GCE

Geography

H081/02: Geographical debates

AS Level

Mark Scheme for June 2024

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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.

MARKING INSTRUCTIONS

PREPARATION FOR MARKING
RM ASSESSOR

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *RM Assessor Assessor Online Training*; *OCR Essential Guide to Marking*.

2. Make sure that you have read and understood the mark scheme and the question paper for this unit. These are posted on the RM Cambridge Assessment Support Portal http://www.rm.com/support/ca

3. Log-in to RM Assessor and mark the **required number** of practice responses ("scripts") and the **number of required** standardisation responses.

   YOU MUST MARK 10 PRACTICE AND 10 STANDARDISATION RESPONSES BEFORE YOU CAN BE APPROVED TO MARK LIVE SCRIPTS.

MARKING

1. Mark strictly to the mark scheme.

2. Marks awarded must relate directly to the marking criteria.

3. The schedule of dates is very important. It is essential that you meet the RM Assessor 50% and 100% (traditional 40% Batch 1 and 100% Batch 2) deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.

4. If you are in any doubt about applying the mark scheme, consult your Team Leader by telephone or the RM Assessor messaging system, or by email.

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

   Rubric Error Responses – Optional Questions
   Where candidates have a choice of question across a whole paper or a whole section and have provided more answers than required, then all responses are marked and the highest mark allowable within the rubric is given. Enter a mark for each question answered into RM assessor, which will select the

highest mark from those awarded. *(The underlying assumption is that the candidate has penalised themselves by attempting more questions than necessary in the time allowed.)*

Multiple Choice Question Responses

When a multiple choice question has only a single, correct response and a candidate provides two responses (even if one of these responses is correct), then no mark should be awarded (as it is not possible to determine which was the first response selected by the candidate).
When a question requires candidates to select more than one option/multiple options, then local marking arrangements need to ensure consistency of approach.

Contradictory Responses

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

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

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

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

6. Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there, then add a tick to confirm that the work has been seen.

7. Award No Response (NR) if:
    - there is nothing written in the answer space

    Award Zero '0' if:
    - anything is written in the answer space and is not worthy of credit (this includes text and symbols).

    Team Leaders must confirm the correct use of the NR button with their markers before live marking commences and should check this when reviewing scripts.

8. The RM Assessor **comments box** is used by your team leader to explain the marking of the practice responses. Please refer to these comments when checking your practice responses. **Do not use the comments box for any other reason.**
    If you have any questions or comments for your team leader, use the phone, the RM Assessor messaging system, or e-mail.

9. *Assistant Examiners will send a brief report on the performance of candidates to their Team Leader (Supervisor) via email by the end of the marking period. The report should contain notes on particular strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.*

10. For answers marked by levels of response: Not applicable in F501
    a. **To determine the level** – start at the highest level and work down until you reach the level that matches the answer
    b. **To determine the mark within the level**, consider the following

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

11. **Annotations**

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

Question			Answer	Mark	Guidance
1	(a)		**Explain <u>two</u> ways in which lake sediments are used to reconstruct past climate.** • analysis of sediment cores can reveal *biological* remains in lake sediments (✓) for example diatoms and pollen grains can be related to past water temperatures and therefore air temperatures (DEV) • pollen identification in different sediment layers (✓) pollen analysis is used to identify past vegetation types as shown in pollen diagrams and this can infer palaeoclimatic conditions (DEV) • diatom identification – single-celled algae with cell walls made of silica (✓) these provide evidence of past climate recorded in the *chemical* composition of their shells (DEV) • varves – colour, thickness / depth of thin *physical* layers of lake sediment indicate seasonal change (✓) lighter bands of coarser sediment indicate higher energy, meltwater run-off in spring / summer; darker bands of finer sediment settle during winter when more water is locked up as ice (DEV) • spore identification in lake sediment layers (✓) spores, such as fern spores, reflect contemporary vegetation at the time of aerial or fluvial deposition, useful in climate reconstruction (DEV)	4 AO1x4	**AO1 – 4 marks** 2 x 1 mark (✓) for each way 2 x 1 mark (DEV) for explanation that links each method used to reconstruction of past climate.
1	(b)		**Examine the role of natural atmospheric greenhouse gases in driving climate change in the geological past.** **Level 3 (5-6 marks)** Demonstrates **thorough** knowledge and understanding of natural atmospheric greenhouse gases (AO1). **Where appropriate place specific details** should be **accurate.** Demonstrates **thorough** application of knowledge and understanding to provide an **accurate, clear** and **developed**	6 AO1x3 AO2x3	**Indicative content** **AO1 - 3 marks** Knowledge and understanding of natural atmospheric greenhouse gases could potentially include: • carbon dioxide, CO_2 – relationship between carbon dioxide levels, average global temperatures and climate change • water vapour – relationship between amount of water vapour in the atmosphere, global / regional temperatures and climate change • methane, CH_4 – relationship between level of methane in

analysis of the role of natural atmospheric GHGs in driving climate change in the geological past (AO2).

Level 2 (3-4 marks)
Demonstrates **reasonable** knowledge and understanding of natural atmospheric greenhouse gases (AO1).

Where appropriate, place specific material is present which is **partially accurate**.

Demonstrates **reasonable** application of knowledge and understanding to provide a **sound** analysis showing some accuracy and development of the role of natural atmospheric GHGs in driving climate change in the geological past (AO2).

Level 1 (1-2 marks)
Demonstrates **basic** knowledge and understanding of natural atmospheric greenhouse gases (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 of the role of natural atmospheric GHGs in driving climate change in the geological past (AO2).

0 marks   No response or no material worthy of credit.

atmosphere and changes in global temperatures e.g. released as vegetation decomposes during permafrost melt

In the geological past fluctuations in these naturally occurring GHGs can be linked to fluctuations in temperature / climate change e.g. glacials / inter-glacials.

AO2 - 3 marks
Application of knowledge and understanding to analyse the role of natural atmospheric GHGs in driving climate change in the geological past could potentially include:
- the role of natural GHGs relates to their impact on the Earth's natural greenhouse effect, contributing to changes in climate in the geological past - before any anthropogenic influence. Their presence in the atmosphere has a warming effect, being transparent to short-wave radiation from the Sun but absorbing the Earth's long-wave radiation
- their role in the geological past was part of a complex set of natural forcings driving climate change - including internal forcings such as the effects of plate tectonics, volcanic eruptions, and oceanic circulation, and external forcings such as solar output and the Milankovitch cycles
- in the case of atmospheric CO_2, low levels correspond with glacials, periods of slower water / carbon cycles and a reduced natural greenhouse effect, whereas higher levels correspond with higher average global temperature, less water locked up as permafrost / ice and an increased natural greenhouse effect
- removal of CO_2 from the atmosphere in geological time scales is explained by periods of mountain building, with increased rainfall, erosion and chemical weathering by rainfall charged with CO_2, this transfers CO_2 from atmosphere to marine sediment stores. Increases in nutrients in oceans stimulated phytoplankton blooms which also extracted CO_2 from the atmosphere

| 1 | (ci) | | Study <u>Fig.1</u> which shows highest recorded air temperatures in the UK, 2015-2022. Using the temperature data in <u>Fig.1</u> calculate the value of the mean (correct to 1 decimal place) and the range. You must show your working.

mean:
• 288.8 divided by 8 (✓) (working)
• 36.1ºC (✓) (answer)
range:
• 40.3 minus 31.1 (✓) (working)
• 9.2ºC (✓) (answer) | 4
AO3x4 | **AO3 – 4 marks**
2 x 1 mark (✓) for mean:
• Working (Σx / n)   1 mark
• Answer   1 mark
2 x 1 mark (✓) for range:
• Working (max value x – min value x)   1 mark
• Answer   1 mark |
| 1 | (cii) | | **Using evidence from <u>Fig.1</u>, analyse the variation in temperatures shown.**

Level 3 (5-6 marks)
Demonstrates **thorough** application of knowledge and understanding to provide clear and developed analysis that shows accuracy for the variation in temperatures shown in Fig.1 (AO2).

Demonstrates **thorough** investigation and interpretation of the resource to fully evidence variation in temperatures. There must be strong ideas linking resource evidence to the variation in temperatures shown in Fig.1 (AO3).

Level 2 (3-4 marks)
Demonstrates **reasonable** application of knowledge and understanding to provide developed analysis that shows some accuracy for the variation in temperatures shown in Fig.1 (AO2).

Demonstrates **reasonable** investigation and interpretation of the resource to evidence variation in temperatures. There must be sound ideas linking resource evidence to the variation in temperatures shown in Fig.1 (AO3).

Level 1 (1-2 marks)
Demonstrates **basic** application of knowledge and understanding to provide basic analysis that shows limited accuracy for the variation in temperatures shown in Fig.1 (AO2). | 6
AO2x3
AO3x3 | **Indicative content**

AO2 - 3 marks
Application of knowledge and understanding to analyse variation in temperatures shown in Fig.1 could potentially include:
• part of a trend of global / regional warming with sharp increases in global surface temperatures this century (9/10 of the hottest years on record have occurred since 2000)
• increase / high temperatures is mainly result of anthropogenic GHG emissions; concentrations of carbon dioxide, methane, nitrous oxide and water vapour in the atmosphere have continued to rise
• these emissions have been caused by continued use of fossil fuels to supply energy for domestic heating, transport, agriculture and industry
• the enhanced greenhouse effect has had significant impact on max temperatures recorded in countries such as the UK
• land use change; a possible local factor influencing max temp, such as expansion of urban area

AO3 - 3 marks
Evidence from investigation and interpretation of the data in Fig.1 could potentially include: |

			Demonstrates **basic** investigation and interpretation of the resource to attempt to evidence variation in temperatures shown in Fig.1. There must be some ideas linking resource evidence to the variation in temperatures shown in Fig.1 (AO3).		- an overall increase in max temp during the period shown – from mid-30s in 2015-2018 to 40 in 2022 - anomalous low in 2021 - max temp only 31.1 - trend in max temps is irregular over the period; possibly too short a time period to confirm any obvious longer-term rate of change, but over 40 degrees was achieved for the first time in 2022 - greatest increase achieved in last two years – '21-'22 Credit any correct reference to data.
1	(d)		**'An effective response to climate change requires policies that extend beyond the vision of international directives.' Discuss.** **Level 4 (10–12 marks)** Demonstrates **comprehensive** and accurate knowledge and understanding of policies in response to climate change that extend beyond the vision of international directives (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 policies in response to climate change that extend beyond the vision of international directive (AO2). **Level 3 (7-9 marks)** Demonstrates **thorough** and mainly accurate knowledge and understanding of policies in response to climate change that extend beyond the vision of international directives (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation offering generally secure judgements with some link between rational conclusions and evidence as to policies in response to climate change that extend beyond the vision of international directive (AO2). **Level 2 (4-6 marks)**	12 AO1x6 AO2x6	**Indicative content** **AO1 - 6 marks** Knowledge and understanding of policies in response to climate change that extend beyond the vision of international directives could potentially include: *international directives* - IPCC – reports - science behind climate change, potential impacts, options for adaptation and for limiting GHG emissions - Kyoto protocol (1997-2012) – legally binding international agreement on limiting carbon emissions - Paris Climate Convention (2015) – legally binding climate deal to reduce global CO_2 emissions by 2050 and keep global warming below 2ºC - EUETS (2003) – scheme in which businesses cut their emissions or incur extra costs; there is a cap / quota on their emissions – less than their quota and they receive carbon credits which can be traded *national and sub-national policies – 'beyond the vision..'* - national - laws re emissions, deliver on international agreements, carbon taxes, low-carbon energy support - local - cheaper public transport, climate-proof neighbourhoods, flood protection, land use change to improve air circulation – all examples of mitigation and adaptation policies being pursued in countries such as Denmark, UK

Demonstrates **reasonable** and some accurate knowledge and understanding of policies in response to climate change that extend beyond the vision of international directives (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 policies in response to climate change that extend beyond the vision of international directives (AO2).

Level 1 (1-3 marks)
Demonstrates **basic** and/or inaccurate knowledge and understanding of policies in response to climate change that extend beyond the vision of international directives (AO1).

Demonstrates **basic** application of knowledge and understanding offering either unsupported or minimal if any evaluation. Judgements and conclusions, if any, are simplistic regarding policies in response to climate change that extend beyond the vision of international directive (AO2).

0 marks No response or no material worthy of credit.

