by the collapse of the Soviet Union and loss of its

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>supply of cheap food

• Zimbabwe – 1980 onwards – Zanu PF led by Robert Mugabe carried out land reform – forcibly dispossessed white farmers redistributing it to among black Zimbabweans many of which not farmers. Dramatic reduction in country's food security.</td></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td>Study Table 4, which shows cereal production for selected countries, 2014

<table>
<tr><td>Country</td><td>Cereal produced[1]</td></tr>
<tr><td>Belgium</td><td>9539</td></tr>
<tr><td>Brazil</td><td>4641</td></tr>
<tr><td>Chad</td><td>941</td></tr>
<tr><td>India</td><td>2981</td></tr>
<tr><td>Mexico</td><td>3582</td></tr>
<tr><td>Poland</td><td>4268</td></tr>
<tr><td>Somalia</td><td>730</td></tr>
<tr><td>Uganda</td><td>2019</td></tr>
<tr><td>USA</td><td>7637</td></tr>
</table>

[1] cereal production in kilograms per hectare

Using the cereal production data above, calculate the median and mean values. You must show your working. Give your answer correct to 1 decimal place for the value of the mean.
Median value = 3582 Mexico

Mean value = 4037.6 (36338 / 9)</td><td>4
AO3x4</td><td>AO3 – 4 marks

• median value stated - 1 mark (✓)

• addition of data - 1 mark (✓)

• division of their summed data by 9 - 1 mark (✓)

• mean value stated - 1 mark (✓)</td></tr>
</table>

Question			Answer	Marks	Guidance
		(ii)	**With reference to the data in the table above, analyse reasons for contrasts in cereal production.** **Level 3 (5-6 marks)** Demonstrates **thorough** application of knowledge and understanding to provide clear and developed analysis regarding contrasts in cereal production. (AO2) Demonstrates **thorough** investigation and interpretation of the quantitative data resource to fully evidence contrasts in cereal production. There are good ideas linking resource evidence to possible causes of contrasts in cereal production. (AO3) **Level 2 (3-4 marks)** Demonstrates **reasonable** application of knowledge and understanding with a sound analysis that showing some accuracy regarding contrasts in cereal production. (AO2) Demonstrates **reasonable** investigation and interpretation of the data resource offering some evidence of contrasts in cereal production. There are sound ideas linking resource evidence to possible causes of contrasts in cereal production. (AO3) **Level 1 (1-2 marks)** Demonstrates **basic** application of knowledge and understanding with a simple analysis showing limited accuracy regarding contrasts in cereal production. (AO2)	**6** AO2x3 AO3x3	**AO2 – 3 marks** Application of knowledge and understanding to analyse the reasons for contrasts in cereal production amongst selected countries could potentially include: • physical factors e.g. some countries have more favourable climate for cereal production such as length of growing season, precipitation totals and seasonal distribution, soils • economic factors e.g. capital available for investment in equipment such as tractors and irrigation, fertilisers, pesticides, herbicides • social factors e.g. land ownership such as fragmentation of farms • political factors e.g. government support for agriculture **AO3 – 3 marks** Evidence from interpretation of the data could potentially include: • ACs e.g. Belgium + USA highest yields at 9539 and 7637 respectively • EDCs e.g. Brazil, India, Mexico and Poland have yields between 4641 and 2981 • LIDCs e.g. Chad, Somalia and Uganda have yields 2019 or less; in the case of Chad and Somalia significantly less at 941 and 730 respectively

Question			Answer	Marks	Guidance
			Demonstrates **basic** investigation and interpretation of the data resource providing limited evidence of contrasts in cereal production. There are limited ideas linking resource evidence to possible causes of contrasts in cereal production. (AO3) **0 marks** No material worthy of credit		
	(d)		**'The level of economic development is the key influence on food security of places.' How far do you agree with this statement?** **Level 4 (10–12 marks)** Demonstrates **comprehensive** and accurate knowledge and understanding of the influence of economic development on food security (AO1). Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and convincing evaluation offering secure judgements leading to rational conclusions that are evidence based as to the extent to which economic development is the key influence on food security (AO2). **Level 3 (7-9 marks)** Demonstrates **thorough** and mainly accurate knowledge and understanding of the influence of economic development on food security (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation offering	**12** AO1x6 AO2x6	**AO1 – 6 marks** Knowledge and understanding of the influence of the level of economic development on food security could potentially include: • Food and Agricultural Organisation (FAO) estimated nearly 800 million people were hungry in 2015 – 98% of these lived in LIDCs – comments about undernourishment and hunger relevant as food security difficult to define • sub-Saharan Africa stands out as where food security is most fragile for the highest proportions of people c. a third • ACs are where levels of food insecurity are at their lowest • many EDCs have relatively low levels of food insecurity e.g. North Africa, Latin America **AO2 – 6 marks**

Question	Answer	Marks	Guidance
	generally secure judgements with some link between rational conclusions and evidence as to the extent to which economic development is the key influence on food security (AO2). **Level 2 (4-6 marks)** Demonstrates **reasonable** and some accurate knowledge and understanding of the influence of economic development on food security (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation offering generalised judgements and conclusions with limited links to evidence as to the extent to which economic development is the key influence on food security (AO2). **Level 1 (1-3 marks)** Demonstrates **basic** and/or inaccurate knowledge and understanding of the role of economic development on food security (AO1). Demonstrates **basic** application of knowledge and understanding offering either unsupported or minimal if any evaluation. Judgements and conclusions, if any, are simplistic regarding the extent to which economic development is the key influence on food security (AO2). **0 marks** No material worthy of credit.		Application of knowledge and understanding to analyse and evaluate the extent to which the level of economic development is the key influence on food security could potentially include: • where a country is along the development continuum does significantly influence its level of food security • the availability of capital allows investment in food production e.g. irrigation, secure food storage, efficient distribution • higher levels of economic development generally mean more people can afford greater quantities of and higher quality food • however, other factors can be influential • political unrest e.g. much of sub-Saharan Africa, Iraq, Syria and Yemen • political misrule e.g. Zimbabwe • disasters e.g. Nepalese earthquake; tropical storms (parts of Asia, parts of the Caribbean) • areas where agriculture reliant on very seasonal rainfall e.g. monsoon regions such as south-east Asia • other physical factors e.g. desertification, extreme relief, long term water scarcity

Question			Answer	Marks	Guidance
					• high rates of population growth e.g. Ethiopia in relation to agricultural resources • alternative measure of food security e.g. % food imported offers interesting analysis and evaluation as to degree of self-sufficiency – a likely Level 3 indicator • some countries are food secure as long as non-primary sectors in their economies are thriving – these generate the wealth to purchase food internationally e.g. Singapore + Japan

Question			Answer	Marks	Guidance
5	(a)		**Explain the differences between explosive and effusive eruptions.** • explosive – convergent plate boundaries; effusive – divergent plate boundaries (✓) • explosive – lava acidic (e.g. andesite) and viscous; effusive – lava basic (e.g. basalt) with low viscosity (✓) • explosive – violent eruption; effusive – limited explosive force of eruption (✓) • explosive – low frequency of eruption; effusive – higher frequency (✓)	**4** AO1x4	**AO1 – 4 marks** 4 x 1 mark (✓) for each correct difference. Focus should be on the knowledge and understanding of each of the two categories of eruptions
	(b)		**Suggest why flooding can result from earthquake activity.**	**6** AO1x3 AO2x3	**AO1 – 3 marks** Knowledge and understanding of flooding produced by

Question	Answer	Marks	Guidance
	Level 3 (5-6 marks) Demonstrates **thorough** knowledge and understanding of why flooding can result from earthquake activity (AO1). Place specific details should be accurate with the amount helping determine where within the Level the response lies. Demonstrates **thorough** application of knowledge and understanding to provide an accurate, clear and developed analysis as to why flooding can result from earthquake activity (AO2). **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of why flooding can result from earthquake activity (AO1). Place specific material is present which is partially accurate with the amount helping determine where within the Level the response lies. Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis showing some accuracy and development as to why flooding can result from earthquake activity (AO2). **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of why flooding can result from earthquake activity (AO1). Little or no place specific material is present and or is inaccurate. Demonstrates **basic** application of knowledge and understanding to provide a simple analysis showing limited accuracy and little development as to why flooding can result from earthquake activity (AO2).		earthquake activity could potentially include: • earthquakes represent the release of stress in Earth's crust • can result in displacement of rocks vertically and or horizontally • natural drainage disrupted, surface water courses diverted, groundwater movement affected • human engineered water structures affected e.g. dams, pipelines • offshore seismic activity can cause uplift of sea bed and displacement of water above • liquefaction can lead to surface pooling of water **AO2 – 3 marks** Application of knowledge and understanding to analyse why flooding can result from earthquake activity could potentially include; • landslides resulting from seismic activity can block streams and rivers especially in upland regions e.g. Himalayas – Hunza Lake in Pakistan formed after 2010 earthquake • natural dams formed – upstream water builds up flooding valley → if water level overtops landslide material, catastrophic flooding downstream can occur e.g. Nepal 2015

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td></td><td></td><td></td><td>0 marks
No material worthy of credit.</td><td></td><td>• seismic activity can cause a landslide which enters a reservoir → displacement of water can weaken and even overtop the dam causing catastrophic flooding downstream e.g. Vaiont dam, northern Italy 1963

• tsunami waves generated by offshore seismic activity → displacement of sea water can flood coastal regions e.g. Aceh province, Sumatra, 2004 + Tōhoku Japan 2011</td></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td>Study Table 5, which shows the distribution of very small ash particles from the vent of the Eyjafjallajökull volcano, Iceland 2010.

<table>
<tr><th>Distance from vent (km)</th><th>% of very small ash particles</th></tr>
<tr><td>1</td><td>11</td></tr>
<tr><td>2</td><td>15</td></tr>
<tr><td>5</td><td>17</td></tr>
<tr><td>10</td><td>19</td></tr>
<tr><td>21</td><td>26</td></tr>
<tr><td>30</td><td>29</td></tr>
<tr><td>56</td><td>45</td></tr>
<tr><td>58</td><td>51</td></tr>
<tr><td>60</td><td>70</td></tr>
</table>

Using the % very small ash particles data above, calculate the median and mean values. You must show your working. Give your answer correct to 1 decimal place for the value of the mean.</td><td>4
AO3x4</td><td>AO3 – 4 marks

• median value stated - 1 mark (✓)

• addition of data - 1 mark (✓)

• division of their summed data by 9 - 1 mark (✓)

• mean value stated - 1 mark (✓)</td></tr>
</table>

Question			Answer	Marks	Guidance
			Median value = 26 Mean value = 31.4 (283 / 9)		
		(ii)	**Using evidence from the table above, analyse changes in the % of very small ash particles.** **Level 3 (5-6 marks)** Demonstrates **thorough** application of knowledge and understanding with a clear, accurate and developed analysis regarding contrasts in % of very small ash particles (AO2) Demonstrates **thorough** investigation and interpretation of the resource to evidence fully contrasts in % of very small ash particles. There are good ideas linking resource evidence to possible causes of contrasts in % of very small ash particles. (AO3) **Level 2 (3-4 marks)** Demonstrates **reasonable** application of knowledge and understanding with a sound analysis showing some accuracy regarding contrasts in % of very small ash particles. (AO2) Demonstrates **reasonable** investigation and interpretation of the data resource offering some evidence of contrasts in % of very small ash particles. There are sound ideas linking resource evidence to possible causes of the contrasts in % of very small ash particles. (AO3)	**6** AO2x3 AO3x3	**AO2 – 3 marks** Application of knowledge and understanding to analyse the reasons for changes in the % of very small ash particles could potentially include: • ash is a very common product from volcanic eruptions • ash particles are at the smaller end of the continuum of volcanic ejecta known as tephra • volcanic eruptions can carry ash into the atmosphere e.g. into jet stream 8 - 15 km high • ash carried away from vent with the smallest particles travelling furthest • heavier ash particles settle out closer to the vent as energy from blast dissipates in the atmosphere • once up in the atmosphere, the smallest ash particles require little air movement to keep them air borne **AO3 – 3 marks** Evidence from interpretation of the data could potentially include:

Question			Answer	Marks	Guidance
			Level 1 (1-2 marks) Demonstrates **basic** application of knowledge and understanding with a simple analysis showing limited accuracy regarding contrasts in % of very small ash particles. (AO2) Demonstrates **basic** investigation and interpretation of the data resource providing limited evidence of % of very small ash particles. There are limited ideas linking resource evidence to possible causes of contrasts in % of very small ash particles. (AO3) **0 marks** No material worthy of credit		• overall increase in % of very small ash particles with increasing distance – positive relationship • first few kilometres little change in % very small ash particles 1km to 10 km, 11 to 19% respectively • between 30 and 56 km significant increase in % small ash particles 29 to 45% respectively • by 60 km very small ash particles make up by far the majority of ash 70%
	(d)		**Discuss the extent to which risks posed by tectonic hazards have reduced over time.** **Level 4 (10–12 marks)** Demonstrates **comprehensive** and accurate knowledge and understanding of the risks posed by tectonic hazards (AO1). Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and convincing evaluation. Evidenced based secure judgements lead to rational conclusions regarding the extent to which risks posed by tectonic hazards have reduced over time (AO2). **Level 3 (7-9 marks)** Demonstrates **thorough** and mainly accurate knowledge and understanding of the risks posed by tectonic hazards (AO1).	**12** AO1x6 AO2x6	**AO1 – 6 marks** Knowledge and understanding of the risks posed by tectonic hazards could potentially include: • volcanic hazards – lava flows; pyroclastic flows; tephra; toxic gases (CO, CO_2, SO_2); lahars • seismic hazards – ground shaking + ground displacement; liquefaction; landslides + avalanches; tsunami • what is meant by 'risk'? $$\text{Risk (R)} = \frac{\text{Frequency or magnitude of hazard (H) x Level of vulnerability (V)}}{\text{Capacity of population to cope and}}$$

Question	Answer	Marks	Guidance
	Demonstrates **thorough** application of knowledge and understanding to provide an effective evaluation. Some evidence supports generally secure judgements which lead to rational conclusions regarding the extent to which risks posed by tectonic hazards have reduced over time (AO2). **Level 2 (4-6 marks)** Demonstrates **reasonable** and some accurate knowledge and understanding of the risks posed by tectonic hazards (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation. Limited evidence leads to generalised judgements and conclusions regarding the extent to which risks posed by tectonic hazards have reduced over time (AO2). **Level 1 (1-3 marks)** Demonstrates **basic** and/or inaccurate knowledge and understanding of the risks posed by tectonic hazards (AO1). Demonstrates **basic** application of knowledge and understanding offering either unsupported or minimal if any evaluation. Judgements and conclusions, if any, are simplistic regarding the extent to which risks posed by tectonic hazards have reduced over time (AO2). **0 marks** No material worthy of credit.		adapt (C) • trends in tectonic hazards appear to have increased over past 50 years – emdat figures might be quoted here • in terms of fatalities, numbers affected + economic cost a few years stand out e.g. 2008 + 2011 but in many of the past fifty years, most tectonic events had limited impacts **AO2 – 6 marks** Application of knowledge and understanding to analyse and evaluate the extent to which the risks posed by tectonic hazards have reduced over time could potentially include: • tectonic forces operate over very long time scales, trends of past earthquake + volcanic activity need to be interpreted with care – likely Level 3 indicator • clear contrast in risk between earthquake + volcanic eruption with former posing much more risk in terms of fatalities, numbers affected + economic cost • population growth (c. 9-10 billion by 2050) resulting in more people exposed to risk from tectonic hazards • ↑ proportion of population urban therefore living at high densities so risk increases

Question			Answer	Marks	Guidance
					• however, resilience ↑ for many people • modifying event – some success with some eruptions e.g. Etna; not possible with earthquakes • modifying vulnerability; improved monitoring techniques especially volcanic activity linked to warning systems; improved hazard mapping; aseismic building design • modifying loss e.g. well trained emergency teams; greater international co-operation

Question			Answer	Marks	Guidance
6	(a)		**With reference to Fig. 1, suggest how climate change can impact on the natural characteristics of places.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of climate change and the natural characteristics of places (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how climate change can impact on the natural characteristics of places (AO2). This will be shown by including **well-developed** ideas linking climate change to the natural characteristics 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 climate change and the natural characteristics of places (AO1). Demonstrates **reasonable** application of knowledge and	8 AO1 x4 AO2 x4	**Indicative Content** **AO1 – 4 marks** Knowledge and understanding of climate change and natural characteristics of places could potentially include: • evidence of climate change especially the warming of the past two hundred years • the impacts of climate change are represented in the cartoon as swamping the world • natural characteristics of places include any factor based in physical geography e.g. altitude, slope angle, drainage, ecosystems **AO2 – 4 marks** Application of knowledge and understanding to interpret how climate change can impact on the natural characteristics of places could potentially include: • from Fig.1 the impression is that humans are at the mercy of the impacts of climate change • link to rising sea levels and the impact on places such as island communities; coastal communities especially along low-lying coasts e.g. deltas + estuaries + land reclaimed from the sea

			understanding to provide a sound interpretation that shows some accuracy of how climate change can impact on the natural characteristics of places (AO2). This will be shown by including **developed** ideas linking climate change to the natural characteristics 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 climate change and the natural characteristics of places AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how climate change can impact on the natural characteristics of places (AO2). There will be **simple** ideas linking climate change to the natural characteristics of places. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No material worthy of credit		• link to impact of higher air temperatures and the impact on climate e.g. some places will receive sustained hot conditions impacting on the people living there • link to impact of higher air temperatures and the impact on climate e.g. some places will experience higher humidity as ↑ in rates of evaporation • link to impact of higher air temperatures and warmer oceans → ↑ in rates of evaporation and resulting increase in number and severity of storms which will then impact on places e.g. coasts • link to impact of higher levels and intensities of rainfall → ↑ chance of mass movements e.g. places with steep slopes • link to impact of changes in seasons and the resulting impact on plants and animals and the changing bio-geography of places e.g. different plants able to grow, changing timing in seasons • cartoon focused on urban area but credit any references to any natural characteristics
	(b)		**Examine how climate change can influences flows of energy and materials in landscape systems.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of climate change and landscape systems (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that	**8** **AO1 x4** **AO2 x4**	**Indicative Content** **AO1 – 4 marks** Knowledge and understanding of climate change and flows of energy and materials in landscape systems could potentially include: • evidence of how climate has changed e.g. warming of past two hundred years; changes to precipitation patterns in previous pluvial periods affecting drylands; longer term climate changes

			shows accuracy of how climate change can influence flows of energy and materials in landscape systems (AO2). There must be **well-developed** ideas of how climate change can influence flows of energy and materials in landscape systems. 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 climate change and landscape systems (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how climate change can influence flows of energy and materials in landscape systems (AO2). There must be **developed** ideas of how climate change can influence flows of energy and materials in landscape systems. 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 climate change and landscape systems (AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how climate change can influence flows of energy and materials in landscape systems (AO2). This will be shown by including **simple** ideas of how climate		affecting glaciated landscapes • climate change, in particular effects on geomorphic systems such as temperatures and levels and types of precipitation • idea that landscape systems are open with energy and materials flowing through them • specific points will depend on the landscape system studied by the candidate, coastal, glaciated or dryland – only one is studied • Level 3 attainable if there is not an equal balance between energy and materials but the very limited or omission of one limits the response to top of Level 1 **AO2 – 4 marks** Application of knowledge and understanding to analyse how climate change can influence flows of energy and materials in landscape systems could potentially include: • some points will depend on the landscape system studied by the candidate, coastal, glaciated or dryland – only one is studied • generic point – increase in temperatures likely to lead to more energy flowing through a landscape system → some processes will increase in intensity • generic point – weathering processes (chemical, physical + biological) likely to be more active due to higher temperatures → more material available to be transported through the landscape system • generic point – erosional processes likely to be more active due to higher temperatures e.g. increased meltwater at glacier base leads to higher ice velocities; increased atmospheric energy leads to stronger winds giving greater wave energy to pound coastlines and more

			change can influence flows of energy and materials in landscape systems. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No material worthy of credit		aeolian energy for corrosion/attrition/deflation in dryland landscapes→ generate more material available to be transported as well as transporting more material themselves • coastal – impact of rising sea level moves more unconsolidated material in coastal zone