- regional - long-term mitigation strategies plus adaptation policies in response to increases in temperatures, sea-level rise, frequency of droughts and wildfires, and need to protect aquatic habitats and ecosystems, such as policy in California

AO2 - 6 marks
Application of knowledge and understanding to analyse and evaluate policies in response to climate change that extend beyond the vision of international directives could potentially include:
- evaluation of international directives by various organisations, for example,
  - on one hand, good progress made by the EU in its carbon trading scheme and the Renewables Directive and,
  - on the other, the flaws of the Kyoto Protocol, which the largest carbon-emitting countries failed to ratify
- evaluation of national and sub-national policies e.g.
  - on one hand, some countries have extended their strategies beyond the vision of the international directives putting in place their own policies – perhaps because of the urgency and scale of their specific problems which are not met by the international directives and,
  - on the other hand they may make less progress if left to pursue their own policies without any international directive
- discussion that effective response to climate change depends on implementation of policies and co-operation *at all scales*
- consideration that some less developed countries, such as Bangladesh, focus only on adaptation; like other developing countries it regards mitigation and reduction of GHG emissions as the responsibility of the developed world

Question			Answer	Mark	Guidance
2	(a)		**Explain how diseases are classified as infectious and non-infectious.** Infectious: • caused by pathogens (✓) transmitted by bacteria, viruses, parasites or fungi (DEV) • communicable (✓) passed from one person to another (DEV) • transmitted directly (✓) such as influenza, HIV, tuberculosis (DEV) • transmitted indirectly (✓) such as malaria (DEV) Non-infectious: • non-communicable disease (✓) risk is linked to diet, environment, lifestyle, age, gender and inherited characteristics (DEV) • caused by nutritional deficiencies (✓) such as rickets (DEV) • caused by lifestyle (✓) such as diabetes, heart disease, cancer (DEV) • caused by genetic inheritance (✓) such as heart disease, stroke, cancer (DEV)	**4** **AO1x4**	**AO1 – 4 marks** Infectious: 1 mark (✓) for identifying a correct cause or defining characteristic 1 mark (DEV) for explaining how the disease is transmitted. Examples of diseases linked to a correct causal factor (DEV) Non-infectious: 1 mark (✓) for identifying a correct cause or defining characteristic 1 mark (DEV) for explaining a factor that affects disease risk. Examples of diseases linked to a correct causal factor (DEV).
2	(b)		**Examine the role of women in combating disease risk.** **Level 3 (5-6 marks)** Demonstrates **thorough** knowledge and understanding of the role of women in combating disease risk (AO1). **Where appropriate place specific details** should be **accurate.** Demonstrates **thorough** application of knowledge and understanding to provide an **accurate, clear** and **developed** analysis as to the role of women in combating disease risk (AO2). **Level 2 (3-4 marks)**	**6** **AO1x3** **AO2x3**	**Indicative content** **AO1 - 3 marks** Knowledge and understanding of the role of women in combating disease risk could potentially include: • women being educated to help family members and others in the local community to reduce disease risk by improving hygiene, diet, maternal / child health • women being trained / encouraged to volunteer with charitable organisations to help other women in neighbouring communities to combat disease risk • women are involved with organisations that aim to combat specific diseases endemic in particular areas **AO2 - 3 marks** Application of knowledge and understanding to analyse the role of

			Demonstrates **reasonable** knowledge and understanding of the role of women in combating disease risk (AO1). **Where appropriate place specific** material is present which is **partially accurate**. Demonstrates **reasonable** application of knowledge and understanding to provide a **sound** analysis showing some accuracy and development as to the role of women in combating disease risk (AO2). **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of the role of women in combating disease risk (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 the role of women in combating disease risk (AO2). **0 marks** No response or no material worthy of credit.		women in combating disease risk could potentially include: • grassroots strategies to reduce disease risk are effective since they are self-motivated among local communities and families where need is greatest. Female involvement has increased in LIDCs / EDCs, based on female education assisted by organisations such as UN, Womankind and other NGOs. • because of their traditional roles in some societies e.g. collecting water, domestic chores, raising children, women are in a better position than men to be educated in issues such as water hygiene, domestic hygiene, sanitation, diet / malnutrition and care of their children / siblings – especially in areas of rural poverty and urban squatter settlements • women are being encouraged to volunteer to work with female-based charities such as Ghana Red Cross women's clubs especially since attempts to involve men, who work outside the villages, has not always met with success • women are involved in specific disease eradication programmes in areas such as Ghana (Guinea worm). Their roles have included monitoring and reporting new cases, ensuring those infected did not contaminate water sources, checking and replacing water filters to remove fleas from drinking water, identifying water sources used by the community requiring treatment
2	(c)	(i)	**Study <u>Fig.2</u> which shows prevalence of HIV among adults, ages 15-49, in sub-Saharan Africa, 2021.** **Using the HIV data in <u>Fig.2</u> calculate the value of the mean (correct to 1 decimal place) and the range. You must show your working.** mean: • 85.7 divided by 8 (✓) (working) • 10.7% (✓) (10.712%) (answer) range: • 27.9 minus 0.8 (✓) (working) • 27.1% (✓) (answer)	**4** **AO3x4**	**AO3 – 4 marks** 2 x 1 mark (✓) for mean: • Working (Σx / n) 1 mark • Answer 1 mark 2x 1 mark (✓) for range: • Working (max value x – min value x) 1 mark • Answer 1 mark

| 2 | (c) | (ii) | **Using evidence from <u>Fig.2</u>, analyse the variation in prevalence of HIV shown.**

Level 3 (5-6 marks)
Demonstrates **thorough** application of knowledge and understanding to provide clear and developed analysis that shows accuracy for the variation in prevalence of HIV shown in Fig.2 (AO2).

Demonstrates **thorough** investigation and interpretation of the resource to fully evidence variation in prevalence of HIV. There must be strong ideas linking resource evidence to the variation in prevalence of HIV shown in Fig.2 (AO3).

Level 2 (3-4 marks)
Demonstrates **reasonable** application of knowledge and understanding to provide developed analysis that shows some accuracy for the variation in prevalence of HIV shown in Fig.2 (AO2).

Demonstrates **reasonable** investigation and interpretation of the resource to evidence the variation in prevalence of HIV. There must be sound ideas linking resource evidence to the variation in prevalence of HIV shown in Fig.2 (AO3).

Level 1 (1-2 marks)
Demonstrates **basic** application of knowledge and understanding to provide basic analysis that shows limited accuracy for the variation in prevalence of HIV shown in Fig.2 (AO2).

Demonstrates **basic** investigation and interpretation of the resource to attempt to evidence the variation in prevalence of HIV shown in Fig.2. There must be some ideas linking resource evidence to the variation in prevalence of HIV shown in Fig.2 (AO3). | **6**
AO2x3
AO3x3 | **Indicative content**
AO2 - 3 marks
Application of knowledge and understanding to analyse variation in prevalence of HIV shown in Fig.2 could potentially include:
• higher prevalence found in countries where
  o limited government funding / drug availability
  o insufficient trained medical staff
  o high birth rates among infected women
  o high levels of illiteracy
  o lack of contraception
• lower prevalence in those countries where progress in
  o availability of self-testing
  o anti-retroviral treatment
  o elimination of mother-to-child transmission

AO3 - 3 marks
Evidence from investigation and interpretation of the data in Fig.2 could potentially include:
• very wide range in prevalence of HIV in sub-Saharan Africa
• highest prevalence in three neighbouring countries of southern Africa – Eswatini 27.9%, Lesotho 20.9%, South Africa 18.3%
• lowest prevalence in more northerly countries of sub-Saharan Africa – Mali 0.8%, Sierra Leone 1.4%, South Sudan 2.1%
• value of the mean for sub-Saharan Africa on its own is not a very useful / representative statistic for this region
• highest prevalence of all found in two very poor LIDCs – Eswatini and Lesotho
• lowest prevalence of all found in two West African countries – Mali and Sierra Leone - among LIDCs these are anomalous |

| 2 | (d) | **'The use of plants for medicine is not sustainable.' With reference to a case study of one medicinal plant, to what extent do you agree?**

Level 4 (10–12 marks)
Demonstrates **comprehensive** and accurate knowledge and understanding of the sustainable use of plants for medicine in the context of one medicinal plant (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 sustainable use of plants for medicine (AO2).

Level 3 (7-9 marks)
Demonstrates **thorough** and mainly accurate knowledge and understanding of the sustainable use of plants for medicine in the context of one medicinal plant (AO1).

Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation offering generally secure judgements with some link between rational conclusions and evidence as to the sustainable use of plants for medicine (AO2).

Level 2 (4-6 marks)
Demonstrates **reasonable** and some accurate knowledge and understanding of the sustainable use of plants for medicine in the context of one medicinal plant (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 sustainable use of plants for medicine (AO2).

Level 1 (1-3 marks) | **12**
AO1x6
AO2x6 | **Indicative content**

AO1 - 6 marks
Knowledge and understanding of the sustainable use of plants for medicine in the context of one medicinal plant could potentially include:
  • the large number of plant species in medicinal use
  • some possible named examples include the rosy periwinkle, foxglove, various opium poppy species, white willow, and African cherry
  • most have specific environmental conditions for growth - soil type, climate
  • case study / place-specific detail for one medicinal plant e.g. the rosy periwinkle
not sustainable
  • the vast majority are sourced from wild populations, only a small number of species are cultivated
  • the huge and growing demand for plants for herbal and pharmaceutical medicines, to meet global demand
  • the most sought after species by international and intra-national trade are under enormous pressure; therefore increasingly the sourcing of wild medicinal plants is unsustainable
sustainable
  • strategies, including treaties, are in place for conservation and protection of habitats
  • organisations in ACs provide funds for economic development and forest protection in LIDCs, such as National Cancer Institute in USA and pharmaceutical TNCs

AO2 - 6 marks
Application of knowledge and understanding to analyse and evaluate the sustainable use of plants for medicine could potentially include:
  • understanding of reasons why use of plants for medicine is increasingly unsustainable, such as
     o over-harvesting is widespread
     o slow-growing plants and those occupying highly specialised niches are particularly vulnerable |

		Demonstrates **basic** and/or inaccurate knowledge and understanding of the sustainable use of plants for medicine in the context of one medicinal plant (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 sustainable use of plants for medicine (AO2). **0 marks** No response or no material worthy of credit.		- o 4000 medicinal plants are estimated to be threatened with 14 acutely endangered - o in traditional Chinese Medicine the preference is for roots rather than leaves, flowers and seeds - o habitat destruction by deforestation in the tropics and the economic and social impacts on local communities (biopiracy) - understanding of ways that sustainability of the use of plants for medicine is promoted, such as - o research and investigation by the Center for Biological Diversity - o pharmaceutical companies diverting profits from drug royalties to forest communities as compensation for protecting the rainforest and to assist economic development - o TNCs such as GSK devoting R&D to the needs of the developing world - o funds from organisations such as the Swedish International Development Authority for forest protection and economic development in Samoa - evaluation of the extent to which use of plants is not sustainable, for example - o on one hand, the number of plants estimated to be threatened or endangered, and the growing demand for new drugs in LIDCs, - o on the other, a more ethical approach, rather than exploitation, which ensures valuable supply of medicinal plants, enables ecosystems to flourish, and provides ecological services at local and global scales - consideration of different aspects of sustainability e.g. - o survival of the plant species themselves - o economic and social sustainability of indigenous rainforest people / communities - o environmental sustainability of ecosystems

Question			Answer	Mark	Guidance
3	(a)		**Explain <u>two</u> causes of the accumulation of plastic in oceans.** • land derived debris (✓) inputs of large volume over long period of time from rivers and beaches (DEV) • dumping off sides of ships at sea / accidental discharge when ships caught in storms (✓) increased over time as volume of shipping and cargoes of 'nurdles' have increased (DEV) • plastic does not biodegrade (✓) it is a long-lived / persistent material that breaks down into microplastics and remains in the ocean (DEV) • ocean currents, winds and the planet's rotation contribute to formation of gyres (✓) debris is carried to their centre and circular currents cause it to remain there (DEV) • difficulty in clearing plastic from gyres (✓) because they are vast in scale, debris is both at the surface and suspended below for several metres, and the supply of plastic continues to grow (DEV)	4 AO1x4	**AO1 – 4 marks** 2 x 1 mark (✓) for identifying each correct cause 2 x 1 mark (DEV) for each explanation of accumulation.
3	(b)		**Examine factors that influence biodiversity in inter-tidal ecosystems.** **Level 3 (5-6 marks)** Demonstrates **thorough** knowledge and understanding of factors that influence biodiversity in inter-tidal ecosystems (AO1). **Where appropriate, place specific details** should be **accurate.** Demonstrates **thorough** application of knowledge and understanding to provide an **accurate, clear** and **developed** analysis as to factors that influence biodiversity in inter-tidal ecosystems (AO2). **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of factors that influence biodiversity in inter-tidal ecosystems (AO1).	6 AO1x3 AO2x3	**Indicative content** **AO1 - 3 marks** Knowledge and understanding of factors that influence biodiversity in inter-tidal ecosystems, such as estuarine tidal mud flats and salt marshes, could potentially include: • light - influenced by solar energy – overall decrease with distance from the equator and with increasing water depth. • temperature - influenced by solar energy – overall decrease with depth; surface temperatures vary with latitude and distribution of ocean currents • nutrient supply – provided by river transport of dissolved nutrients from weathered rocks, and by wind-blown dust, and by input of organic material from plants / animals • other factors include human inputs, salinity, time

| | | | Where appropriate, **place specific** material is present which is **partially accurate.**

Demonstrates **reasonable** application of knowledge and understanding to provide a **sound** analysis showing some accuracy and development as to factors that influence biodiversity in inter-tidal ecosystems (AO2).

Level 1 (1-2 marks)
Demonstrates **basic** knowledge and understanding of factors that influence biodiversity in inter-tidal ecosystems (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 factors that influence biodiversity in inter-tidal ecosystems (AO2).

0 marks No response or no material worthy of credit. | | **AO2 - 3 marks**
Application of knowledge and understanding to analyse factors that influence biodiversity in inter-tidal ecosystems could potentially include:
• light penetrates water in shallow inter-tidal zones; where there is enough light for photosynthesis growth of the primary producers occurs
• light contributes to colonisation and succession of plants in an ecosystem over time; this provides an environment for the consumers, hence more biodiverse food chains and food webs develop
• water temperature contributes to germination and growth of pioneer species; plant succession follows with attraction for insects / birds / animals - adding to biodiversity as trophic levels develop over time
• nutrients in accumulated deposits of silts and clays, e.g. in estuarine tidal mud flats, support vast numbers of invertebrates on which diverse bird species feed – e.g. waders
• nutrients supplied to the inter-tidal zone can be circulated by tidal action and accumulate in deposits of silts and clays in upper salt marshes which are more biodiverse than mud flats
• the combination of nutrient supply, light and temperature contributes to high net primary productivity (NPP) and higher levels of biodiversity in some inter-tidal ecosystems |
| 3 | (c) | (i) | Study <u>Fig.3</u> which shows number of pirate attacks against ships worldwide. Using the pirate attacks data in <u>Fig.3</u> calculate the value of the mean (correct to 1 decimal place) and the range. You must show your working.
mean:
• 1552 divided by 8 (✓) (working)
• 194 (✓) (answer)
range:
• 246 minus 132 (✓) (working)
• 114 (✓) (answer) | **4**
AO3x4 | **AO3 – 4 marks**
2 x 1 mark (✓) for mean:
• Working (Σx / n)   1 mark
• Answer   1 mark
2 x 1 mark (✓) for range:
• Working (max value x – min value x)   1 mark
• Answer   1 mark |

| 3 | (c) | (ii) | **Using evidence from Fig.3, analyse the variation in number of pirate attacks shown.**

Level 3 (5-6 marks)
Demonstrates **thorough** application of knowledge and understanding to provide clear and developed analysis that shows accuracy for the variation in number of pirate attacks shown in Fig.3 (AO2).