Question			Answer	Marks	Guidance
7	(a)		**With reference to Fig.2, suggest how social inequality can influence risks from disease in places.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of risks from disease and social inequality in places (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how social inequality can influence risks from disease in places (AO2). This will be shown by including **well-developed** ideas linking social inequality to risks from disease in 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 risks from disease and social inequality in places (AO1).	**8** **AO1 x4** **AO2 x4**	**Indicative Content** **AO1 – 4 marks** Knowledge and understanding of risks from disease and social inequality in places could potentially include: • when and where social inequality results in standards of living and quality of life declining, risks from disease tend to increase • the association between poverty and ill-health is very strong • idea of post-code lottery as applied to health care relevant – level of medical provision varies with inner city areas often possessing fewer health care facilities and professionals per head of population • social inequality can result in people living in overcrowded conditions • social inequality can result in poor diet both in terms of quantity and quality of food

			Demonstrates **reasonable** application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how social inequality can influence risks from disease in places (AO2). This will be shown by including **developed** ideas linking social inequality to risks from disease in 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 risks from disease and social inequality in places AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how social inequality can influence risks from disease in places (AO2). There will be **simple** ideas linking social inequality to risks from disease in places. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No material worthy of credit		**AO2 – 4 marks** Application of knowledge and understanding to analyse how contrasts in inequality between places can influence risks from disease could potentially include: • higher levels of unemployment → lower incomes • lower incomes → poorer diet → increased risk of disease • higher incomes from employment in better paid employment (managerial + professional) allow more choice in housing market → higher proportion living in detached housing → less overcrowding → lower risk from disease • higher population densities → greater risk from spread of infectious disease e.g. influenza / TB • higher proportion of managerial and professional occupations could mean that people work further away from home and work longer hours → increased risk from diseases such as stroke / heart • higher income can offer greater opportunities for access to leisure and recreation → reducing risks from some diseases e.g. heart / diabetes • loss of employment from inner city of that of manufacturing sector → reduced levels of pollution (air / water) → reduced risk from diseases such as lung cancers • easier to recruit health professionals to work in suburban locations → reduction in risks from disease for those living in these places
	(b)		**Examine how physical factors influencing landscape systems can affect the spread of disease.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of physical factors influencing landscape systems and the	**8** **AO1 x4** **AO2 x4**	**Indicative Content** **AO1 – 4 marks** Knowledge and understanding of physical factors influencing landscape systems and the spread of disease could potentially include:

			spread of disease (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how physical factors influencing landscape systems can affect the spread of disease (AO2). There must be **well-developed** ideas of how physical factors influencing landscape systems can affect the spread of disease. 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 physical factors influencing landscape systems and the spread of disease (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how physical factors influencing landscape systems can affect the spread of disease (AO2). There must be **developed** ideas of how physical factors influencing landscape systems can affect the spread of disease. 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 physical factors influencing landscape systems and the spread of disease (AO1).		• knowledge + understanding of landscape systems will focus on one of coastal, glaciated or dryland • physical factors influencing landscape systems include geology; climate (temperature, precipitation, wind); relief; soils; flora and fauna; climate change; • physical factors influencing the spread of disease include climate (temperature, precipitation, wind); relief; flora and fauna; climate change • types of disease spread include diffusion (expansion, relocation, contagious); Hägerstrand's diffusion model **AO2 – 4 marks** Application of knowledge and understanding to analyse how physical factors influencing landscape systems can affect the spread of disease could potentially include: • most of the physical factors influence rates of weathering + erosion in landscape systems • climate - a key physical factor affecting both landscape systems + disease spread → warm + humid conditions aid spread of diseases e.g. malaria, dengue and yellow fever; wind can spread disease either by dispersing pathogens themselves or the vectors transmitting them e.g. insects; periods of cold can increase transmission of some viruses e.g. influenza • relief – often related to climate as increases in altitude lower temperatures preventing some vectors thriving e.g. mosquitoes; regions of high and steep relief may inhibit movement of people → reducing spread of disease • flora and fauna – spores and pollen can cause

			Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how physical factors influencing landscape systems can affect the spread of disease (AO2). This will be shown by including **simple** ideas of how physical factors influencing landscape systems can affect the spread of disease. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No material worthy of credit		disease e.g. hay fever; role of fauna acting as vectors for a wide range of diseases • climate change - ↑ in temperature, rainfall + humidity affecting disease spread e.g. West Nile virus in North America but also loss of habitat in some regions e.g. East Africa if this area becomes warmer

Question			Answer	Marks	Guidance
8	(a)		**With reference to Fig.3, suggest how geology can influence both landscape systems and ocean basins.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of landscape systems and ocean basins (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how geology influences landscape systems and ocean basins (AO2). This will be shown by including **well-developed** ideas linking geology to landscape systems and ocean basins. There are clear attempts to make synoptic links between content from different parts of the course of study.	**8** **AO1 x4** **AO2 x4**	**Indicative Content** **AO1 – 4 marks** Knowledge and understanding of landscape systems and ocean basins and their geology could potentially include: • knowledge + understanding of landscape systems will focus on one of coastal, glaciated or dryland • two key aspects of geology – lithology and structure; former = physical and chemical composition of rocks; latter = properties of individual rocks e.g. joints, bedding planes, faulting, permeability • landscape system geology influences landscapes and landforms e.g. highly resistant rock tends to stand out as an area of higher altitude; influences rate and type of weathering and erosion

			Level 2 (3-5 marks) Demonstrates **reasonable** knowledge and understanding of landscape systems and ocean basins (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how geology influences landscape systems and ocean basins (AO2). This will be shown by including **developed** ideas linking geology to landscape systems and ocean basins. 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 landscape systems and ocean basins (AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how geology influences landscape systems and ocean basins (AO2). There will be **simple** ideas linking geology to landscape systems and ocean basins. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No material worthy of credit		• ocean basins (c. 71% of globe's surface) have similar structures – continental shelf → continental slope → continental rise → abyssal plain → mid-oceanic ridges + seamounts / guyots; some ocean basin margins have ocean trenches **AO2 – 4 marks** Application of knowledge and understanding to interpret how geology can influence both landscape systems and ocean basins could potentially include: • role of geology (lithology + structure) will depend on which landscape system the candidate has studied e.g. influence of geology on marine cliff profiles, roche moutonnée or inselbergs • relationship between geology and weathering processes • sea-floor spreading and age of ocean basin rocks – thickest + oldest sediments closest to continents; nowhere in the ocean basins is rock > 200 million years in age • production of basaltic lava at mid-oceanic ridges which then 'pushed' away from ridges and spreads across ocean basins until it is subducted at an ocean trench • sediment can play a significant role in both landscape systems + ocean basins; can bury landforms on land and under water; sediment movements occur in both landscape systems + ocean basins
	(b)		**Examine how changes to the extent of sea ice might affect place profiles.**	**8** **AO1 x4** **AO2 x4**	**Indicative Content** **AO1 – 4 marks** Knowledge and understanding of changes to the extent

			Level 3 (6-8 marks) Demonstrates **thorough** knowledge and understanding of changes in the extent of sea ice and place profiles (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how changes to the extent of sea ice might affect place profiles (AO2). There must be **well-developed** ideas of how changes in the extent of sea ice might affect 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 changes in the extent of sea ice and place profiles (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how changes to the extent of sea ice might affect place profiles (AO2). There must be **developed** ideas of how changes in the extent of sea ice might affect 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)** Demonstrates **basic** knowledge and understanding of changes in the extent of sea ice and place profiles (AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited		of sea ice and place profiles could potentially include: • in high latitudes incoming solar energy less intense c.f. mid- and low latitudes → more heat energy is outgoing than incoming → cold temperatures → sea water freezes • ice has a high albedo → large proportion of incoming solar energy reflected back to space • contrast between Antarctic – continent surrounded by ocean and Arctic – ocean enclosed by land • always been seasonal changes to extent of sea ice around Antarctica and across the Arctic Ocean • increasing concern that global warming → greater melt of sea ice during the summer e.g. 2016 tied with 2007 for second lowest Arctic sea ice extent (least sea ice extent was 2012) • Antarctic sea ice contrasts with Arctic as it has been increasing. Long term average = 18.7 million km^2 but recent has grown to c. 20 million km^2 • place profile = set of characteristics both natural and human including past and present connections, flows of people, resources, money and ideas **AO2 – 4 marks** Application of knowledge and understanding to analyse how changes to in the extent of sea ice might affect place profiles could potentially include: • with decreasing extent of sea ice in the Arctic in the summer, places along the northern coastlines of Eurasia and North America are becoming ice free • implications for indigenous people of the Arctic → their traditional places changing their natural characteristics leaving them little choice but to alter their ways of life e.g. more settle

			accuracy of how changes to the extent of sea ice might affect place profiles (AO2). This will be shown by including **simple** ideas of how changes in the extent of sea ice might affect place profiles. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No material worthy of credit		permanently as their more nomadic existence no longer possible • potential opening of trade routes e.g. North-west Passage (NWP) from northern Atlantic to northern Pacific along northern coast of North America + Northern Sea Route running along Russian Arctic coast. Has potential implications for place profiles of northern Alaska (Prudoe Bay) and Northern Canada as regards mineral exploitation and trading route ways • increasing geo-political tensions result from reducing sea ice cover. Canadians regard much of the NWP as their jurisdiction but others disagree e.g. US • geo-political tensions also along northern coast of Eurasia – Russia claims large areas of the Arctic ocean as part of its EEZ (exclusive economic zone) – changes place profile of ports e.g. Archangelsk + Pevek

Question			Answer	Marks	Guidance
9	(a)		**With reference to Fig.4, suggest how food production methods can impact on human characteristics of places.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of food production methods and human characteristics of places (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how food production methods can impact on human characteristics of places (AO2). This will be shown by including **well-developed** ideas linking	**8** **AO1 x4** **AO2 x4**	**Indicative Content** **AO1 – 4 marks** Knowledge and understanding of food production methods and human characteristics of places could potentially include: • food production methods transform natural ecosystems through the modification of plants, animals and the natural environment – idea of agro-ecosystems • physical factors include: temperature; light; water; air; soil • food production methods also include human factors such as: labour; capital; markets; transport

			food production methods to human characteristics 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 food production methods and human characteristics of places (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how food production methods can impact on human characteristics of places (AO2). This will be shown by including **developed** ideas linking food production methods to human characteristics 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 food production methods and human characteristics of places (AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how food production methods can impact on human characteristics of places (AO2). There will be **simple** ideas linking food production methods to human characteristics of places. There are limited attempts to make synoptic links between content from different parts of the course of study.		infrastructure; government; • human characteristics of places include demographic; socio-economic; cultural; political; past and present connections; shifting flows of people, resources, money and investment and ideas **AO2 – 4 marks** Application of knowledge and understanding to interpret how food production methods can impact on human characteristics of places could potentially include: • food production methods modify the natural environment which provides the setting into which rural places are intimately connected • the traditional picture portrayed in the opening paragraph helps create the human characteristics of a settlement pattern made up of isolated farms, small villages and market towns. Their socio-economic characteristics were dominated by employment in agriculture and jobs closely associated with farming e.g. blacksmith, auctioneer • as food production methods alter, the human characteristics likewise alter • demographic – young adults may leave for urban places with the rural population becoming more elderly partly due to unaffordable housing and partly lack of employment opportunities • socio-economic – very few now employed in agriculture; managerial and professional people live in the farms, converted barns, villages and market town and commute in a twice daily flow to urban places. They tend to be higher paid c.f. agricultural incomes. In-flows of retirees tend to be relatively wealthy and from the same non-

			0 marks No material worthy of credit		agricultural background • cultural + political- bring urban perceptions of what rural life should be
	(b)		**Examine how physical factors influencing landscape systems can influence food production.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of landscape systems and food production (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how physical factors influencing landscape systems can influence food production (AO2). There must be **well-developed** ideas of how physical factors influencing landscape systems can influence food production 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 landscape systems and food production (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how physical factors influencing landscape systems can influence food production (AO2). There must be **developed** ideas of how physical factors influencing landscape systems can influence food production. There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant.	**8** **AO1 x4** **AO2 x4**	**Indicative Content** **AO1 – 4 marks** Knowledge and understanding of physical factors influencing landscape systems and food production could potentially include: • knowledge + understanding of landscape systems will focus on one of coastal, glaciated or dryland • climate: temperature – weathering processes; optimum temperatures for crop and livestock growth • climate: water – weathering + erosional processes (including ice); water needs of plants and animals • relief: altitude, slope angle and aspect influence climatic factors; altitude + aspect influence micro-climate; slope angle **AO2 – 4 marks** Application of knowledge and understanding to analyse how physical factors influencing landscape systems can influence food production could potentially include: • temperature and growing season – each crop requires a minimum threshold temperature for growth + a specific length of growing season when temperatures are > than the minimum e.g. most cereals >6^{o}C whereas rice 22-28^{o}C • precipitation + water supply – plants and livestock vary in their requirement for water e.g. wheat 450 – 650 mm for growing period. 1 kg of beef requires between 5 and 20 thousand litres of

			Level 1 (1-2 marks) Demonstrates **basic** knowledge and understanding of landscape systems and food production (AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how physical factors influencing landscape systems can influence food production (AO2). This will be shown by including **simple** ideas of how physical factors influencing landscape systems can influence food production. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No material worthy of credit		water • seasonality of water supply can be significant e.g. monsoon both for landscape systems and food production • relief – altitude exerts its influence through climate / weather changes with increasing height; aspect has a micro-climatic influence e.g. south-facing slopes in northern hemisphere – affects both landscape systems e.g. intensity of weathering and food production; slope angle influences water movement across n the slope as well as ability to use machinery and type of livestock farmed

Question			Answer	Marks	Guidance
10	(a)		**With reference to Fig.5, suggest how tectonic hazards can influence the informal representation of a place.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of tectonic hazards and informal representation of a place (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how tectonic hazards can influence the informal representation of a place (AO2).	**8** **AO1 x4** **AO2 x4**	**Indicative Content** **AO1 – 4 marks** Knowledge and understanding of tectonic hazards and informal representation of a place could potentially include: • the impacts of tectonic hazards on people • tectonic hazards can include both earthquake (as in the resource) but also volcanic events • impacts can be physical, economic, social, political • ways of representing a place can be categorised as

			This will be shown by including **well-developed** ideas linking tectonic hazards with an informal representation of a place. 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 tectonic hazards and informal representation of a place (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how tectonic hazards can influence the informal representation of a place (AO2). This will be shown by including **developed** ideas linking tectonic hazards with an informal representation of a place. 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 tectonic hazards and informal representation of a place (AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how tectonic hazards can influence the informal representation of a place (AO2). There will be **simple** ideas linking tectonic hazards with an informal representation of a place. There are limited attempts to make synoptic links between content from different parts of the course of study.		either formal (e.g. census) or informal • informal – wide diversity of media (television / film / music / art / photography / literature / graffiti / blogs) offer representations of a place **AO2 – 4 marks** Application of knowledge and understanding to interpret how tectonic hazards can influence the informal representation of a place could potentially include: • places that repeatedly experience tectonic hazards likely to have many references to the particular hazard in informal representations generated from that place e.g. literature, art or blogs e.g. Japan • when a high energy tectonic event occurs e.g. Haitian earthquake 2010, international media convey many informal representations about the place as well as using statistics e.g. mortality and injured numbers • the photograph itself conveys a sense of helplessness amongst the inhabitants as they stand around waiting for something to happen • in the background, the graffiti on the wall – a clever use of the outline of Haiti as seen on a map to represent a face – clearly supports the representation of 'need' by the slogan 'we need HELP' and the praying hands • the presence of a military figure prominently in the central foreground conveys a representation of Haiti as needing strong force to keep order • the Haitians in the photograph are overwhelmingly young adult males which might be interpreted as representing a threatening element or that other groups in society, female, children, elderly will not be able to get aid e.g. not strong enough to carry away food / water

			0 marks No material worthy of credit		
	(b)		**Examine how volcanic and earthquake activity can influence landscape systems.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of volcanic and earthquake activity and landscape systems (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how volcanic and earthquake activity can influence landscape systems (AO2). There are well-developed ideas linking volcanic and earthquake activity with landscape systems. 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 volcanic and earthquake activity and landscape systems (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how volcanic and earthquake activity can influence landscape systems (AO2). There are some developed ideas linking volcanic and earthquake activity with landscape systems. There are some attempts to make synoptic links between content from different parts of the course of study but these	**8** **AO1 x4** **AO2 x4**	**Indicative Content** **AO1 – 4 marks** Knowledge and understanding of volcanic and earthquake activity and landscape systems could potentially include: • knowledge + understanding of landscape systems will focus on one of coastal, glaciated or dryland. Processes e.g. weathering and landforms are included. Candidates do not have to state which landscape system they have studied. • volcanic and earthquake activity – global pattern of plates and plate boundaries included • volcanic and earthquake activity - features and processes associated with plate boundaries e.g. lava erupted, ash fall, rift valley formation, land rises/falls following seismic activity **AO2 – 4 marks** Application of knowledge and understanding to analyse how volcanic and earthquake activity can influence landscape systems could potentially include: • geology of any landscape system links with plate tectonics e.g. Triassic sandstones making up the East Devon coastal cliffs formed when this area was a desert at a latitude of 20^{o} – 30^{o}N • volcanic and earthquake activity responsible for upland areas e.g. Himalayas, Alps – linked with glaciated landscape systems • volcanic and earthquake activity linked with dryland regions e.g. Mojave Desert + Tibetan Plateau in lee

			are not always relevant. **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of volcanic and earthquake activity and landscape systems (AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how volcanic and earthquake activity can influence landscape systems (AO2). There are simple ideas linking volcanic and earthquake activity with landscape systems. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No material worthy of credit		of mountains formed by tectonic activity • weathering and erosional processes in landscape systems influenced by geology • present day volcanic activity can produce 'new' material affecting a landscape system e.g. lava flows into sea on Hawaii • Present day earthquake activity can alter landscape system e.g. impact of Tōhoku Japan 2011 on coastline

Question			Answer	Marks	Guidance
11*			**'The impacts of climate change will increase global poverty and inequality'.** **How far do you agree with this statement?** **AO1** **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding	**20** **AO1 x10** **AO2 x10**	**Indicative content** **AO1 – 10 marks** Knowledge and understanding of the impacts of climate change could potentially include**:** • Many scientists agree that climate change is already a reality with changes in average

Question			Answer	Marks	Guidance
			of the impacts of climate change. **Level 3 (5–7 marks)** Demonstrates **thorough** knowledge and understanding of the impacts of climate change. **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of the impacts of climate change. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of the impacts of climate change. **0 marks** No material worthy of credit **AO2** **Level 4 (8–10 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of the impacts of climate change. Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to whether the impacts of climate change will increase global poverty and inequality. **Level 3 (5–7 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of the impacts of climate change.		climatic conditions, changes in climate variability and changes in the frequency and magnitude of extreme events already observed globally. There are also projected sea level changes by 2100. • Impacts on physical and biological systems have been observed. • Impacts on ecosystems – plants and animals are adapted to climatic conditions, some will adapt to change others more remote and specialised may not. • Impacts on human health – increased spread of infectious diseases, increase in the spread of vector- borne diseases, heat waves, drought, and floods can all impact health. • Extreme weather events – frequency and intensity predicted to increase with global warming but the exact nature of the relationship is complex and unclear. • Impact of rising sea levels on low lying coastal areas. • Impact on basic resources of food and water. **AO2 – 10 marks** Application of knowledge and understanding to analyse and evaluate the extent to which impacts will