Demonstrates **thorough** investigation and interpretation of the resource to fully evidence variation in number of pirate attacks. There must be strong ideas linking the resource to the variation in number of pirate attacks shown in Fig.3 (AO3).

Level 2 (3-4 marks)
Demonstrates **reasonable** application of knowledge and understanding to provide developed analysis that shows some accuracy for the variation in number of pirate attacks shown in Fig.3 (AO2).

Demonstrates **reasonable** investigation and interpretation of the resource to evidence the variation in number of pirate attacks. There must be sound ideas linking resource evidence for the variation in number of pirate attacks shown in Fig.3 (AO3).

Level 1 (1-2 marks)
Demonstrates **basic** application of knowledge and understanding to provide basic analysis that shows limited accuracy for the variation in number of pirate attacks shown in Fig.3 (AO2).

Demonstrates **basic** investigation and interpretation of the resource to attempt to evidence the variation in number of pirate attacks shown in Fig.3. There must be some ideas linking resource evidence to the variation in number of pirate attacks shown in Fig.3 (AO3). | **6**
AO2x3
AO3x3 | **Indicative content**
AO2 - 3 marks
Application of knowledge and understanding to analyse variation in number of pirate attacks shown in Fig.3 could potentially include:
high number of attacks reflects growth in transcontinental shipping associated with globalisation
reasons for high number of attacks include a combination of relative poverty, unstable national governments, and links to organised crime networks
variation within these worldwide figures reveals high numbers on main trading routes such as western Indian Ocean (Gulf of Aden and Red Sea) and Southeast Asia (Malacca and Singapore Straits)
lower numbers and recent decline have been the result of
the work of a maritime coalition involving the EU, NATO and the USA including assistance for governments, such as Somalia, and training opportunities to divert younger men from criminal activities on the oceans
a host of countries including India, China, Japan, South Korea that patrol the most vulnerable areas and share intelligence
intense military surveillance / naval policing
AO3 - 3 marks
Evidence from investigation and interpretation of Fig.3 could potentially include:
high number of attacks every year; high mean 194 highest numbers of attacks, over 240, occurred in the earlier period, 2014-15 lowest number of attacks in two of the most recent years, 2019 – 162 and 2021 - 132 tendency for a trend of overall decline in the eight year period - but irregular two substantial drops in number of attacks - 2016 (246 to 191) and 2021 (195 to 132) |

| 3 | (d) | **'The greatest impact of oil spills is on human activity.' With reference to a <u>case study</u> of <u>one</u> oil spill, to what extent do you agree?**

Level 4 (10–12 marks)
Demonstrates **comprehensive** and accurate knowledge and understanding of the impact of oil spills on human activity and other environments in the context of one oil spill (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 impact of oil spills on human activity and other environments (AO2).

Level 3 (7-9 marks)
Demonstrates **thorough** and mainly accurate knowledge and understanding of the impact of oil spills on human activity and other environments in the context of one oil spill (AO1).

Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation offering generally secure judgements with some link between rational conclusions and evidence as to the impact of oil spills on human activity and other environments (AO2).

Level 2 (4-6 marks)
Demonstrates **reasonable** and some accurate knowledge and understanding of the impact of oil spills on human activity and other environments in the context of one oil spill (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 impact of oil spills on human activity and other environments (AO2).

Level 1 (1-3 marks) | **12**
AO1x6
AO2x6 | **Indicative content**

AO1 - 6 marks
Knowledge and understanding of the impact of oil spills on human activity and other environments in the context of one oil spill could potentially include:
human activities
• fishing industry – loss of fish / shellfish stocks, loss of income, loss of employment, impact on businesses dependent on fish such as restaurants, retail
• tourism industry – impact on the physical resources tourists visit such as beaches, wildlife / birds, loss of income in places of accommodation and other businesses linked to tourist trade, unemployment
• management of the oil spill – strategies to deal with the escaped oil, skimming, burning, dispersal, beach cleaning
physical environment
• oil-contaminated beach material
• oil trapped in coastal salt marshes accumulates in the deposited mud
• air pollution from burning oil
marine ecosystems
• high level of mortality - birds, fish, turtles, mammals
• impact on all trophic levels in the area
• death of any coral ecosystems

Case study / place-specific detail of one oil spill e.g. the Deepwater Horizon disaster off the Louisiana coast

AO2 - 6 marks
Application of knowledge and understanding to analyse and evaluate the impact of oil spills on human activity and other environments in the context of one oil spill could potentially include:
• evaluation of the extent to which human activity is affected – this could be in terms of geographical scale / |

| | | | Demonstrates **basic** and/or inaccurate knowledge and understanding of the impact of oil spills on human activity and other environments in the context of one oil spill (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 impact of oil spills on human activity and other environments (AO2).

0 marks No response or no material worthy of credit. | | area, financial loss, unemployment, trickle down effects on other related human activities / businesses
• evaluation of the extent to which physical / marine environments are affected – this could be in terms of geographical scale / area, the scale of the impact on marine organisms / life, the visual impact
• understanding that the impacts can be environmental, economic, social and political and that these impacts are interlinked
• discussion that distinguishes between short-term and longer term impacts
• understanding that attempts to manage an oil spill can also have impacts – mainly positive but sometimes presenting difficulties |

Question			Answer	Mark	Guidance
4	(a)		**Explain <u>two</u> ways that deforestation can impact the physical environment in attempts to increase food production.** • decline in animal / insect / bird species / loss of biodiversity in the area (✓) impact on all trophic levels within the natural ecosystem (DEV) • overall decline in plant species diversity and/or species richness (✓) leads to loss of habitats available to wildlife (DEV) • impact on soil quality (✓) can lead to soil erosion by wind / rain / increased run off / leaching of nutrients / reduction in leaf litter (DEV) • changes the landscape (✓) visual impact of changed land use from forest to agricultural landscape such as pasture / monoculture (DEV) • use of chemicals in the deforested area (✓) impact on ecosystems beyond the cleared area (DEV)	4 AO1x4	**AO1 – 4 marks** 2 x 1 mark (✓) for identifying each impact of deforestation 2 x 1 mark (DEV) for each explanation that links deforestation to an impact on the physical environment.
4	(b)		**Examine how globalisation of the food industry creates inequality between TNCs and small suppliers.** **Level 3 (5-6 marks)** Demonstrates **thorough** knowledge and understanding of how globalisation of the food industry creates inequality between TNCs and small suppliers (AO1). **Where appropriate, place specific details** should be **accurate.** Demonstrates **thorough** application of knowledge and understanding to provide an **accurate, clear** and **developed** analysis as to how globalisation of the food industry creates inequality between TNCs and small suppliers (AO2) **Level 2 (3-4 marks)**	6 AO1x3 AO2x3	**Indicative content** **AO1 - 3 marks** Knowledge and understanding of how globalisation of the food industry creates inequality between TNCs and small suppliers could potentially include: *Globalisation of the food industry:* • food distribution and consumption have become increasingly global in scale • developments in transport, communications and refrigeration create greater global connectedness • food chains have become global *TNCs v small suppliers:* • shift from traditional small scale farming systems to agribusiness with links to large internationally organised TNCs and major food retailers

			Demonstrates **reasonable** knowledge and understanding of how globalisation of the food industry creates inequality between TNCs and small suppliers (AO1). **Where appropriate, place specific** material is present which is **partially accurate.** Demonstrates **reasonable** application of knowledge and understanding to provide a **sound** analysis showing some accuracy and development as to how globalisation of the food industry creates inequality between TNCs and small suppliers (AO2). **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of how globalisation of the food industry creates inequality between TNCs and small suppliers (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 how globalisation of the food industry creates inequality between TNCs and small suppliers (AO2). **0 marks** No response or no material worthy of credit.		**AO2 - 3 marks** Application of knowledge and understanding to analyse how globalisation of the food industry creates inequality between TNCs and small suppliers could potentially include: • TNCs are in a very strong position to supply foods globally because they have access to a variety of transport systems; small suppliers are much more limited in their ability to distribute their produce which tends to be more local • The food industry tends to be dominated by TNCs because they have the capital to invest in processes that produce foods on a large scale in capital-intensive operations; this leaves small producers disadvantaged and marginalised in terms of costs, marketing and distribution • The large scale of TNCs and the benefits that TNCs might bring to a country make it difficult for some national governments to regulate their own food systems or to promote the interests of small farmers; this leaves small-scale farmers unable to compete with large-scale agribusiness – and they become economically disadvantaged • TNCs benefit from economies of scale; they increase inequalities between themselves and small suppliers by exploiting local farmers with low prices for their products or low wages
4	(c)(i)		**Study Fig.4 which shows percentage food security in the total population of selected countries, 2021. Using the food security data in Fig.4 calculate the value of the mean (correct to 1 decimal place) and the range. You must show your working.** mean: • 494.2 divided by 8 (✓) (working) • 61.8% (✓) (61.775%) (answer)	4 AO3x4	**AO3 – 4 marks** 2 x 1 mark (✓) for mean: • Working ($\Sigma x / n$) 1 mark • Answer 1 mark 2 x 1 mark (✓) for range: • Working (max value x – min value x) 1 mark • Answer 1 mark

4	(c)(ii)		range: • 96.5 minus 13.6 (✓) (working) • 82.9% (✓) (answer)		

4	**(c)(ii)**		**Using evidence from <u>Fig.4</u>, analyse the variation in food security shown.**
			
			Level 3 (5-6 marks)
			Demonstrates **thorough** application of knowledge and understanding to provide clear and developed analysis that shows accuracy for the variation in food security shown in Fig.4 (AO2).
			
			Demonstrates **thorough** investigation and interpretation of the resource to fully evidence variation in prevalence of severe food insecurity. There must be strong ideas linking resource evidence to the variation in food security shown in Fig.4 (AO3).
			
			Level 2 (3-4 marks)
			Demonstrates **reasonable** application of knowledge and understanding to provide developed analysis that shows some accuracy for the variation in food security shown in Fig.4 (AO2).
			
			Demonstrates **reasonable** investigation and interpretation of the resource to evidence variation in prevalence of severe food insecurity. There must be sound ideas linking resource evidence to the variation in food security shown in Fig.4 (AO3).
			
			Level 1 (1-2 marks)
			Demonstrates **basic** application of knowledge and understanding to provide basic analysis that shows limited accuracy for the variation in food security shown in Fig.4 (AO2).
			
			Demonstrates **basic** investigation and interpretation of the resource to evidence variation in prevalence of severe food
				6
				AO2x3
				AO3x3
					Indicative content
					
					AO2 - 3 marks
					Application of knowledge and understanding to analyse reasons for variation in food security shown in Fig.4 could potentially include:
					• there are very wide global inequalities in food security revealed by these figures for selected countries
					• variation in food security is influenced by
					   ○ physical factors (such as geology, soil, length of growing season, impact of climate change)
					   ○ social, economic and political factors (such as land ownership system, scarcity of land for farming, competition both in food markets and for scarce resources, land grabbing, poverty, advances in technology, conflict / war)
					   ○ shocks (such as extreme weather events, tectonic hazards, supply chain disruption)
					
					AO3 - 3 marks
					Evidence from investigation and interpretation of Fig.4 could potentially include:
					• the calculated mean, 61.8%, conceals a very wide range in food security from 96.5% in the UK to 13.6% in South Sudan
					• highest food security is found in countries classified as ACs including the UK 96.5%, Northern Europe and Japan 96.2%, East Asia
					• lowest food security is found in countries classified as LIDCs including South Sudan 13.6%, Sub-Saharan Africa and Haiti 17.5%, Caribbean

			insecurity shown in Fig.4. There must be some ideas linking resource evidence to the variation in food security shown in Fig.4 (AO3).		• food security in between the two extremes is found in Honduras 50.1%, Central America, Brazil 71.1%, South America, Algeria 81%, North Africa, and Laos 68.2%, South Asia

4	(d)		**'Food production methods used by indigenous people in an extreme environment are influenced more by ecosystems than any other physical condition.' To what extent do you agree?**
			
			Level 4 (10–12 marks)
			Demonstrates **comprehensive** and accurate knowledge and understanding of the influence of ecosystems and other physical conditions on food production methods used by indigenous people in an extreme environment (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 influence of ecosystems and other physical conditions on food production methods used by indigenous people in an extreme environment (AO2).
			
			Level 3 (7-9 marks)
			Demonstrates **thorough** and mainly accurate knowledge and understanding of the influence of ecosystems and other physical conditions on food production methods used by indigenous people in an extreme environment (AO1).
			
			Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation offering generally secure judgements with some link between rational conclusions and evidence as to the influence of ecosystems and other physical conditions on food production methods used by indigenous people in an extreme environment (AO2).
				12
				AO1x6
				AO2x6
					Indicative content
					
					AO1 - 6 marks
					Knowledge and understanding of the influence of ecosystems and other physical conditions on food production methods used by indigenous people in an extreme environment could potentially include:
					
					Food production methods
					Arctic
					• hunting e.g. narwhal, whales, seals
					• gathering e.g. berries
					• herding e.g. caribou
					• fishing e.g. shellfish
					Sahel
					• agriculture e.g. peanuts, millet
					• animal husbandry e.g. cattle, goats
					
					Physical conditions
					• ecosystems e.g. Arctic tundra / marine
					    ○ natural vegetation / low NPP and diversity
					    ○ soils / permafrost and seasonal change
					    ○ land / marine mammals / low biodiversity
					    ○ decomposition / slow rate
					• terrain e.g. Arctic
					    ○ relief – mountains / plains / glacial / periglacial
					    ○ extent of ice cover / permafrost
					    ○ extent of vegetation cover / bare ground
					• climate e.g. Arctic
					    ○ temperatures (low monthly mean < -15C)
					    ○ precipitation (low annual amount <100mm)

Level 2 (4-6 marks)
Demonstrates **reasonable** and some accurate knowledge and understanding of the influence of ecosystems and other physical conditions on food production methods used by indigenous people in an extreme environment (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 influence of ecosystems and other physical conditions on food production methods used by indigenous people in an extreme environment (AO2)

Level 1 (1-3 marks)
Demonstrates **basic** and/or inaccurate knowledge and understanding of the influence of ecosystems and other physical conditions on food production methods used by indigenous people in an extreme environment (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 influence of ecosystems and other physical conditions on food production methods used by indigenous people in an extreme environment (AO2).

0 marks No response or no material worthy of credit.

- o   frequent storms / strong winds
- o   affected by global climate change

Arctic exemplars given above, but extreme physical conditions in dryland areas such as the Sahel equally appropriate as and / or.

AO2 - 6 marks
Application of knowledge and understanding to analyse and evaluate the influence of ecosystems and other physical conditions on food production methods used by indigenous people in an extreme environment could potentially include:

- evaluation of the influence of ecosystem characteristics on food production methods, e.g. in the Arctic, hunting, gathering, herding and fishing are all closely related to marine mammal populations, tundra vegetation / gathering berries, caribou herds and coastal mussel farming / fishing, which have sustained people for a long time
- evaluation of the influence of terrain on food production methods – in the Arctic this has an impact on soil quality / depth in former glaciated areas or current areas of permafrost where agriculture is not possible, but as a habitat for caribou it provides herding opportunities
- evaluation of the influence of climate on food production methods includes impact of temperature on length of growing season, and water supply on plant growth, plus in the Arctic, seasonal impacts on caribou migration, and summer hunting for marine mammals as sea ice fragments
- understanding that climate change threatens traditional methods of food production and these have become increasingly difficult to sustain in recent years; evaluation of the extent of change, is shown by the rapid change in the 21st C in the Arctic for example in terms of difficulty in hunting

					• marine mammals, the impact on polar bear, reindeer and caribou numbers / migrations, and fish stocks • food production methods in extreme environments are influenced by a combination of all physical conditions, especially since ecosystems are themselves influenced by terrain, extreme climate and climate change – conditions of the environment which are all interrelated

Question			Answer	Mark	Guidance
5	(a)		**Explain <u>two</u> characteristics of shallow-focus earthquakes.** • point where energy is released lies between the surface and 70 km depth (✓) occur in outer crustal layer (DEV) • very common / frequent occurrence / 70-85% of total energy released by all earthquakes (✓) result of frequent release of stress along faults in cold brittle rocks of the crust (DEV) • greatest occurrence Pacific rim / orogenic belts / ocean ridges (✓) areas of active movement / fracture of the crust (DEV) • capable of causing severe impacts (✓) many release only low levels of energy but they can be high-energy events depending on depth of focus / nature of fault surface / amount of movement / rock rigidity (DEV)	**4** **AO1x4**	**AO1 – 4 marks** 2 x 1 mark (✓) for each appropriate characteristic 2 x 1 mark (DEV) for each explanation of the characteristic
5	(b)		**Examine how the theories of continental drift and plate tectonics are supported by evidence for sea-floor spreading.** **Level 3 (5-6 marks)** Demonstrates **thorough** knowledge and understanding of how the theories of continental drift and plate tectonics are supported by evidence for sea-floor spreading (AO1).	**6** **AO1x3** **AO2x3**	**Indicative content** **AO1 - 3 marks** Knowledge and understanding of how the theories of continental drift and plate tectonics are supported by evidence for sea-floor spreading could potentially include: *Theories of continental drift and plate tectonics:* • Wegener, early 20th C, made case for the theory • Proposed that in the Carboniferous a single continent existed - Pangaea

Where appropriate, place specific details should be **accurate.**

Demonstrates **thorough** application of knowledge and understanding to provide an **accurate, clear** and **developed** analysis as to how the theories of continental drift and plate tectonics are supported by evidence for sea-floor spreading (AO2).

Level 2 (3-4 marks)
Demonstrates **reasonable** knowledge and understanding of how the theories of continental drift and plate tectonics are supported by evidence for sea-floor spreading (AO1).

Where appropriate, place specific material is present which is **partially accurate**.

Demonstrates **reasonable** application of knowledge and understanding to provide a **sound** analysis showing some accuracy and development as to how the theories of continental drift and plate tectonics are supported by evidence for sea-floor spreading (AO2).

Level 1 (1-2 marks)
Demonstrates **basic** knowledge and understanding of how the theories of continental drift and plate tectonics are supported by evidence for sea-floor spreading (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 how the theories of continental drift and plate tectonics are supported by evidence for sea-floor spreading (AO2).

0 marks   No response or no material worthy of credit.

- This slowly broke apart into two land masses
- Movement continued to present day as continents separated and spread across the globe
- He presented geological and biological evidence
- 1960s, increasing understanding of shape, size and convergence / divergence of tectonic plates

Evidence of sea-floor spreading:
- Scientific discoveries – incl Mid-Atlantic Ridge, palaeomagnetism, reversals in Earth's polarity
- Mirror image of young rock near mid-ocean ridge and older rock further away
- 'Conveyer belt' of moving rock each side of the mid-ocean ridge

AO2 - 3 marks
Application of knowledge and understanding to analyse how the theories of continental drift and plate tectonics are supported by evidence for sea-floor spreading could potentially include:
- The symmetrical pattern of geomagnetic reversals in basalts either side of mid-ocean ridges indicates that as fresh molten rock from the asthenosphere reached the ocean bed, older rock was 'pushed' away from the ridge
- Eventually the sea floor reaches an ocean trench where material is subducted into the asthenosphere and becomes semi molten
- These scientific discoveries and Wegener's ideas were linked in the 1960s, it becoming clear that plates are moved by sea-floor spreading from mid-ocean ridges
- The continents were carried by the moving plates, which supported the idea of Pangaea breaking up, continents drifting apart, and supporting Wegener's earlier geological and biological evidence

| 5 | (ci) | | **Study <u>Fig.5</u> which shows economic costs (estimated) of earthquakes, 2021. Using the economic costs data in <u>Fig.5</u> calculate the value of the mean (correct to 1 decimal place) and the range. You must show your working.**
mean:
  • 752 divided by 8 (✓) (working)
  • 94 $bn (✓) (answer)
range:
  • 350 – 7 (✓) (working)
  • 343 $bn (✓) (answer) | **4**
AO3x4 | **AO3 – 4 marks**
2 x 1 mark (✓) for mean:
  • Working (Σx / n)   1 mark
  • Answer   1 mark
2 x 1 mark (✓) for range:
  • Working (max value x – min value x)   1 mark
  • Answer   1 mark |
| 5 | (cii) | | **Using evidence from <u>Fig.5</u>, analyse the variation in economic costs of earthquakes shown.**

Level 3 (5-6 marks)
Demonstrates **thorough** application of knowledge and understanding to provide clear and developed analysis that shows accuracy for the variation in economic costs of earthquakes shown in Fig.5 (AO2).

Demonstrates **thorough** investigation and interpretation of the resource to fully evidence variation in economic costs of earthquakes. There must be strong ideas linking resource evidence for the variation in economic costs of earthquakes shown in Fig.5 (AO3).

Level 2 (3-4 marks)
Demonstrates **reasonable** application of knowledge and understanding to provide developed analysis that shows some accuracy for the variation in economic costs of earthquakes shown in Fig.5 (AO2).

Demonstrates **reasonable** investigation and interpretation of the resource to evidence variation in economic costs of earthquakes. There must be sound ideas linking resource evidence to the variation in economic costs of earthquakes shown in Fig.5 (AO3). | **6**
AO2x3
AO3x3 | **Indicative content**

AO2 - 3 marks
Application of knowledge and understanding to analyse variation in economic costs of earthquakes shown in Fig.5 could potentially include:
  • costs of reconstruction of housing, industry, transport infrastructure, power supplies
  • population density for example higher / urban, lower / rural
  • types of hazard generated and their impact such as ground shaking / displacement, liquefaction, landslides and avalanches, tsunami
  • the scale of destruction which may depend on a combination of earthquake magnitude, location of epicentre, geology
  • costs of management strategies to mitigate against future vulnerability

AO3 - 3 marks
Evidence from investigation and interpretation of the data in Fig.5 could potentially include:
  • highest costs are for Kobe 1995 ($350bn and Sichuan 2008 ($186bn)
  • lowest costs are for Nepal 2015 ($11bn) and |

			Level 1 (1-2 marks) Demonstrates **basic** application of knowledge and understanding to provide basic analysis that shows limited accuracy for the variation in economic costs of earthquakes shown in Fig.5 (AO2). Demonstrates **basic** investigation and interpretation of the resource to attempt to evidence variation in economic costs of earthquakes shown in Fig.5. There must be some ideas linking resource evidence to the variation in economic costs of earthquakes shown in Fig.5 (AO3).		Iran/Iraq 2017 ($7bn) • the mean ($94bn) conceals a very wide range in economic costs as a result of these selected earthquake events
5	**(d)**		**'The impacts people experience as a result of volcanic eruptions are almost entirely negative.' Discuss.** **Level 4 (10–12 marks)** Demonstrates **comprehensive** and accurate knowledge and understanding of the impacts people experience as a result of volcanic eruptions (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 impacts people experience as a result of volcanic eruptions (AO2). **Level 3 (7-9 marks)** Demonstrates **thorough** and mainly accurate knowledge and understanding of the impacts people experience as a result of volcanic eruptions (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation offering generally secure judgements with some link between rational conclusions and evidence as to the impacts people experience as a result of volcanic eruptions (AO2). **Level 2 (4-6 marks)** Demonstrates **reasonable** and some accurate knowledge	**12** **AO1x6** **AO2x6**	**Indicative content** **AO1 - 6 marks** Knowledge and understanding of the impacts people experience as a result of volcanic eruptions could potentially include: *negative* • mortality / injury • destruction of buildings / property • destruction of transport / power infrastructure • displacement / environmental refugees • loss of livelihood / destruction livestock / crops *benefits* • soil fertility • minerals • building materials • tourist attraction • mitigation strategies • geothermal energy **AO2 - 6 marks** Application of knowledge and understanding to analyse and evaluate the impacts people experience as a result of

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and understanding of the impacts people experience as a result of volcanic eruptions (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 impacts people experience as a result of volcanic eruptions (AO2).

Level 1 (1-3 marks)
Demonstrates **basic** and/or inaccurate knowledge and understanding of the impacts people experience as a result of volcanic eruptions (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 impacts people experience as a result of volcanic eruptions (AO2).

0 marks No response or no material worthy of credit.

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volcanic eruptions could potentially include:
- discussion of negative impacts and their links to different types of volcanic eruption
  - explosive / effusive
  and related hazards, such as
  - pyroclastic flows
  - tephra
  - lahars
  - gas
  - tsunami / flood
- discussion of benefits and their links to time scale and type of country involved
- impacts on people can be
  - social e.g. injury, displacement
  - economic e.g. loss of livelihood
  - political e.g. benefits of mitigation strategies
- evaluation of the extent to which impacts are almost entirely negative or not which may depend on issues such as:
  - short-term or long term impacts
  - impacts on people living in close proximity or more distant from the eruption
  - level of development / wealth of government of the country involved
  - type of mitigation strategies in place
  and on the specific examples referred to

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Question	Answer	Mark	Guidance
6 (a)	**With reference to <u>Fig. 6</u>, suggest how the role of the media in shaping the public image of climate change can influence representations of a place.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of the role of the media in shaping the public image of climate change and representations of a place (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how the role of the media in shaping the public image of climate change can influence representations of a place (AO2). This will be shown by including **well-developed** ideas linking resource evidence of the role of the media in shaping the public image of climate change and representations 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 the role of the media in shaping the public image of climate change and representations of a place (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how the role of the media in shaping the public image of climate change can influence representations of a place (AO2). This will be shown by including **developed** ideas linking resource evidence of the role of the media in shaping the public image of climate change and representations of a	8 AO1 x4 AO2 x4	**Indicative content** **AO1 - 4 marks** Knowledge and understanding of the role of the media in shaping the public image of climate change and representations of a place could potentially include: *The role of media in shaping the public image of climate change:* • role and possible bias of the media and different interest groups in shaping the public image of climate change. *Representations of a place:* • images shown on TV, films, photographs, of places affected by climate change such as drought, wildfire, thinning and melting of sea ice, floods, bleached coral • use of satellite images over time e.g. showing changes to valley glaciers • documentaries and reports on the plight of low lying island communities affected by SL rise • formal statistical evidence about a place, through research e.g. population change, CO_2 emission **AO2 - 4 marks** Application of knowledge and understanding to interpret how the role of the media in shaping the public image of climate change can influence representations of a place could potentially include: *Fig 6 shows TV / photographic coverage of a demonstration by an environmental organisation in Australia, 2019.* • unbiased media shaping public image using verified data, that reflects the huge weight of scientific research in favour of climate change, - through formal representations of a place such as statistical evidence, satellite imagery over time. *Fig 6 shows media recording the weight of public*

			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 the role of the media in shaping the public image of climate change and representations of a place (AO1). Demonstrates **basic** application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how the role of the media in shaping the public image of climate change can influence representations of a place (AO2). There will be **simple** ideas linking resource evidence of the role of the media in shaping the public image of climate change and representations of a place. There are limited attempts to make synoptic links between content from different parts of the course of study. **0 marks** No response or no response worthy of credit.		*opinion and sense of urgency over the issue by the size of the demonstration / nature of messages on banners* • biased media shaping public image using information that suggests climate change is more open to question than it really is, - through informal representations of a place which are possibly misleading as suggested in some newspaper headlines *Figure 6 shows significant police presence not only controlling the crowd but also perhaps questioning media / photographer* • media can bring awareness to the general public about the entire issue of anthropogenic global warming and its potential threats, - through science-based documentaries on TV or scientific reports with visual representations of places affected, *potential for this is shown in Fig 6 by presence of camera crew / photographers* • media can report on global conferences such as COP27, 'extinction rebellion' demonstrations, parliamentary debates, and represent places under discussion. *Fig 6 clearly shows media covering a demonstration by an environmental organisation*
6	(b)		**Examine how the vulnerability of people to the impacts of climate change can influence flows of money and investment.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of the vulnerability of people to the impacts of climate change and flows of money and investment (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how the vulnerability of people to the impacts of climate change can influence flows of money and investment (AO2).	**8** **AO1 x4** **AO2 x4**	**Indicative content** **AO1 - 4 marks** Knowledge and understanding of the vulnerability of people to the impacts of climate change and flows of money and investment could potentially include: *Vulnerability of people to the impacts of climate change:* • rural communities in the developing world • farming communities in marginal locations • people living in coastal areas • indigenous people living in extreme environments

There must be **well-developed** ideas of how the vulnerability of people to the impacts of climate change can influence flows of money and investment.
There are clear attempts to make synoptic links between content from different parts of the course of study.