Question			Answer	Marks	Guidance
			Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to whether the impacts of climate change will increase global poverty and inequality. **Level 2 (3–4 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of the impacts of climate change. Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgments and conclusions, with limited use of evidence as to whether the impacts of climate change will increase global poverty and inequality. **Level 1 (1–2 marks)** Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of the impacts of climate change. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to whether the impacts of climate change will increase global poverty and inequality. **0 marks** No material worthy of credit **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and		increase global poverty and inequality could potentially include: • Health impacts – increased spread of infection triggered by climate change will mean the geographic spread of mosquitoes carrying malaria and dengue fever for example. However, the extent to which this will increase inequality lies in the vulnerability of populations – in ACs there will be the resources to cope with such diseases, in areas where poverty already exists there will not be the medical resources to cope with the spread of disease (e.g. Brazil, southern Africa) and in this way impacts increase inequality. Also in areas like the Sahel an increase in temperatures may make it too warm for mosquitoes as they exist in a distinct temperature range, and malaria will reduce. • Many poor countries depend on 'climate sensitive' sectors e.g. agriculture and fishing, especially in tropical and sub-tropical areas. The concern is that climate change will push these vulnerable communities into situations where their food security and ability to make a living is severely compromised. • Governments in LIDCs do not have the resources to create alternative futures. In food insecure areas where farming livelihoods are already at risk decreasing crop yields will

Question			Answer	Marks	Guidance
			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.		threaten famine and widespread malnutrition. In this way the poor will get poorer. A heatwave will have a different scale of impact in USA and in countries of the Sahel • The erratic nature of rainfall patterns is also a problem in areas that are already experiencing water stress. Again this unpredictability will impact poor countries more as they do not have the financial or technological means to capture and store water in times of excess. • Increased frequency and magnitude of extreme weather events affect all regions of the world. In the UK there have been heatwaves and periods of prolonged and heavy rainfall resulting in costly and destructive floods. However, ACs have the insurance and the financial ability to recover and rebuild and advanced health care systems, in LIDCs recovery is much slower and may severely hinder economic development. In this way inequality will be increased. • Rising sea levels will affect countries across the development continuum. A country such as the UK is well equipped to cope and can invest in flood defences, small , vulnerable island communities such as those in the Pacific and cities where shanty towns occupy coastal areas will experience a greater impact. Many

Question			Answer	Marks	Guidance
					small island state are vulnerable and do not have the capacity to recover. The existence of many people depends on a livelihood of reef fishing for food and income. • Conclusions may accept that impacts will be felt globally but that the differentiating factor is existing levels of poverty and vulnerability and risk exposure. The key will be mitigation and adaptation, wealth provides the means to do this.

Question			Answer	Marks	Guidance
12*			**'Current levels of anthropogenic GHG emissions are largely from EDCs'. How far do you agree?** **AO1** **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding of current levels of anthropogenic GHG emissions. **Level 3 (5–7 marks)** Demonstrates **thorough** knowledge and understanding of current levels of anthropogenic GHG emissions. **Level 2 (3-4 marks)**	**20** **AO1 x10** **AO2 x10**	**Indicative content** **AO1 – 10 marks** Knowledge and understanding of anthropogenic GHG emissions could potentially include**:** • Energy requirements – there is a global increase in energy use due to increasing levels of industrialisation, transport, population growth and increasing affluence of populations as countries develop. • Increases in manufacturing have led to

Question	Answer	Marks	Guidance
	Demonstrates **reasonable** knowledge and understanding of current levels of anthropogenic GHG emissions. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of current levels of anthropogenic GHG emissions. **0 marks** No material worthy of credit **AO2** **Level 4 (8–10 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of the countries responsible for current levels of anthropogenic GHG emissions. Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to whether current levels of anthropogenic GHG emissions are largely from EDCs. **Level 3 (5–7 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of the countries responsible for current levels of anthropogenic GHG emissions. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to whether current levels of anthropogenic GHG emissions are largely from EDCs.		increased levels of GHG emissions. • Transport – in a globalised economy world trade of goods and services has meant increasing levels of GHG emissions resulting from a broadening transport network. • Energy, industry and transport alone account for nearly 60% of GHG emissions. • Urbanisation - urban growth is increasing levels of emissions in terms of energy use, but also land use change. • Deforestation – impact on GHG emissions as forests are cleared, also change of land use may be urban growth or agricultural land both of which add to GHG emissions. • Technological advances – wider use has an impact on energy requirements. **AO2 – 10 marks** Application of knowledge and understanding to analyse and evaluate whether increasing levels of anthropogenic GHG emissions are largely from EDCs could potentially include: • North America and Europe had their main period of industrial growth 1850-1960s but they remain major contributors due to high energy

Question	Answer	Marks	Guidance
	Level 2 (3–4 marks) Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of the countries responsible for current levels of anthropogenic GHG emissions. 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 current levels of anthropogenic GHG emissions are largely from EDCs. **Level 1 (1–2 marks)** Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of the countries responsible for current levels of anthropogenic GHG emissions. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to whether current levels of anthropogenic GHG emissions are largely from EDCs. **0 marks** No material worthy of credit **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3**		demand from affluent populations. • China's reliance on coal and industrial development means that it is the EDC with the highest level of GHG emissions. • India (EDC) meets ¾ of its energy needs through fossil fuels and its future energy demand is projected to increase more than any other country. However, it would still be well below the world average for per capita energy consumption and it has untapped renewable energy potential – HEP and wind and plans to have over a third of its energy demand met by renewable by 2030. • The top 10 countries for GHG emissions account for 80% of anthropogenic emissions. They include 5 ACs (Including US – 2nd and Japan – 5th, Germany -6th) and 5 EDCs (China -1st, India – 3rd and Russia – 4th).So there is not a domination of EDCs. • GHG emissions in ACs such as UK and Germany have reduced but the overall levels and per capita levels remain some of the highest in the world. • EDCs such as China, India and Brazil have seen rising emissions due to development of manufacturing and rising affluence of the

Question			Answer	Marks	Guidance
			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.		population. • Reasons for emissions can change who is most responsible, when deforestation and land use change are considered countries such as Brazil and Indonesia rank 3 and 4 behind China and US. Despite this Brazil has an energy mix of 28% sugar cane and HEP, it is not a country reliant on fossil fuels. • Future projections - increasing levels of industrialisation and urbanisation in EDCs may alter the contribution of different countries and see more EDCs in world ranking of emitters. • What of the future position of LIDCs as they progress. • ACs although not as heavily involved in manufacturing are still high level emitters of GHG, particularly US, Japan and Germany. • Case study support is detailed in the specification – the answer will depend on the choice of case study- countries covered may include ACs such as UK and Germany compared to EDCs such as China and India.

Question			Answer	Marks	Guidance
13*			**Examine the link between levels of economic development and the prevalence of non-communicable diseases.** **AO1** **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding of the prevalence of non-communicable diseases. **Level 3 (5–7 marks)** Demonstrates **thorough** knowledge and understanding of the prevalence of non-communicable diseases. **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of the prevalence of non-communicable diseases. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of the prevalence of non-communicable diseases. . **0 marks** No material worthy of credit **AO2**	**20** **AO1 x10** **AO2 x10**	**Indicative content** **AO1 – 10 marks** Knowledge and understanding of the prevalence of non-communicable diseases could potentially include**:** • Basic distinction between communicable (infectious or contagious) and non-communicable diseases (NCDs) - those which are non- infectious and non-transmissible among people such as cardio vascular disease (CVD), chronic heart disease (CHD), cancers, diabetes, ageing diseases – dementia and Alzheimer's. • Reference to theory – the epidemiological transition model – socio-economic development over time can be related to a transition in countries from infectious to chronic and degenerative diseases as the main cause of death. • As countries develop infectious diseases such as malaria, small pox and TB are replaced by chronic and degenerative disease such as

Question	Answer	Marks	Guidance
	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 prevalence of non-communicable diseases. Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to whether there is a link between levels of economic development and the prevalence of non-communicable diseases. **Level 3 (5–7 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of the prevalence of non-communicable diseases. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to whether there is a link between levels of economic development and the prevalence of non-communicable diseases. **Level 2 (3–4 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of the prevalence of non-communicable diseases. Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence as to whether there is a link between levels of		heart disease, dementia and cancers. • As countries develop anthropogenic not infectious agents are the main causes of disease. • Outline of the socio-economic, environmental and cultural conditions determinants of health – diet, water and sanitation, quality of health care services, housing, exercise, education. • Supporting evidence of global change may include the fact that the most common global causes of death are now NCDs, numbers globally dying from infectious diseases are declining as treatments, education on sanitation, better quality basic resources and vaccinations are more common. **AO2 – 10 marks** Application of knowledge and understanding to analyse and evaluate the link between levels of economic development and non-communicable diseases could potentially include: • As nations develop the economic and social conditions in which people live should improve – leading to lower incidence of infectious diseases as a result of malnutrition and poor hygiene for example. • Affluence leads to some negatives in terms of health e.g. higher levels of access to tobacco