Level 2 (3-5 marks)
Demonstrates **reasonable** knowledge and understanding of the vulnerability of people to the impacts of climate change and flows of money and investment (AO1).

Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how the vulnerability of people to the impacts of climate change can influence flows of money and investment (AO2).

There must be **developed** ideas of how the vulnerability of people to the impacts of climate change can influence flows of money and investment
There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant.

Level 1 (1-2 marks)
Demonstrates **basic** knowledge and understanding of the vulnerability of people to the impacts of climate change and flows of money and investment (AO1).

Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how the vulnerability of people to the impacts of climate change can influence flows of money and investment (AO2).
This will be shown by including **simple** ideas of how the vulnerability of people to the impacts of climate change can influence flows of money and investment.
There are limited attempts to make synoptic links between

- urban dwellers

Flows of money and investment:
- foreign / development aid
- emergency aid
- government investment in mitigation, adaptation and protection strategies

AO2 - 4 marks
Application of knowledge and understanding to analyse how the vulnerability of people to the impacts of climate change can influence flows of money and investment could potentially include:

- subsistence farmers in LIDCs will become increasingly vulnerable as temperature and rainfall averages change; many depend on direct rainfall therefore investment in irrigation and other methods to conserve soil moisture occurs where possible for example through local co-operative schemes
- farmers living in marginal areas, where rainfall is unreliable and extreme events are increasingly frequent, benefit from government investment in ACs and EDCs, but less so in LIDCs
- people living in coastal areas are subject to sea level rise and increasing frequency of storm events; ACs invest in various *protection* strategies; communities may depend on use of foreign aid and emergency aid for disasters
- indigenous communities are supported financially in response to the impacts of climate change through *adaptation* strategies e.g. Canadian government investment to support Arctic and northern communities
- urban dwellers, especially the elderly, young and chronically ill are vulnerable; AC governments invest in buildings that conform to *accommodation strategies* to combat extremes of temperature through use of new building codes for houses, offices and factories

		content from different parts of the course of study. **0 marks** No response or no response worthy of credit.		

Question		Answer	Mark	Guidance
7	**(a)**	**With reference to <u>Fig. 7</u>, suggest how vectors of disease influenced by physical factors might affect demographic characteristics of places at a local scale.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of vectors of disease influenced by physical factors and demographic characteristics of places at a local scale (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how vectors of disease influenced by physical factors might affect demographic characteristics of places at a local scale (AO2). This will be shown by including **well-developed** ideas linking resource evidence of vectors of disease influenced by physical factors and demographic characteristics of places at a local scale. 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 vectors of disease influenced by physical factors and demographic characteristics of places at a local scale (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how vectors of disease influenced by physical factors might affect demographic	**8** **AO1 x4** **AO2 x4**	**Indicative content** **AO1 - 4 marks** Knowledge and understanding of vectors of disease influenced by physical factors and demographic characteristics of places at a local scale could potentially include: *Examples of vectors of disease influenced by physical factors:* • mosquitos – prevalent in tropics / sub-tropics in warm, humid areas close to water sources (malaria, dengue) • tsetse flies – prevalent in sub-Saharan Africa, especially rural areas ranging from rain forest to savannah habitats - warmer, more humid environments (sleeping sickness) • ticks – widespread global distribution, populations slightly greater in higher areas and in wooded / grassy areas, and in warmer, rainy seasons, (lyme disease) • freshwater snails – parasitic worms in infested water in subtropical and tropical areas e.g. in Africa, parts of South America, Caribbean, Middle East and Asia (bilharzia) *Demographic characteristics of places at a local scale:* • total population – possible decline through higher mortality or migration away from affected areas • population structure – age, gender – effects on the most vulnerable groups • population density – decline especially rural areas • population change – birth rate / death rate / migration *Different types of place at a local scale could be influenced by vectors of disease* – rural / urban, tropical / sub-tropical, seasonality of climate, lowland / mountain communities. **AO2 - 4 marks**

characteristics of places at a local scale (AO2).

This will be shown by including **developed** ideas linking resource evidence of vectors of disease influenced by physical factors and demographic characteristics of places at a local scale. 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 vectors of disease influenced by physical factors and demographic characteristics of places at a local scale (AO1).

Demonstrates **basic** application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how vectors of disease influenced by physical factors might affect demographic characteristics of places at a local scale (AO2).

There will be **simple** ideas linking resource evidence of vectors of disease influenced by physical factors and demographic characteristics of places at a local scale. There are limited attempts to make synoptic links between content from different parts of the course of study.

0 marks No response or no response worthy of credit.

Application of knowledge and understanding to interpret how vectors of disease influenced by physical factors might affect demographic characteristics of places at a local scale could potentially include:

Fig.7 shows villagers affected by flooding in eastern India.
- places with seasonal monsoonal / river flooding *as shown in the high level and extensive floodwaters in Figure 7* have possible high incidence of diarrhoeal disease, and demographic structure might be affected by higher mortality among vulnerable *young and elderly as shown in Figure 7*
- impact of altitude on mosquito habitats affects
  - large scale seasonal population movements of those of *working population age* e.g. between malaria-free highland settlements and those in agricultural lowlands in Ethiopia
  - *higher population density* might be found in highlands
- tropical locations, possibly high mortality rates / loss of *total population*. *Villagers in Figure 7 might be waiting temporary or permanent evacuation.* Many vectors of disease are prevalent in places with warm, wet, low lying tropical and extra-tropical climate. Vector-borne diseases include dengue, malaria, yellow fever, Zika, diarrhoeal disease, bilharzia.
- less accessible rural areas in LIDCs, possible decline in village population in all age groups, where all members of a population are vulnerable to the increase in transmission of water-borne pathogens during flood *as suggested in the age range of villagers shown in Figure 7*, possibly subsequent *lower rates of population growth*
- settlements affected by vector-borne diseases linked to natural hazards; effect on demographics as *IDPs migrate away* to places more distant from source of epidemic
- areas of tsetse fly habitats, mainly in sub-Saharan Africa, tend to be of *lower population density*. African sleeping sickness is considered fatal without treatment; villages in less accessible area tend to have *lower total population*.

| 7 | (b) | | **Examine how national solutions for dealing with incidence of cancers linked to air pollution might be** | **8** **AO1 x4** | **Indicative content** |

influenced by government spending in key services.	**AO2 x4**	**AO1 - 4 marks** Knowledge and understanding of national solutions for dealing with incidence of cancers linked to air pollution and government spending in key services could potentially include:
Level 3 (6-8 marks) Demonstrates **thorough** knowledge and understanding of national solutions for dealing with incidence of cancers linked to air pollution and government spending in key services (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how national solutions for dealing with incidence of cancers linked to air pollution might be influenced by government spending in key services (AO2). There must be **well-developed** ideas of how national solutions for dealing with incidence of cancers linked to air pollution might be influenced by government spending in key services. 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 national solutions for dealing with incidence of cancers linked to air pollution and government spending in key services (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how national solutions for dealing with incidence of cancers linked to air pollution might be influenced by government spending in key services (AO2). There must be **developed** ideas of how national solutions for dealing with incidence of cancers linked to air pollution might be influenced by government spending in key services. There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant.		*National solutions for dealing with incidence of cancers linked to air pollution:* • clean air programmes • health and education campaigns • screening / diagnosis • reduced waiting times between diagnosis and treatment • cleaner transport / traffic systems • cleaner energy sources • cancer research *Government spending in key services:* • public health services • education • housing • public transport systems **AO2 - 4 marks** Application of knowledge and understanding to analyse how national solutions for dealing with incidence of cancers linked to air pollution might be influenced by government spending in key services could potentially include: • AC government spending in key services such as UK is relatively high and contributes to relatively well-organised national scale programmes / campaigns • LIDC government spending in key services is more limited; effective intervention relies on global support / development aid • EDCs such as India are developing national solutions but encounter difficulties with air pollution issues that are geographically extensive and from diverse sources; they also have difficulty in finding appropriate solutions in the face of great inequalities in wealth / lifestyle and enforcing legislation

			Level 1 (1-2 marks)		

Level 1 (1-2 marks)
Demonstrates **basic** knowledge and understanding of national solutions for dealing with incidence of cancers linked to air pollution and government spending in key services (AO1).

Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how national solutions for dealing with incidence of cancers linked to air pollution might be influenced by government spending in key services (AO2). This will be shown by including **simple** ideas of how national solutions for dealing with incidence of cancers linked to air pollution might be influenced by government spending in key services.
There are limited attempts to make synoptic links between content from different parts of the course of study.

0 marks No response or no response worthy of credit.

- top-down national solutions for dealing with cancers linked to air pollution include government spending on:
  o key health services such as research into molecular cancer prevention
  o key education services such as information / training / or advice on lifestyle that affect cultural behaviours
  o key transport services such as investment in rapid transit systems in cities or as in India legislation to scrap subsidies for petrol and diesel
  o other attempts to reduce particulate matter include the National Clean Air Programme in India
- bottom-up / grass roots strategies are supported by governments in their national solutions and involve training of volunteers, working with NGOs , educating local communities especially in rural areas e.g. re stubble burning in India
- understanding that attempted solutions may be direct such as investment in technology or indirect such as changes in lifestyle through education and health campaigns

Question	Answer	Mark	Guidance
8 (a)	**With reference to <u>Fig.8</u>, suggest how the global distribution of warm and cold surface currents can influence human activity in <u>one</u> type of landscape system you have studied.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of the global distribution of warm and cold surface currents and human activity in **one** type landscape system (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how the global distribution of warm and cold surface currents can influence human activity in **one** type of landscape system (AO2). This will be shown by including **well-developed** ideas linking resource evidence of the global distribution of warm and cold surface currents and human activity in **one** type of landscape system. There are clear attempts to make synoptic links between content from different parts of the course of study. **Level 2 (3-5 marks)** Demonstrates **reasonable** knowledge and understanding of the global distribution of warm and cold surface currents and human activity in **one** type of landscape system (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how the global distribution of warm and cold surface currents can influence human activity in **one** type of landscape system (AO2). This will be shown by including **developed** ideas linking	8 AO1 x4 AO2 x4	**Indicative content** **AO1 - 4 marks** Knowledge and understanding of the global distribution of warm and cold surface currents and human activity in **one** type of landscape system could potentially include: *Global distribution of warm and cold surface currents:* • cold currents flow towards the equator e.g. California, and warm currents towards the poles e.g. Brazilian • some currents flow past coastal landscapes e.g. Gulf Stream • some warm currents flow past glaciated landscapes e.g. North Atlantic Drift • some cold currents flow past dryland landscapes e.g. Peru *Human activity in **one** type of landscape system could include:* • coastal (lowland / upland, high / low energy, emergent / submergent) – tourism, fishing, urban / port / resort development • glaciated / periglacial – tourism, fishing, port • dryland (mid/low latitude, semi-arid, polar)– tourism, fishing, farming, indigenous culture **AO2 - 4 marks** Application of knowledge and understanding to interpret how the global distribution of warm and cold surface currents can influence human activity in **one** type of landscape system could potentially include: Fig.8 is a global map that shows some selected warm and cold surface currents *Dryland landscapes:* • mid-latitude dryland; upwelling of cold water, rich fishing grounds, coastal port activity *e.g. Peru current / N. Atacama as shown in Figure 8* • low-latitude dryland; cold currents contribute to extremely dry climate (apart from coastal morning fog and heavy dew), hence farming tends to be pastoral nomadism *e.g. Canary*

			resource evidence of the global distribution of warm and cold surface currents and human activity in **one** type of landscape system.
			There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant.
			
			Level 1 (1-2 marks)
			Demonstrates **basic** knowledge and understanding of the global distribution of warm and cold surface currents and human activity in **one** type of landscape system (AO1).
			
			Demonstrates **basic** application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how the global distribution of warm and cold surface currents can influence human activity in **one** type of landscape system (AO2).
			
			There will be **simple** ideas linking resource evidence of the global distribution of warm and cold surface currents and human activity in **one** type of landscape system.
			There are limited attempts to make synoptic links between content from different parts of the course of study.
			0 marks No response or no response worthy of credit.
					current / western Sahara as shown in Figure 8
					• polar drylands; sea-ice being lost as cold currents become less influential, affecting indigenous way of life *e.g. in the Arctic / Labrador current as shown in Figure 8*
					Glaciated landscapes:
					• warm currents near glaciated uplands / fjord coastlines bring warmer temperature to coastal areas *e.g. North Atlantic Drift as shown in Figure 8*
					   o enables some arable farming in low lying coastal fringes at higher latitudes than inland areas
					   o ports can operate in ice free waters for more of the year, favouring fishing industry and tourism / cruise ships
					• cold currents flowing past current glacial / periglacial areas my bring icebergs into commercial shipping lanes *e.g. cold Labrador current as shown in Figure 8*
					Coastal landscapes:
					• warm currents can influence inshore sea and coastal temperatures favouring tourism industry – beach activity / watersports *e.g. Gulf Stream, Brazilian, as shown in Figure 8*
					• fishing industry can benefit from different types of catch in cold and warm water currents *e.g. cold Peruvian current as shown in figure 8*
					• ice free ports where warm waters favour trade / shipping *e.g. effects of warm NAD in Figure 8 on northern European ports*

8	(b)		**Examine how sea level change due to climate change might influence flows of people.**
			
			Level 3 (6-8 marks)
			Demonstrates **thorough** knowledge and understanding of sea level change due to climate change and flows of people (AO1).
			
			Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how sea level change due to climate change might influence flows of people (AO2).
				8
				AO1 x4
				AO2 x4
					Indicative content
					
					AO1 - 4 marks
					Knowledge and understanding of sea level change due to climate change and flows of people could potentially include:
					
					Sea level change due to climate change:
					• recent eustatic SL change, the result of global warming
					• approx. rise of 3.0mm / year (mainly thermal expansion)
					• caused by:
					   o thermal expansion of water
					   o melting glaciers / ice caps (Andes, Himalayas)
					   o melting ice sheets (Antarctic, Greenland)

There must be **well-developed** ideas of how sea level change due to climate change might influence flows of people.
There are clear attempts to make synoptic links between content from different parts of the course of study.

Level 2 (3-5 marks)
Demonstrates **reasonable** knowledge and understanding of sea level change due to climate change and flows of people (AO1).

Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how sea level change due to climate change might influence flows of people (AO2).

There must be **developed** ideas of how sea level change due to climate change might influence flows of people.
There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant.

Level 1 (1-2 marks)
Demonstrates **basic** knowledge and understanding of sea level change due to climate change and flows of people (AO1).

Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how sea level change due to climate change might influence flows of people (AO2).

This will be shown by including **simple** ideas of how sea level change due to climate change might influence flows of people in island communities.
There are limited attempts to make synoptic links between content from different parts of the course of study.
0 marks No response or no response worthy of credit.

Flows of people:
- population migration (internal / international)
- small scale e.g. households / larger scale, mass evacuation
- short term / temporary, long term / permanent
- environmental refugees
- commuter flows, possibly disrupted

AO2 - 4 marks
Application of knowledge and understanding to analyse how sea level change due to climate change might influence flows of people could potentially include:

- rising SL is likely to lead to flows of people / migration away from coastal areas because:
  - loss of low lying coastal land which is used for farming, house building, fishing industry – taking away livelihood and food security
  - loss of access to white sandy beaches, coral reefs affecting the tourism industry e.g. Maldives
  - periodic flooding / damage to sea defences from increase in storm surges and more extreme cyclones
  - scarcity of fresh water for drinking and irrigation as a result of saltwater intrusion
  - migration inland to inhabit dry land which is higher e.g. Kiribati where settlements are abandoned by communities on low lying islands
  - international migration e.g. Tuvalu, recent loss of 15% of population, people claiming to be environmental refugees
  - government plans for mass migration of island populations e.g. to Fiji from other South Pacific islands
- rising sea level could have an impact on communications in coastal / estuarine areas, such as bridges, roads, rail, disrupting commuter flows – especially with increased frequency of storms / storm surges and higher tides

Question			Answer	Mark	Guidance
9	(a)		**With reference to <u>Fig.9</u>, suggest how opportunities <u>between</u> countries to ensure food security through appropriate aid are influenced by social inequality.**	8 AO1 x4 AO2 x4	**Indicative content**

With reference to <u>Fig.9</u>, suggest how opportunities <u>between</u> countries to ensure food security through appropriate aid are influenced by social inequality.

Level 3 (6-8 marks)
Demonstrates **thorough** knowledge and understanding of opportunities **between** countries to ensure food security through appropriate aid and social inequality (AO1).

Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how opportunities **between** countries to ensure food security through appropriate aid are influenced by social inequality (AO2). This will be shown by including **well-developed** ideas linking resource evidence on opportunities **between** countries to ensure food security through appropriate aid and social inequality.
There are clear attempts to make synoptic links between content from different parts of the course of study.

Level 2 (3-5 marks)
Demonstrates **reasonable** knowledge and understanding of opportunities **between** countries to ensure food security through appropriate aid and social inequality (AO1).

Demonstrates **reasonable** application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how opportunities **between** countries to ensure food security through appropriate aid are influenced by social inequality (AO2).

This will be shown by including **developed** ideas linking resource evidence on opportunities **between** countries to ensure food security through appropriate aid and social

Mark: 8, AO1 x4, AO2 x4

Guidance

Indicative content

AO1 - 4 marks

Knowledge and understanding of opportunities **between** countries to ensure food security through appropriate aid and social inequality could potentially include:

*Opportunities **between** countries to ensure food security through appropriate aid:*
- programme food aid – transfer of food between governments as a form of economic support
- project food aid – for hunger-related development / nutrition programmes through multilateral agencies
- emergency or relief food aid – for direct / free distribution in the case of famine or disaster-related acute food shortage

Social inequality:
- the spatial pattern of social inequality at global scale is evident in contrasts between ACs, EDCs and LIDCs
- greatest inequality tends to be between those ACs, which have the most wealth and resources, and the poorest of the LIDCs

AO2 - 4 marks
Application of knowledge and understanding to interpret how opportunities **between** countries to ensure food security through appropriate aid are influenced by social inequality could potentially include:

Fig.9 shows food packages set out in an organised way probably by an NGO / UN / WFP agency ready for distribution.

- wealthy ACs have the means and are in a strong position to send food aid directly to places where food security is threatened – in most parts of the world. *Figure 9 shows provision of food supplies probably funded by a more wealthy*

			inequality. There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant.		*country or organisation for people in desperate need / possibly displaced from their homes in Yemen, an LIDC* • ACs have resources, manpower, food stocks, money, transport, NGO workers to respond quickly and appropriately in emergency such as acute drought / other natural disaster. *Figure 9 shows the scale and nature of humanitarian response in terms of quantity of food, NGO manpower and transport that has been possible for the people / families affected by drought / conflict / poverty in a relatively remote area of Yemen*

Level 1 (1-2 marks)
Demonstrates **basic** knowledge and understanding of opportunities **between** countries to ensure food security through appropriate aid and social inequality (AO1).

Demonstrates **basic** application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how opportunities **between** countries to ensure food security through appropriate aid are influenced by social inequality (AO2).

There will be **simple** ideas linking resource evidence on opportunities **between** countries to ensure food security through appropriate aid and social inequality.
There are limited attempts to make synoptic links between content from different parts of the course of study.

0 marks No response or no response worthy of credit.

• ACs have the political strength and mechanisms to involve themselves in supporting other countries through organised programmes of food relief – often working through multilateral agencies such as the WFP. *Figure 9 appears to show well-organised provision of emergency / relief food aid packages by an agency; logo not clear but evident*
• wealthier countries are also in a position to ensure food security in other countries through co-operation, advice, education and financial support to build a more resilient, long-term food supply system where appropriate. *Figure 9 possibly shows an agency or agencies at work that rely on contributions / co-operation of more than one country*

| 9 | (b) | | **Examine how different food production methods might influence place identity.**

Level 3 (6-8 marks)
Demonstrates **thorough** knowledge and understanding of how different food production methods might influence place identity (AO1).

Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how different food production methods might influence place identity (AO2).

There must be **well-developed** ideas of how different food production methods might influence place identity. | **8**
AO1 x4
AO2 x4 | **Indicative content**

AO1 - 4 marks
Knowledge and understanding of how different food production methods might influence place identity could potentially include:

Different food production methods such as:
• intensive / extensive
• subsistence / commercial
• arable / pastoral
• shifting / sedentary

Place identity shaped by characteristics such as:
• demographic |

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 how different food production methods might influence place identity (AO1).

Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how different food production methods might influence place identity (AO2).

There must be **developed** ideas of how different food production methods might influence place identity.
There are some attempts to make synoptic links between content from different parts of the course of study but these are not always relevant.

Level 1 (1-2 marks)
Demonstrates **basic** knowledge and understanding of how different food production methods might influence place identity (AO1).

Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how different food production methods might influence place identity (AO2).

This will be shown by including **simple** ideas of how different food production methods might influence place identity.
There are limited attempts to make synoptic links between content from different parts of the course of study.

0 marks   No response or no response worthy of credit.

- socioeconomic
- cultural
- political
- built environment
- natural landscape

AO2 - 4 marks
Application of knowledge and understanding to analyse how different food production methods might influence place identity could potentially include:

- intensive - might require either capital investment with much use of machinery in fields and / or intensive labour force; patterns of settlement might be nucleated as on Dutch polders or there might be large areas under glass e.g. horticulture in the Netherlands; areas under production are probably small-scale with high yields per acre requiring easy access by road / rail systems for rapid transport of produce
- extensive – might involve large scale commercial farming, with dispersed settlements / ranches / farms as in cereal farming in Canadian Prairies; low population density and labour input is small in relation to area farmed; landscape of vast plains either cattle ranching or wheat fields or nomadic pastoralism in drylands / LIDCs such as Sahel areas, sheep / goats / cattle, follow rains, fresh grass, temporary settlements, low population density
- subsistence – patchwork of small fields close to settlements / villages; all members of family or village working on small plots such as rice production in South Asia; low levels of technology, limited use of machinery, communications limited / produce for own consumption; may be supported by local co-operative organisations
- commercial – large scale production, high capital inputs with use of machinery, storage buildings, processing plants; in ACs well organised farming communities, nucleated settlements and isolated farmhouses; in EDCs/LIDCs possible plantations with poorly paid labourers living in small settlements on site; landscapes of one crop such as rubber, palm oil, sugar cane

					• shifting cultivation – tropical rain forest, low population density, rotation of fields rather than crops, small areas cut down / previously used areas in different stages of forest regeneration, isolated settlements, subsistence agriculture, indigenous groups e.g. Amazon

Question			Answer	Mark	Guidance
10	(a)		**With reference to <u>Fig. 10</u>, suggest how lava flows generated by volcanic eruptions might influence socioeconomic characteristics of places at a local scale.** **Level 3 (6-8 marks)** Demonstrates **thorough** knowledge and understanding of lava flows generated by volcanic eruptions and socioeconomic characteristics of places at a local scale (AO1). Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed interpretation that shows accuracy of how lava flows generated by volcanic eruptions might influence socioeconomic characteristics of places at a local scale (AO2). This will be shown by including **well-developed** ideas linking resource evidence on lava flows generated by volcanic eruptions and socioeconomic characteristics of places at a local scale. 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 lava flows generated by volcanic eruptions and socioeconomic characteristics of places at a local scale (AO1). Demonstrates **reasonable** application of knowledge and understanding to provide a sound interpretation that shows some accuracy of how lava flows generated by volcanic eruptions might influence socioeconomic characteristics of places at a local scale (AO2). This will be shown by including **developed** ideas linking lava flows generated by volcanic eruptions and socioeconomic	8 **AO1 x4** **AO2 x4**	**Indicative content** **AO1 - 4 marks** Knowledge and understanding of lava flows generated by volcanic eruptions and socioeconomic characteristics of places at a local scale could potentially include: *Lava flows generated by volcanic eruptions:* • extrusive volcanics – molten igneous rock • free-flowing type, very high temperature at eruption, can flow several kilometres, faster flows, basaltic, basic, associated with effusive eruptions some from more than one fissure, lava plateaux • viscous type, not so high temperature at eruption, flow shorter distances, slower flows, andesitic, acid, associated with explosive eruptions *Socioeconomic characteristics of places at a local scale:* • land use • built environment • economic activity / type of employment • types of housing / households • cultural factors **AO2 - 4 marks** Application of knowledge and understanding to interpret how lava flows generated by volcanic eruptions might influence socioeconomic characteristics of places at a local scale could potentially include: *Fig.10 shows a lava flow reaching a settlement in Hawaii* • lava flows are powerful volcanic hazards; flowing molten rock at very high temperature, very difficult to control. *Figure 10 shows the scale, destruction through burning, and uncontrolled impact of the lava flow* • flow is usually downslope away from the volcanic vent

| | | | characteristics of places at a local scale.
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 lava flows generated by volcanic eruptions and socioeconomic characteristics of places at a local scale (AO1).

Demonstrates **basic** application of knowledge and understanding to provide a simple interpretation that shows limited accuracy of how lava flows generated by volcanic eruptions might influence socioeconomic characteristics of places at a local scale (AO2).

There will be **simple** ideas linking resource evidence on lava flows generated by volcanic eruptions and socioeconomic characteristics of places at a local scale.
There are limited attempts to make synoptic links between content from different parts of the course of study.
0 marks No response or no response worthy of credit. | | towards lower ground where there might be settlements, and commercial activity such as farmland, industry, ports. *Figure 10 shows the lava flow approaching low density housing and large, possibly industrial, buildings probably on the outer edge of Kapoho*
• Fig.10 shows the impact on Kapoho, Hawaii
 o Loss of farmland and natural habitats such as woodland
 o Destruction of the built environment, such as the isolated buildings, home, farmsteads shown
 o Blocking of roads, limiting access
 o Atmospheric pollution
• Consequent impact on the socioeconomic profile might include
 o Evacuation of population / permanent loss of household occupants
 o Damage to built environment – destruction of housing, farms ,factories, public buildings, roads, as *shown in Figure 10*
 o Loss of income / employment
 o Loss of local cultural features such as places of worship, traditions, societies |
| 10 | (b) | | **Examine how the features and processes associated with conservative plate boundaries might influence people's perceptions of place.**

Level 3 (6-8 marks)
Demonstrates **thorough** knowledge and understanding of features and processes associated with conservative plate boundaries and people's perceptions of place (AO1).

Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis that shows accuracy of how features and processes associated with conservative plate boundaries might influence people's | **8**
AO1 x4
AO2 x4 | **Indicative content**

AO1 - 4 marks
Knowledge and understanding of features and processes associated with conservative plate boundaries and people's perceptions of place could potentially include:
Features and processes associated with conservative plate boundaries:
• essentially plates slide past each other
• friction, build-up of pressure, released as earthquake, mostly shallow focus
• no volcanic activity / distinctive landforms but a 'tear' in the landscape may disrupt drainage patterns and human |

perceptions of place (AO2).

There must be **well-developed** ideas of how features and processes associated with conservative plate boundaries might influence people's perceptions of 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 features and processes associated with conservative plate boundaries and people's perceptions of place (AO1).

Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis that shows some accuracy of how features and processes associated with conservative plate boundaries might influence people's perceptions of place (AO2).