Question			Answer	Marks	Guidance
			economic development and the prevalence of non-communicable diseases. **Level 1 (1–2 marks)** Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of the prevalence of non-communicable diseases. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to whether there is a link between levels of economic development and the prevalence of non-communicable diseases. **0 marks** No material worthy of credit **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with limited structure. The information is supported by limited		and alcohol both of which have proven links to certain NCDs – lung cancer, heart disease, some cancers. • Poor diet – too much fat, sugar and salt in diets made up of processed foods, rise of fast food outlets which are also high in fat, salt and sugar content, poor quality food in supermarkets; all leading to overweight and obesity. Obesity has links to diabetes, high levels of cholesterol, some cancers and heart disease. • Lifestyle change in affluent countries – poor diet and not enough exercise – both leading to health problems and NCDs. • In ACs there is a more sedentary lifestyle – high % in tertiary/service jobs where people sit down all day, high % car ownership, more money to socialise – involves drinking and smoking – all factors lead to poor health and increased risk of heart disease, obesity, diabetes, cancer. • WHO data shows that ACs have much higher % of all risk factors for NCD – tobacco, high blood pressure, alcohol, high cholesterol and obesity. • However, there is also a link between deprivation/poverty and NCDs in ACs. Poverty

Question			Answer	Marks	Guidance
			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.		may force families to eat poor quality, budget food; there is also evidence of high concentrations of fast food outlets and budget alcohol outlets in deprived areas. • Is there an element of a 'medical illusion' in that NCDs are picked up and diagnosed more in ACs due to advances in technology and widespread media coverage of symptoms. • Some NCDs in the top five causes of death in ACs do not appear in the top five causes of death in LIDCs e.g. Alzheimer's and lung cancer but in emerging economies and middle income countries there is an increasing incidence of lung cancer, heart disease and strokes. • Evidence also predicts a rise in the deaths from NCDs in developing regions by 2020. • Examples and case studies should be used to support points and may include examples from ACs such as USA and UK or from the emerging economies of India and China where incidence of lung cancer and NCDs related to obesity are increasing.

Question			Answer	Marks	Guidance
14*			**Assess the effectiveness of various strategies to deal with disease risk and eradication.** **AO1** **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding of strategies to deal with disease risk and eradication. **Level 3 (5–7 marks)** Demonstrates **thorough** knowledge and understanding of strategies to deal with disease risk and eradication. **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of strategies to deal with disease risk and eradication. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of strategies to deal with disease risk and eradication. **0 marks** No material worthy of credit **AO2** **Level 4 (8–10 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of the strategies available to deal with disease risk and eradication.	**20** **AO1 x10** **AO2 x10**	**Indicative content** **AO1 – 10 marks** Knowledge and understanding of the various strategies to deal with disease risk and eradication could potentially include**:** Disease eradication: • Global campaigns e.g. past – small pox 1980 and present polio. • National government campaigns, mainly top down approaches which involve funding and maybe even legislation. Main investment is in vaccination programmes and the supply and staffing of health care facilities. • Strategies initiated by global organisations such as WHO (World Health Organisation) and NGOs such as the Red Cross. Disease risk: • Strategies which aim to reduce risk include – education and awareness programmes e.g. for heart disease (high cholesterol, smoking, alcohol, diet awareness) . • Strategies to reduce risk with low cost, bottom-up approach e.g. malaria – insecticidal nets, indoor spraying, more waste collection

Question			Answer	Marks	Guidance
			Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to the effectiveness of various strategies to deal with disease risk and eradication. **Level 3 (5–7 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of the strategies available to deal with disease risk and eradication. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to the effectiveness of various strategies to deal with disease risk and eradication. **Level 2 (3–4 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of the strategies available to deal with disease risk and eradication. Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence as to the effectiveness of various strategies to deal with disease risk and eradication. **Level 1 (1–2 marks)** Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of the strategies available to deal with disease risk and eradication.		(decaying rubbish attracts mosquitoes), hygiene education (spitting attracts mosquitoes), curtains, shutters and properly fitting windows. • Often strategies involve a broad integration of international organisations and a combination of strategies e.g. Zika virus, disease risk strategies involve WHO, Red Cross and national governments and include education, fumigation and chemical control. • Media campaigns on risk factors e.g. heart disease – risk from smoking, alcohol, obesity and a lack of exercise all cover a strategy of risk modification. Strategy may involve – food labelling, national campaign to monitor risk factors, labelling of healthy foods, encouraging a simple diet change which would have wide impact e.g. swap palm oil for soya oil. **AO2 – 10 marks** Application of knowledge and understanding to analyse and evaluate the effectiveness of various strategies to deal with disease risk and eradication could potentially include: • All strategies require public support, understanding and demand to be effective. Attempts by any organisation or government may run into political, cultural, economic and social obstacles; resistance to vaccination

Question	Answer	Marks	Guidance
	Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to the effectiveness of various strategies to deal with disease risk and eradication. **0 marks** No material worthy of credit **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with limited structure. The information is supported by limited evidence. **Level 1** The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		programmes e.g. MMR vaccination in UK, resistance by national governments due to cost particularly in LIDCs, cultural factors – particularly related to the role of women. • A way of address resistance at the local level is to adopt grass roots approaches to participation and engage people. • In many parts of the world both the cause – parasite and treatment – antibiotics have developed resistances and this will continue to inhibit the effectiveness of tackling some diseases. • Strategies to reduce risk do not need to be high cost but may have further knock-on effects which impact on their effectiveness e.g. burning a mosquito coil is used in Asia and South America but this has been linked to health concerns relating to its polluting side effect. • Often programmes which are tailored to individual country contexts are most effective e.g. risks to heart disease in ACs include obesity and smoking, in LIDCs risks are mainly linked to under-nutrition and poor diet. • Strategies employed by NGOs can be particularly effective as they: can reach those in most severe need; can reach

Question			Answer	Marks	Guidance
					local/community level and have low cost operations e.g. Médecins Sans Frontières. Examples may be based on a particular disease, country campaign or organization.

Question			Answer	Marks	Guidance
15*			**Examine the extent to which globalisation has affected the use of oceans.** **AO1** **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding of how oceans are used. **Level 3 (5–7 marks)** Demonstrates **thorough** knowledge and understanding of how oceans are used. **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of how oceans are used. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of how oceans are used. **0 marks** No material worthy of credit **AO2** **Level 4 (8–10 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how globalisation affects the use of oceans. Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based of the extent to which	**20** **AO1 x10** **AO2 x10**	**Indicative content** **AO1 – 10 marks** Knowledge and understanding of globalisation and how oceans are used could potentially include**:** • Oceans as an element in the process of globalisation. • Oceans provide a number of biological resources e.g. food sources. • Ocean energy resources include oil and gas, these have been exploited for many years and exploration continues. Recent uses for energy include wave and tidal powers which have increased as demand for clean, renewable energy alternatives increases. • Oceans are used to supply mineral resources such as ferrous and non-ferrous metals. • Oceans have always provided a means of transport for people and goods. Shipping routes exist connecting all parts of the world for trade with major routes existing to link east and west. • Oceans used for submarine cables which facilitate globalisation. • Oceans have leisure services uses for long distance cruise travel and short distance crossings such as the Channel and Irish Sea

Question			Answer	Marks	Guidance
			globalization has affected the use of oceans. **Level 3 (5–7 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how globalisation affects use of the oceans. 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 of the extent to which globalization has affected the use of oceans. **Level 2 (3–4 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how globalisation affects use of the oceans. Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence as to the extent to which globalization has affected the use of oceans. **Level 1 (1–2 marks)** Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how globalisation affects the use of oceans. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to the extent to which globalization has affected the use of oceans.		crossings. • Oceans provide a range of leisure activity uses. **AO2 – 10 marks** Application of knowledge and understanding to analyse and evaluate the extent to which globalisation has affected the use of oceans could potentially include: • Transport has a key role in the process of globalisation. As countries develop, markets grow and global interconnections expand, the transport of resources, energy, goods and people also increases. The transport of freight dominates maritime transport and has increased considerably. • Increased trade and the globalisation of brands have led to the increased movement of goods. Containerisation has facilitated this as standardised containers can be used to transfer goods between road, rail and ocean travel. • Electronic connectivity is another key feature of globalisation, it enables worldwide communication. The submarine cable network provides vital support to global electronic connectivity. High speed links are extensive particularly between

Question	Answer	Marks	Guidance
	0 marks No material worthy of credit **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with limited structure. The information is supported by limited evidence. **Level 1** The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		east and west. • The expanse of marketing is a further outcome of globalisation and this has had impacts on service industries – in retail – markets have expanded globally (internet shopping means that goods can be bought from other countries and shipped to the consumer). • Companies are now much more able to locate production in lowest cost locations. The agricultural sector is an example of how flexibility in supply chain networks has further increased maritime transport – agricultural goods can be grown in one country, processed in another and finally delivered to consumers elsewhere. • As economic development spreads due to the global activities of TNCs and the ability of governments and companies to invest abroad (FDI), rising affluence will drive consumer demand and a multinational supply of goods. There will inevitably be increased demand for energy and mineral resources. Pressure will continue to grow to make use of oceanic energy and mineral resources.

Question			Answer	Marks	Guidance
					• An overall conclusion may be reached that globalisation has had significant affect on the uses of oceans.

Question			Answer	Marks	Guidance
16*			**Assess the effectiveness of stakeholders in the use and management of one renewable biological resource.** **AO1** **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding of how stakeholders use and manage renewable biological resources. **Level 3 (5–7 marks)** Demonstrates **thorough** knowledge and understanding of how stakeholders use and manage renewable biological resources. **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of how stakeholders use and manage renewable biological resources. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of how stakeholders use and manage renewable biological resources. **0 marks** No material worthy of credit	**20** **AO1 x10** **AO2 x10**	**Indicative content** **AO1 – 10 marks** Knowledge and understanding of one renewable biological resource and the stakeholders involved in its use and management could potentially include**:** • Use and management of renewable biological resources e.g. krill or whale. Use depends on the chosen resource: • Krill – processed into products such as oil or paste for human consumption, also animal feeds or bait for fishing. • Whale – primarily whale meat for human consumption, also whale oil – soaps, lamps, varnish, paint and bones – fertilisers and glue. Management strategies include: Krill: • monitoring and regulation • surveillance – scientific observation

Question	Answer	Marks	Guidance
	AO2 **Level 4 (8–10 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how stakeholders use and manage renewable biological resources. Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to the effectiveness of stakeholders in the use and management of a renewable biological resource. **Level 3 (5–7 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how stakeholders use and manage renewable biological resources. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to the effectiveness of stakeholders in the use and management of a renewable biological resource. **Level 2 (3–4 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how stakeholders use and manage renewable biological resources. Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers		• control – quotas • spatial division of catch to limit impact on marine predators. • Fishing boats licensed and marked so that they can be identified. • Vessels inspected. Whales: • Scientific research to monitor populations and resilience. • Consultation – to include the views of marine scientists. • Enforcement of current IWC regulations. Stakeholders involved: • National governments – krill (Chile, China, South Korea, Ukraine, Norway), whale (Japan, Norway, Iceland). • Krill – Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) – conservation measures under and ecosystem approach, modelling of quotas – Krill Yield Model and Total Allowance Catch. • Whaling – International Whaling Commission. • British Antarctic Survey work with fishing companies to understand the impact of marine

Question			Answer	Marks	Guidance
			generalised judgements and conclusions, with limited use of evidence as to the effectiveness of stakeholders in the use and management of a renewable biological resource. **Level 1 (1–2 marks)** Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how stakeholders use and manage renewable biological resources. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to the effectiveness of stakeholders in the use and management of a renewable biological resource. **0 marks** No material worthy of credit **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with		resource use. • Marine Stewardship Council **AO2 – 10 marks** Application of knowledge and understanding to analyse and evaluate the effectiveness of stakeholders in the use and management of one renewable biological resource could potentially include: • Separating the spatial division of the catch is difficult as it requires international co-operation. • Quotas – requires accurate data and monitoring, both have been criticised under the CCAMLR and there is also a coalition of anti-whaling nations which has called for whaling nations to have smaller catches and under closer supervision. • Due to advances in technology, a development of biochemical products and increased demand pressure on krill is expected in the future. Again intergovernmental planning is needed together with accurate data on planned expansion. • There is debate as to whether collaborative approaches from stakeholders have been more effective e.g. Antarctic Treaty. • The values, attitudes, socio-economic status and

Question			Answer	Marks	Guidance
			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.		political context of stakeholders influences both use and management e.g. the cultural importance of whales in Japan, the importance of fish processing industries in Chile, Norway insists whale hunting is based on preservation and sustainability, in Japan whale meat is part of its food culture. • Resilience – different species of fish and whale have different thresholds for effective management and possess varying levels of resilience. Accurate and reliable data is needed and this can be difficult to obtain. • Effectiveness of the stakeholders in their ability to manage through laws, treaties, regulations and the idea of the 'tragedy of the commons' where 'renewable' resources are dangerously depleted.

Question			Answer	Marks	Guidance
17*			**Examine the extent to which food security can impact on the physical environment.**	**20** **AO1 x10**	**Indicative content** **AO1 – 10 marks**

Question	Answer	Marks	Guidance
	AO1 **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding of the ways food security can impact on the physical environment. **Level 3 (5–7 marks)** Demonstrates **thorough** knowledge and understanding of the ways food security can impact on the physical environment. **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of the ways food security can impact on the physical environment. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of the ways food security can impact on the physical environment. **0 marks** No material worthy of credit **AO2** **Level 4 (8–10 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how food security impacts on the physical environment. Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgments leading to rational conclusions that are evidence based of the extent to which food security can impact on the physical environment.	**AO2 x10**	Knowledge and understanding of food security and impacts on the physical environment could potentially include**:** • Food security issues e.g. food shortages can lead to more intensive farming. • Increasing food security and the growing demand for food is leading to more land being taken into production. • Growing food demand due to population increase and falling yields in difficult environments forces farming onto marginal/fragile land. • Food security can be improved by making existing land more productive. The physical environment includes: • Soil (impacts of for example erosion, compaction, waterlogging, salinisation, desertification and structural deterioration) • Biodiversity (loss of) • Landscape (impacts of for example terracing, monoculture). • Water supply (impact through for example pollution, silting, depletion) **AO2 – 10 marks**

Question	Answer	Marks	Guidance
	Level 3 (5–7 marks) Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how food security impacts on the physical environment. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgments, with some link between rational conclusions and evidence of the extent to which food security can impact on the physical environment. **Level 2 (3–4 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how food security impacts on the physical environment. Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence of the extent to which food security can impact on the physical environment. **Level 1 (1–2 marks)** Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how food security impacts on the physical environment. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions of the extent to which food security can impact on the physical environment.		Application of knowledge and understanding to analyse and evaluate the extent to which food security can impact the physical environment could potentially include: • Impacts on the physical environment affect countries across the development continuum. In ACs it may be the impact of agro chemicals, in LIDCs intensive farming methods or poorly managed irrigation systems leading to impacts such as low levels of soil organic matter and salinisation. • The impact on the physical environment can be short term or long term. Large scale deforestation for commercial agricultural purposes will lead to long term environmental damage and land degradation, improper use of irrigation can lead to short term waterlogging. • The scale of the physical impact can also vary, forest clearance for agricultural purposes is occurring globally and often on a large scale, terracing is a localised landscape impact. • A range of strategies exist to manage the impact on the physical environment e.g. higher yielding crop varieties, improved farming methods – crop rotation, paying farmers for environmental management projects,

Question	Answer	Marks	Guidance
	0 marks No material worthy of credit **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with limited structure. The information is supported by limited evidence. **Level 1** The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		maintaining vegetation cover and water management techniques to protect soil. • In countries which are food secure and there is less pressure on the land, positive impacts on the physical environment include agro-forestry projects, environmental stewardship schemes. More pressure on the land leads to intensive farming practices which, if not properly managed, lead to long term environmental damage. • The physical environment is impacted where there is both high and low food security. Sometimes high levels of food security involve practices which cause environmental damage (pollution, soil compaction from machinery, landscape impact of ploytunnels and large fields), low levels of food security can lead to land and soil degradation from systems which constantly harvest and nutrients are never returned to the soil and the land is not allowed time to recover. • High levels of food security and over production can be maintained through the use of chemicals, pesticides, insecticides and

Question			Answer	Marks	Guidance
					herbicides, however, this leads to impacts on the physical environment such as eutrophication and pollution of groundwater supplies. • Food shortages, falling yields and growing population in LIDCs all lead to marginal land being brought into production, this can in turn lead to physical impacts such as soil degradation, soil erosion, and desertification.

Question			Answer	Marks	Guidance
18*			**'Increased risks to food security from desertification are due to human activities'.** **To what extent do you agree with this statement?** **AO1** **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding of how human activities increase the risk to food security from desertification. **Level 3 (5–7 marks)** Demonstrates **thorough** knowledge and understanding of how human activities increase the risk to food security from desertification. **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of how human activities increase the risk to food security from desertification. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of how human activities increase the risk to food security from desertification. **0 marks** No material worthy of credit **AO2** **Level 4 (8–10 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of how human activities increase the risk to food security from desertification.	**20** **AO1 x10** **AO2 x10**	**Indicative content** **AO1 – 10 marks** Knowledge and understanding of how human activities increase the risk to food security from desertification could potentially include**:** • Desertification is a process of land degradation in arid and semi-arid areas. Land that was originally another type of biome turns increasingly to a desert biome. • Facts about the global location and spread of desertification. • Risks to food security from desertification include the fact that farming becomes very difficult and quantities of food decline. • Human activities that can lead to desertification include overgrazing, overcultivation, deforestation and poor farming practices that upset the natural balance of the ecosystem and take more than they put back. **AO2 – 10 marks** Application of knowledge and understanding to analyse and evaluate the extent to which risks to food security from desertification are due to human activity could potentially include: • Desertification is regarded as a result of progressive climate deterioration; others see it as the result of human mis-management of the

Question	Answer	Marks	Guidance
	Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to the extent to which human activities increase the risks to food security from desertification. **Level 3 (5–7 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how human activities increase the risk to food security from desertification. Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to the extent to which human activities increase the risks to food security from desertification. **Level 2 (3–4 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how human activities increase the risk to food security from desertification. Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence as to the extent to which human activities increase the risks to food security from desertification. **Level 1 (1–2 marks)** Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited		environment. • Causes are complex and can be economic, social, political and environmental. • As food becomes scarce hunger and malnutrition result. Animals go hungry which causes more food shortages. People move to find more farmland, this creates more pressure on the land and desertification spreads. • There is evidence from hot desert areas of climatic change resulting in less rainfall (total amount and reliability), an increase in the frequency and intensity of drought and higher temperatures leading to an increase in evapotranspiration, reduced condensation and lower rainfall. • When climate change reduces surface (and underground) water sources vegetation declines, land loses its protective cover, soil is exposed, erosion increases and the surface layer holding nutrients is removed. It can be argued that the climatic changes are the result of human activities. • Human causes include population growth which puts more pressure on the land and leads to a change in traditional farming practices, humans are no longer working in balance with the fragile dryland ecosystems. Lack of knowledge

Question			Answer	Marks	Guidance
			accuracy of how human activities increase the risk to food security from desertification. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to the extent to which human activities increase the risks to food security from desertification. **0 marks** No material worthy of credit **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with limited structure. The information is supported by limited evidence. **Level 1** The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		and poverty exacerbate the impact of these human activities. • There is debate not only of the relative contribution of human and physical causes of desertification but also over the exact nature of the human causes. It is believed that overgrazing and deforestation are not a factor and that poverty, poor farming practices, civil unrest and war are more likely human causes. • The effects of climate change are still uncertain and the statistics on the advance of desertification are unreliable. • There is a cycle of events, which has both human and physical causes that results in desertification: poor farming practices lead to the removal of vegetation, there is an increase in soil erosion, added to this increased irrigation leads to salinisation of soil and climatic change reduces rainfall, productivity falls, poverty and political and economic instability result and there is more pressure on the land resulting in poor framing practices.