There must be **developed** ideas of how features and processes associated with conservative plate boundaries might influence people's perceptions of 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 features and processes associated with conservative plate boundaries and people's perceptions of place (AO1).

Demonstrates **basic** application of knowledge and understanding to provide a simple analysis that shows limited accuracy of how features and processes associated with conservative plate boundaries might influence people's perceptions of place (AO2).

This will be shown by including **simple** ideas of how features

structures
- along the line of the tear faults there may be
  - areas of frequent but moderate earthquakes
  - areas of infrequent but very severe earthquakes

People's perceptions of place might depend on their identity:
- age
- gender
- sexuality
- religion
- role

AO2 - 4 marks
Application of knowledge and understanding to analyse how features and processes associated with conservative plate boundaries might influence people's perceptions of place could potentially include:

- perceptions change as people *age*; in areas of conservative margins where severe earthquakes are infrequent, *older* people might have experienced one in the past, e.g. Loma Prieta 6.9, California 1989, causing their current perception to be one of imminent threat. This perception might affect their behaviour such as moving in retirement to areas perceived to be of lower risk. For *younger* people perceptions of the threat might be heightened by the need for earthquake drills at school
- perceptions of those with the *role of planners / authorities* in areas near conservative margins are particularly significant. Their responses to potential hazards, although based on evidence such as monitoring of seismic activity, involve perception of risk e.g. in preparation of risk maps. Also their advice and regulations must be related to perceptions of hazard risk in the short- and long-term. Understanding of lateral displacement / disruption of communication lines, energy and water supplies, and rivers also influence perceptions of planners.
- *gender* does not appear to be a factor that might lead to different perception of places at or near conservative

| | | | and processes associated with conservative plate boundaries might influence people's perceptions of place.
There are limited attempts to make synoptic links between content from different parts of the course of study.

0 marks   No response or no response worthy of credit. | | margins; men and women are exposed to the same risks and their perceptions might be influenced by other personal factors, such as age.
• *sexuality* can influence the way in which people use places; some places acquire a meaning because they are where LGBTQ groups tend to cluster e.g. the Castro District of San Francisco. As with gender this may not be a factor per se in perception of places near conservative margins; but within these groups age and role might have an influence on perception.
• Similarly *religion* may not be a factor per se in perception of places near conservative margins; but locating temples, mosques, churches away from areas of greatest risk might be an important perception |

Question			Answer	Mark	Guidance
11*			**'Mitigation of risks of climate change can be effective only if political challenges are overcome.' To what extent do you agree?** **AO1** **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding of political and other challenges for effective mitigation of risks of climate change. **Level 3 (5-7 marks)** Demonstrates **thorough** knowledge and understanding of political and other challenges for effective mitigation of risks of climate change. **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of political and other challenges for effective mitigation of risks of climate change. **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of political and other challenges for effective mitigation of risks of climate change. **AO2** **Level 4 (8-10 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of political and other challenges for effective mitigation of risks of climate change. Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to political and other challenges for effective mitigation of risks of climate change.	20 **AO1 x10** **AO2 x10**	**Indicative content** **AO1 - 10 marks** Knowledge and understanding of political and other challenges for effective mitigation of risks of climate change could potentially include: *Political challenges* • decisions to shift from fossil fuels to nuclear, wind, solar, tidal, geothermal in power generation • costs of supporting strategies to cut GHG emissions in some ACs such as carbon pricing, low-carbon energy support, energy efficiency • national strategies such as some LIDCs being exclusively on adaptation rather than mitigation *Technological challenges* • improving vehicular fuel efficiency • improving efficiency of coal-fired electricity plants • carbon capture and storage • geoengineering strategies such as reducing insolation absorbed and removing CO_2 *Socio-economic challenges* • stricter regulations on building insulation • encouraging use of public transport • shifting public attitudes re conservation and reduction in energy consumption **AO2 - 10 marks** Application of knowledge and understanding to analyse and evaluate political and other challenges for effective mitigation of risks of climate change could potentially include: • evaluation of the political challenges and discussion of their significance in achieving effective mitigation of risks of climate change • discussion of possible effects of level of economic development and attitudes of differing governments

Level 3 (5-7 marks)
Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis of political and other challenges for effective mitigation of risks of climate change.

Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to political and other challenges for effective mitigation of risks of climate change.

Level 2 (3-4 marks)
Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis of political and other challenges for effective mitigation of risks of climate change.

Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence as to political and other challenges for effective mitigation of risks of climate change.

Level 1 (1-2 marks)
Demonstrates **basic** application of knowledge and understanding to provide a simple analysis of political and other challenges for effective mitigation of risks of climate change.

Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to political and other challenges for effective mitigation of risks of climate change.

towards mitigation strategies – whereby some developing countries regard mitigation and reduction of GHG emissions as the responsibility of the developed world
- consideration of the effectiveness of government policies in ACs in supporting carbon pricing, the drive to take up renewables and achieving energy efficiency in the domestic sector
- effectiveness of political decisions to shift national energy policy away from use of fossil fuel
- understanding that political challenges are not the only limitations in mitigation – there are also technological and socio-economic challenges
- understanding / evaluation of the difficulties of achieving the technology to mitigate against the risks of climate change by reducing GHG emissions
- understanding that socio-economic challenges are also difficult to overcome if effective mitigation is to be achieved, especially in shifting public attitudes

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Quality of extended response
Level 4
There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.
Level 3
There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence.
Level 2
The information has some relevance and is presented with limited structure. The information is supported by limited evidence.
Level 1
The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.

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Question	Answer	Mark	Guidance
12*	**Evaluate the contribution of ACs to anthropogenic greenhouse gas emissions over time.** **AO1** **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding of the contribution of ACs and other types of country to anthropogenic GHG emissions over time. **Level 3 (5-7 marks)** Demonstrates **thorough** knowledge and understanding of the contribution of ACs and other types of country to anthropogenic GHG emissions over time. **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of the contribution of ACs and other types of country to anthropogenic GHG emissions over time. **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of the contribution of ACs and other types of country to anthropogenic GHG emissions over time. **AO2** **Level 4 (8-10 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of the contribution of ACs and other types of country to anthropogenic GHG emissions over time. Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to the contribution of ACs and other types of country to anthropogenic GHG emissions over	20 AO1 x10 AO2 x10	**Indicative content** **AO1 - 10 marks** Knowledge and understanding of the contribution of ACs and other types of country to anthropogenic GHG emissions over time could potentially include: *AC's contribution to GHG emissions* • growth in CO_2 emissions from early 19thC to 1960s following industrialisation in North America and Europe powered by coal • decline in CO_2 emissions since mid-1970s with shift away from coal power, development of nuclear power, conservation measures and international obligations • CO_2 emissions of industrialised ACs (individually and collectively) exceeded that of other countries such as EDCs and LIDCs for over 100 years • human activity in ACs has contributed to enhanced greenhouse effect through higher levels of atmospheric water vapour and methane emissions *Other countries e.g. EDCs contributions to GHG emissions* • industrialised later, since 1970s, based on massive coal energy consumption • shorter period of GHG emissions but now some EDCs are the world's largest emitters of CO_2 **AO2 - 10 marks** Application of knowledge and understanding to analyse and evaluate the contribution of ACs and other types of country to anthropogenic GHG emissions over time could potentially include: • evaluation of AC's contributions over time shows significant impact on enhanced greenhouse effect and global warming; this is the result of a long period of

time.

Level 3 (5-7 marks)
Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis of the contribution of ACs and other types of country to anthropogenic GHG emissions over time.

Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence as to the contribution of ACs and other types of country to anthropogenic GHG emissions over time.

Level 2 (3-4 marks)
Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis of the contribution of ACs and other types of country to anthropogenic GHG emissions over time.

Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements and conclusions, with limited use of evidence as to the contribution of ACs and other types of country to anthropogenic GHG emissions over time.

Level 1 (1-2 marks)
Demonstrates **basic** application of knowledge and understanding to provide a simple analysis of the contribution of ACs and other types of country to anthropogenic GHG emissions over time.

Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to the contribution of ACs and other types of country to anthropogenic GHG emissions over time.

increase in GHG emission from early 1800s to 1960s, mainly through industrialisation
- these long term GHG emissions from ACs are probably the main forcing agent of global warming and climate change
- evaluation of AC contribution also does show a period of decline, especially in CO_2 emissions since 1970s; this is mainly the result of government attempts to decarbonise economies in ACs by strategies such as energy conservation and electricity generation from more renewable and nuclear sources
- GHG emissions from ACs remain high but in recent years / 20thC GHG emissions from some EDCs far outstrip those of ACs, especially in absolute tonnage of CO_2 in the atmosphere
- In the last 5 years whereas emissions of CO_2 from ACs e.g. UK have fallen those of EDCs e.g. China are still increasing albeit at a decelerating rate
- Variation in the size of an AC and its population size could be contributing factors

		Quality of extended response		
		Level 4 There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with limited structure. The information is supported by limited evidence. **Level 1** The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		

Question	Answer	Mark	Guidance
13*	**'Disease outbreaks influenced by natural hazards have only short-term impacts on resident populations.' With reference to a <u>case study</u> of <u>one</u> country, to what extent do you agree?** **AO1** **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding of short-term and long-term impacts of disease outbreaks influenced by natural hazards on resident populations. **Level 3 (5-7 marks)** Demonstrates **thorough** knowledge and understanding of short-term and long-term impacts of disease outbreaks influenced by natural hazards on resident populations. **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of short-term and long-term impacts of disease outbreaks influenced by natural hazards on resident populations. **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of short-term and long-term impacts of disease outbreaks influenced by natural hazards on resident populations. **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 short-term and long-term impacts of disease outbreaks influenced by natural hazards on resident populations.	20 **AO1 x10** **AO2 x10**	**Indicative content** **AO1 - 10 marks** Knowledge and understanding of short-term and long-term impacts of disease outbreaks influenced by natural hazards on resident populations could potentially include: *Possible short-term impacts:* • higher rates of mortality / injury from direct health risks • greater health risks from diseases e.g. diarrhoea / typhoid during flood hazards with water-borne diseases - but also any diseases introduced by NGO workers • high rates of mortality among infants and elderly • loss of employment / income through inability to work • influx of aid and aid workers may bring immediate relief *Possible long-term impacts:* • higher rates of mortality from indirect health risks • loss of income / poverty in households resulting from morbidity • mobility of residents affected by their own illness and by limited access to public services depending on effects of the hazard • government policies / speed of intervention reviewed in response to the event Flexibility required in identifying whether or not impacts are short- or long-term; may depend on case material applied. Natural hazards, other than flooding, that influence disease outbreaks can also be credited.

PMT

Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to short-term and long-term impacts of disease outbreaks influenced by natural hazards on resident populations.

Level 3 (5-7 marks)
Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis of short-term and long-term impacts of disease outbreaks influenced by natural hazards on resident populations.

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 short-term and long-term impacts of disease outbreaks influenced by natural hazards on resident populations.

Level 2 (3-4 marks)
Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis of short-term and long-term impacts of disease outbreaks influenced by natural hazards on resident populations.
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 short-term and long-term impacts of disease outbreaks influenced by natural hazards on resident populations.

Level 1 (1-2 marks)
Demonstrates **basic** application of knowledge and understanding to provide a simple analysis of short-term and long-term impacts of disease outbreaks influenced by natural hazards on resident populations.
Demonstrates **basic** application of knowledge and

AO2 - 10 marks
Application of knowledge and understanding to analyse and evaluate short-term and long-term impacts of disease outbreaks influenced by natural hazards on resident populations could potentially include:

- evaluation of short-term impacts relative to their effects in the long-term; this may depend on the type of disease and type / severity of hazard
- evaluation of whether or not the health risks posed are direct or indirect
- consideration of the level of development and the government's preparedness and ability to respond to a disease outbreak following a natural hazard
- analysis of the scale of the event / outbreak might be a consideration in terms of characteristics of the geographical area e.g. urban / rural
- analysis of the demographic characteristics of the resident population might be a consideration e.g. number, density, structure
- impacts of the disease might be affected by the effects of the hazard on accessibility, water supply, sanitation, medical supplies, food
- evaluation of the significance of standards of living of the resident population and their level of resilience to the impacts of disease associated with natural hazards
- understanding that the impacts can be environmental, social, economic and political
- understanding that the impacts can vary over time

understanding to provide an un-supported evaluation that offers simple conclusions as to short-term and long-term impacts of disease outbreaks influenced by natural hazards on resident populations.

Quality of extended response
Level 4
There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.
Level 3
There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence.
Level 2
The information has some relevance and is presented with limited structure. The information is supported by limited evidence.
Level 1
The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.

Question			Answer	Mark	Guidance
14*			**'The main causes of non-communicable diseases are cultural.' Discuss.** **AO1** **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding of cultural and other causes of non-communicable diseases. **Level 3 (5-7 marks)** Demonstrates **thorough** knowledge and understanding of cultural and other causes of non-communicable diseases. **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of cultural and other causes of non-communicable diseases. **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of cultural and other causes of non-communicable diseases. **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 cultural and other causes of non-communicable diseases. Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based on cultural and other causes of non-communicable diseases. **Level 3 (5-7 marks)** Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis of cultural and other causes of non-communicable diseases.	**20** **AO1 x10** **AO2 x10**	**Indicative content** **AO1 - 10 marks** Knowledge and understanding of cultural and other causes of non-communicable diseases could potentially include: *Examples,* including cardio-vascular diseases (e.g. heart disease, stroke), diabetes, hypertension, types of cancer, chronic respiratory disease, degenerative diseases *Cultural* • lifestyle including • poor / unhealthy diet • excess body weight • smoking • harmful use of alcohol • physical inactivity • length of exposure to high levels of air pollution • sunbathing / use of sunbeds *Social* • population structure / ageing / long life expectancy • genetics / hereditary factors *Economic* • poverty / low income • level of development / standards of living / stage in epidemiological transition Flexibility required in distinguishing cultural and social / socio-economic factors; this may depend on exemplar material selected**.** **AO2 - 10 marks** Application of knowledge and understanding to analyse

Demonstrates **thorough** application of knowledge and understanding to provide a detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence on cultural and other causes of non-communicable diseases.