Question			Answer	Marks	Guidance
19*			**Assess how effectively hazards from volcanic eruptions are managed in countries with contrasting levels of economic development.** **AO1** **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding of the management of hazards from volcanic eruptions in countries with contrasting levels of economic development. **Level 3 (5–7 marks)** Demonstrates **thorough** knowledge and understanding of the management of hazards from volcanic eruptions in countries with contrasting levels of economic development **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of the management of hazards from volcanic eruptions in countries with contrasting levels of economic development. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of the management of hazards from volcanic eruptions in countries with contrasting levels of economic development. **0 marks** No material worthy of credit **AO2**	**20** **AO1 x10** **AO2 x10**	**Indicative content** **AO1 – 10 marks** Knowledge and understanding of the management of hazards from volcanic eruptions in countries with contrasting levels of economic development could potentially include**:** The different types of hazard that need to be addressed: Primary hazards: • Lava flows, pyroclastic flows – avalanche of hot ash and rock fragments, lahars – a mixture of water, rock, sand and mud that flow down valleys leading away from volcanoes, Jökulhlaups – specific to Iceland – floods from volcanoes erupting under ice, ashfalls and tephra – volcanic rock blasted into the atmosphere. Secondary hazards • Mudflows, contaminated water, fires, landslides. earthquakes, tsunamis, famine, disease, crop failure, climatic impacts. Management includes: • Prediction – recording seismic shocks, measure ground inflation/deformation as magma accumulates within the volcano, gravity

Question			Answer	Marks	Guidance
			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 management of responses in different countries. Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to how effectively countries with different levels of economic development manage volcanic hazard events. **Level 3 (5–7 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of the management responses in different countries. 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 how effectively countries with different levels of economic development manage volcanic hazard events. **Level 2 (3–4 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of the management of responses in different countries. Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgments and conclusions, with limited use of		increases as magma fills the reservoir beneath the volcano, collection of gas and lava samples – sulphur dioxide and hydrogen chloride increase are signals of volcanic activity. • Warning – lahar detection/warning systems. • Education – to enable people to recognize the signals and take action for protection e.g. drills. • Preparation – land use mapping may be used alongside hazard mapping – previous lahar routes and lava flows can be mapped from sediment deposits. Insurance. • Direct action during the event – this is difficult with volcanoes but some examples include: diverting lava flows with controlled explosions, spraying lava flows so that they cool and solidify, dropping concrete blocks to slow lava flows. • Modification post event – emergency aid, rapid response teams with specialist training, contingency resources for rebuilding. The student may structure the management into categories: • Modify the event, the losses the vulnerability. • Pre-disaster – prediction, preparation,

Question			Answer	Marks	Guidance
			evidence as to how effectively countries with different levels of economic development manage volcanic hazard events. **Level 1 (1–2 marks)** Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of the management of responses in different countries. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to how effectively countries with different levels of economic development manage volcanic hazard events. **0 marks** No material worthy of credit **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with		prevention. • Post-disaster – response, recovery, redevelopment. • Physical and social management **AO2 – 10 marks** Application of knowledge and understanding to analyse and evaluate how effectively hazards from volcanic eruptions are managed in countries with contrasting levels of economic development could potentially include: • Money and resources: ACs will have more money to invest in planning and mitigation whereas LIDCs will have limited resources, mitigation for infrequent events such as volcanic eruptions will probably be low on the political and spending agenda of an LIDC. • Technology and expertise: ACs will have high levels of both due to good education levels and availability of funding, although many EDCs + LIDCs may lack expertise and technology it must be acknowledged that in some countries – perhaps emerging economies or those countries where despite being lower-middle income, there are specialised response teams due to the threat of volcanic eruptions or perhaps the increased frequency of such events.

Question			Answer	Marks	Guidance
			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.		• Quality of social services: this includes those services which deal with injury and secondary impacts such as disease (diarrhoea, malaria, chicken pox) and contaminated water. Services will be of a better quality in ACs, in EDCs + LIDCs where survivors are living in high density emergency shelters for extended periods of time disease will spread more. • Recovery, rebuilding and restoring: in ACs where the population is more affluent people can afford insurance and also there will be more tax revenue post event available for rebuilding and restoration of public services, infrastructure and compensation for businesses. • Population: In EDCs + LIDCs many farming communities are reliant on the high yielding volcanic soils and therefore the human impact for people living in close proximity of the volcano may be greater. • Time- reconstruction after the event may follow very different time scales in different countries. Several stages are involved – assessment of damage, coordination of a response and reconstruction, in a LIDC or even EDC this may take decades. • Case studies: choice of case studies to support

Question			Answer	Marks	Guidance
					the answer may include examples from: Iceland, Italy, Indonesia, Japan, Montserrat, Philippines. A minimum of two is needed to offer 'contrast', and examples must be of differing levels of economic development across ACs, EDCs or LIDCs.

Question			Answer	Marks	Guidance
20*			**Assess the extent to which impacts from earthquake activity vary across countries with contrasting levels of economic development.** **AO1** **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding of the impacts of earthquake activity. **Level 3 (5–7 marks)** Demonstrates **thorough** knowledge and understanding of the impacts of earthquake activity. **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of the impacts of earthquake activity. **Level 1 (1–2 marks)** Demonstrates **basic** knowledge and understanding of the impacts of earthquake activity. **0 marks** No material worthy of credit **AO2** **Level 4 (8–10 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate as to whether the impact varies across countries with contrasting levels of economic	**20** **AO1 x10** **AO2 x10**	**Indicative content** **AO1 – 10 marks** Knowledge and understanding of the impacts from earthquake activities could potentially include**:** • Categorising impacts into social, economic, environmental and political impacts; short and long term impacts; impacts for primary effects (ground shaking and ground rupture) and impacts from secondary effects (such as impacts from soil liquefaction, landslides, avalanches, tsunamis and fires). • Initial impacts centre on injury and loss of life. • People may become separated and displaced in the aftermath. • Physical impacts could include loss of crops, biodiversity, and land due to fires, flooding, landslides and avalanches. • Buildings will be destroyed – homes – leading to the needs for short term shelters, historical buildings can be destroyed and these will never be replaced, commercial property will be damaged /destroyed with impacts on functioning of businesses and loss of money and basic infrastructure will be damaged

Question			Answer	Marks	Guidance
			development. Demonstrates **comprehensive** application of knowledge and understanding to provide a detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to the extent to which impacts from earthquake activity vary across countries with contrasting levels of economic development**.** **Level 3 (5–7 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy as to whether the impact varies across countries with contrasting levels of economic 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 as to the extent to which impacts from earthquake activity vary across countries with contrasting levels of economic development**.** **Level 2 (3–4 marks)** Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy as to whether the impact varies across countries with contrasting levels of economic development. Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence as to the extent to which impacts from earthquake activity vary across countries with contrasting levels of		leading to impacts on power supply, water supply and transportation networks. • Disease may result from lack of safe drinking water due to the impact on basic services and infrastructure or due to the time taken to remove dead bodies. • Financial impacts are often huge and wide ranging, there is a short term cost e.g. of business disruption and removal of debris and a long term cost of recovery and rebuilding. • Impact on food supply can vary, it may be short or long term, production, transportation and quantity of food can all be affected. • Political impacts can include the long term debt from recovery, civil unrest and frustration with government responses, a political dependency on countries providing aid. **AO2 – 10 marks** Application of knowledge and understanding to analyse and evaluate the extent to which impacts vary across countries with contrasting levels of economic development could potentially include: • Impact will depend on the risk and vulnerability of the country and its people. Reference may be made to a model of vulnerability which shows how there is not just the vulnerability of the physical existence of a hazard but also within the country in question – the degree of

Question			Answer	Marks	Guidance
			economic development. **Level 1 (1–2 marks)** Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy as to whether the impact varies across countries with contrasting levels of economic development. Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to the extent to which impacts from earthquake activity vary across countries with contrasting levels of economic development. **0 marks** No material worthy of credit **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with limited structure. The information is supported by limited		mitigation, preparedness, perception, prevention, the quality of the built environment, social vulnerability (e.g. population density, people with no choice but to live in close proximity to the hazard, or a choice they make) and place vulnerability. • Some countries will be better prepared and therefore impacts will be less. This is not always a straight forward distinction between rich and poor countries and can relate to experience and expertise. • Where the quality of the built environment is poor, impacts will be greater, often this is linked to poverty. • The capacity, training and equipment for emergency services will vary in countries with contrasting levels of economic development and will be a key factor in minimising the impact. • The degree of impact will also depend on a county's ability to recover. This will vary with the scale of the disaster, even ACs suffer huge costs and long term recovery e.g. New Zealand, Christchurch - $NZ 40 billion and a projected 50 year recovery. • Generally ACs and some EDCs have the physical and financial resources to reduce

Question			Answer	Marks	Guidance
			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.		impacts and (recover from them) – economies are more robust, individuals and companies have insurance, they can afford the technology to lessen impacts. • Evidence should be provided through reference to case studies of countries at contrasting levels of economic development – two required in the specification. This will probably be an AC and LIDC or an AC and EDC.

Assessment Objectives (AO) grid

Candidates answer either question 1, 2, 3, 4 or 5, either question 6, 7, 8, 9 or 10 and one of questions 11, 12, 13, 14, 15, 16, 17, 18, 19 or 20.

Question	AO1	AO2	AO3	Marks
1, 2, 3, 4 or 5 (a)(i)	4			4
1, 2, 3, 4 or 5 (b)	3	3		6
1, 2, 3, 4 or 5 (c)(i)			4	4
1, 2, 3, 4 or 5 (c)(ii)		3	3	6
1, 2, 3, 4 or 5 (d)	6	6		12
6, 7, 8, 9 or 10 (a)	4	4		8
6, 7, 8, 9 or 10 (b)	4	4		8
11, 12, 13, 14, 15, 16, 17, 18, 19 or 20	10	10		20
Total	31	30	7	68

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