Level 2 (3-4 marks)
Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis of cultural and other causes 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 on cultural and other causes of non-communicable diseases.

Level 1 (1-2 marks)
Demonstrates **basic** application of knowledge and understanding to provide a simple analysis of cultural and other causes of non-communicable diseases.
Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions on cultural and other causes of non-communicable diseases.

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

and evaluate cultural and other causes of non-communicable diseases could potentially include:
- evaluation of the influence of cultural causes; this may depend on the specific disease(s) being considered, for example,
  o the tendency towards lack of exercise and changes in diet have driven an obesity epidemic in some ACs giving increased risks of cancer and CVD
  o nearly 20% of all cases of cancer diagnosed in the UK each year are smoking related
  o indoor air pollution where fuels such as animal dung are used for heating and paraffin for cooking and lighting e.g. in rural areas of India
- evaluation of other causes of NCDs including the social and economic factors plus where relevant the influence of socio-economic status and any environmental risk factors, for example,
  o of the economic factors, wealth is a significant influence: for example, regarding affordable holidays to hot destinations; changes in diet with increasing preference for meat, dairy, fast food and pre-packed 'ready' meals, correlated with a rise in the incidence of bowel cancer; and alcohol consumption which increases risks of oral, oesophageal and liver cancer
  o an important consideration is that lifestyle 'choices' are not always in effect choices; they are very often constrained by poverty
- consideration of how the various causes / factors vary
  o between ACs, EDCs and LIDCs
  o and how they might change over time
- understanding that the risk for developing an NCD depends on a combination of many factors – cultural, social and economic

For a focus on a communicable disease, marks for AO1 for knowledge and understanding up to a maximum of 5 marks,

| | | 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. | | but not above bottom level in AO2**.** |

Question			Answer	Mark	Guidance
15*			**'Sustainable use of biological resources within oceans depends on the attitudes of stake holders.' With reference to a <u>case study</u>, to what extent do you agree?** **AO1** **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding of sustainable use of biological resources within oceans and attitudes of stake holders and other influences. **Level 3 (5-7 marks)** Demonstrates **thorough** knowledge and understanding of sustainable use of biological resources within oceans and attitudes of stake holders and other influences. **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of sustainable use of biological resources within oceans and attitudes of stake holders and other influences. **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of sustainable use of biological resources within oceans and attitudes of stake holders and other influences. **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 sustainable use of biological resources within oceans and attitudes of stake holders and other influences.	**20** **AO1 x10** **AO2 x10**	**Indicative content** **AO1 - 10 marks** Knowledge and understanding of sustainable use of biological resources within oceans and attitudes of stake holders and other influences could potentially include: *Sustainable use of biological resources* - harvesting the ocean's biological resources such that their recovery for the future is assured, and the rest of their ecosystems are not adversely affected. *Renewable biological resources* include marine animals such as shellfish, krill, whales, seal, tuna and other fish stocks. *Stake holders* • indigenous peoples such as Inuit that hunt whales and seals • individual countries such as Norway which have a policy of harvesting krill • The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) - an international organisation with 25 member states set up in 1982 • environmental NGOs such as Greenpeace • companies that gain profit from harvesting krill *Other influences* • socioeconomic status of stake holders • political context of stake holders • the 'value' of this natural capital • the resilience of these biological resources • the impact of overfishing on the rest of the ecosystem

Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions that are evidence based as to sustainable use of biological resources within oceans and attitudes of stake holders and other influences.

Level 3 (5-7 marks)
Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis of sustainable use of biological resources within oceans and attitudes of stake holders and other influences.

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 sustainable use of biological resources within oceans and attitudes of stake holders and other influences.

Level 2 (3-4 marks)
Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis of sustainable use of biological resources within oceans and attitudes of stake holders and other influences.

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 sustainable use of biological resources within oceans and attitudes of stake holders and other influences.

Level 1 (1-2 marks)
Demonstrates **basic** application of knowledge and understanding to provide a simple analysis of sustainable use biological resources within oceans and attitudes of stake holders and other influences.

- warming / acidification of oceans

AO2 - 10 marks
Application of knowledge and understanding to analyse and evaluate sustainable use of biological resources within oceans and attitudes of stake holders and other influences could potentially include:
- evaluation of the attitudes of stake holders towards sustainable use of biological resources, including
  - indigenous populations in polar regions have relatively small demand, they have few other food options, they harvest only what they require and the impact on the natural ecosystem is very limited – sustainable use
  - individual countries historically may have involved companies that exploited the resources for economic gain, but an example of change in attitude in 2018 when 5 large companies formed the Association of Responsible Krill Harvesting agreeing to stop fishing in sensitive areas
  - CCAMLR now monitors and regulates commercial krill fishing – important because krill food chains and webs include most of the Antarctic ecosystem
  - Greenpeace is not convinced that attitudes towards conservation are stringent enough and are campaigning for the Antarctic region to become an enormous marine reserve in which all fishing would be banned
- evaluation of the significance of other influences on sustainable use of biological resources including
  - socioeconomic status; international organisations dominated by ACs; sustainability is questioned since little consideration given to impacts on ecosystems in their demand for food
  - in the last 50 years resilience of the various

| | | | Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to sustainable use of biological resources within oceans and attitudes of stake holders and other influences.

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. | | resources has been weakened by the effects of global warming on upper ocean temperatures in addition to human exploitation |

Question	Answer	Mark	Guidance
16*	**'The changing geography of the Arctic region can be managed effectively only through international organisations.' Discuss.** **AO1** **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding of management of the changing geography of the Arctic region through international organisations and other means. **Level 3 (5-7 marks)** Demonstrates **thorough** knowledge and understanding of management of the changing geography of the Arctic region through international organisations and other means. **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of management of the changing geography of the Arctic region through international organisations and other means. **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of management of the changing geography of the Arctic region through international organisations and other means. **AO2** **Level 4 (8-10 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed analysis of the effectiveness of management of the changing geography of the Arctic region through international organisations and other means. Demonstrates **comprehensive** application of knowledge and understanding to provide detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence of the effectiveness of management	**20** **AO1 x10** **AO2 x10**	**Indicative content** **AO1 - 10 marks** Knowledge and understanding of the management of the changing geography of the Arctic region through international organisations and by other means could potentially include: *International organisations:* • Arctic Council – Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, USA – for co-operation • UN Convention on the Law of the Sea – a legal framework for all marine and maritime activities • Intergovernmental Panel on Climate Change • European Space Agency – monitor ice extent and thickness • EU – actively against air, land and sea pollution and unsustainable exploitation of natural resources *Other means:* • Individual states with Arctic coastlines – promote their own interests in terms of oil and gas exploitation and shipping in areas over which they have sovereign rights • Research and advice from international institutions such as and the International Arctic Research Centre and by universities such as Durham university • Inputs of NGOs such as Circumpolar Conservation Union or the World Wide Fund for nature • TNCs in the Arctic oil and gas sector have responsibilities to co-exist with and protect indigenous communities The Arctic region's changing geography is largely the result of climate change and globalisation; this includes loss in area of sea ice and ice thinning and the impacts of this on the

of the changing geography of the Arctic region through international organisations and other means.

Level 3 (5-7 marks)
Demonstrates **thorough** application of knowledge and understanding to provide a clear, developed analysis of the effectiveness of management of the changing geography of the Arctic region through international organisations and other means.

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 effectiveness of management of the changing geography of the Arctic region through international organisations and other means.

Level 2 (3-4 marks)
Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis of the effectiveness of management of the changing geography of the Arctic region through international organisations and other means.
Demonstrates **reasonable** application of knowledge and understanding to provide a sound evaluation that offers generalised judgements, with limited use of links between conclusions and evidence of the effectiveness of management of the changing geography of the Arctic region through international organisations and other means.

Level 1 (1-2 marks)
Demonstrates **basic** application of knowledge and understanding to provide a simple analysis of the effectiveness of management of the changing geography of the Arctic region through international organisations and other means.
Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple use of links between conclusions and evidence of the effectiveness of management of the changing geography

environment and the growth in human activity.
AO2 - 10 marks
Application of knowledge and understanding to analyse and evaluate the effectiveness of management of the changing geography of the Arctic region through international organisations and by other means could potentially include:

- evaluation of the roles of international organisations in management of the changing geography of the Arctic region, for example the Arctic Council is an integrated forum to promote co-operation between the eight states that have Arctic coastlines
- understanding that there is no comprehensive treaty that relates to governance of the entire Arctic
- evaluation of the roles of other organisations in managing the changing geography of the Arctic such as monitoring and research in environmental issues, and protecting traditional indigenous communities
- understanding the impact of individual states in furthering their own vested interests in exploitation of the Arctic, especially following the effects of ice depletion, on accessibility, for example exploitation of oil and gas or potential shipping routes
- unilateral action by states or non-state actors could affect surrounding states and indigenous communities
- understanding that lack of governance of the area has geo-political implications plus regional issues common to the entire Arctic such as sustainability of fragile ecosystems
- understanding that within the Arctic region the issues that require cohesive management can be political, environmental, social, or economic – and that the situation for each is changing rapidly especially since a time will come when a threshold or tipping point is crossed

			of the Arctic region through international organisations and other means.		
			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.		

PMT

Question	Answer	Mark	Guidance
17*	**'Food security issues are caused mainly by human factors.'** With reference to a <u>case study</u> of <u>one</u> place, to **what extent do you agree?** **AO1** **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding of human and other factors that cause food security issues. **Level 3 (5-7 marks)** Demonstrates **thorough** knowledge and understanding of human and other factors that cause food security issues. **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of human and other factors that cause food security issues. **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of human and other factors that cause food security issues. **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 human and other factors that cause food security issues. Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational conclusions	20 **AO1 x10** **AO2 x10**	**Indicative content** **AO1 - 10 marks** Knowledge and understanding of human and other factors that cause food security issues could potentially include: *Human factors:* • availability of capital linked to farming output • dominance of agribusiness and TNCs • competition for scarce resources including agricultural land, water, and energy • access to technological developments in seeds, fertilisers, mechanisation, irrigation • impact of land grabbing • poor land management / soil erosion • political influences such as government investment in transport, food storage, government pricing / subsidy policies • globalisation and access to global markets *Other factors:* • soil characteristics that might limit crop growth such as texture, structure and nutrient supply • temperature and length of growing season • increasing temperatures due to climate change • precipitation reliability and water supply / shortages • altitude, aspect and slope • extreme events such as natural hazards, including floods and droughts Food security is when there is access to sufficient food for individuals to lead a healthy life. Factors influencing food security vary from place to place depending on place-specific details selected

that are evidence based as to human and other factors that cause food security issues.

Level 3 (5-7 marks)
Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis of human and other factors that cause food security issues.

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 human and other factors that cause food security issues.

Level 2 (3-4 marks)
Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis of human and other factors that cause food security issues.

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 human and other factors that cause food security issues.

Level 1 (1-2 marks)
Demonstrates **basic** application of knowledge and understanding to provide a simple analysis of human and other factors that cause food security issues.

Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to human and other factors that cause food security issues.

AO2 - 10 marks
Application of knowledge and understanding to analyse and evaluate human and other factors that cause food security issues with reference to a case study of one place could potentially include:
- evaluation of human factors that cause problems in achieving food security, such as
    o where small scale farmers are disadvantaged by the competition from large scale agribusiness and TNCs
    o where a government is financially unable, or has inadequate policies, to support infrastructure leading to food supply problems
    o level of development of a country e.g. LIDCs having limited access to farming technology
    o inappropriate land management that might lead to soil erosion
    o land grabbing by which countries seeking to ensure their own food security acquire farmland in developing countries
- evaluation of other factors, mainly physical factors e.g
    o increased frequency of floods and droughts possibly as a result of changing climate
    o where weather patterns are unreliable such as the effects of unreliable monsoon rains on the water table in the Punjab region of India
    o where any change in the extreme environmental conditions, such as in the Arctic, threaten food security of indigenous people who depend on foods harvested from the environment
- food security issues may be caused by a combination of inter-related human and physical factors
- consideration of the influence of all the factors at different scales from national to local
- the idea that food security can change over time often through economic, political or environmental shock

					• food security may vary with level of economic development at any scale with LIDCs more vulnerable
			Quality of extended response **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with limited structure. The information is supported by limited evidence. **Level 1** The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		

Question	Answer	Mark	Guidance
18*	**'The impact of poor food security on the lives of people depends on a place's level of economic development.' Discuss.** **AO1** **Level 4 (8-10 marks)** Demonstrates **comprehensive** knowledge and understanding of the impact of poor food security on the lives of people and level of economic development. **Level 3 (5-7 marks)** Demonstrates **thorough** knowledge and understanding of the impact of poor food security on the lives of people and level of economic development. **Level 2 (3-4 marks)** Demonstrates **reasonable** knowledge and understanding of the impact of poor food security on the lives of people and level of economic development. **Level 1 (1-2 marks)** Demonstrates **basic** knowledge and understanding of the impact of poor food security on the lives of people and level of economic development.. **AO2** **Level 4 (8-10 marks)** Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of the impact of poor food security on the lives of people and level of economic development. Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated evaluation that offers secure judgements leading to rational	**20** **AO1 x10** **AO2 x10**	**Indicative content** **AO1 - 10 marks** Knowledge and understanding of the impact of poor food security on the lives of people and level of economic development could potentially include: *Less developed places / countries / regions / areas / economically developing countries:* • higher incidence of severe food insecurity • possible inequalities in food security on tribal basis • initiates internal migration from rural to urban areas • higher incidence of poverty / dependence on food aid • higher incidence of undernourished infants • higher mortality / morbidity rates • lower life expectancy • limited government investment in infrastructure compounds problems of food access and distribution • land grabbing compounds issue of basic food supply • limited education restricts ability to prepare balanced nutritious diet for infants / children / mothers – more susceptible to nutrient-deficiency diseases *More developed places / countries / regions / areas / economically developed countries:* • among the wealthier people there is easier access to a wide range of food options and the opportunity for a healthy diet • high incidence of overweight and obese people with higher risk of NCDs such as CVD and type 2-diabetes • poverty in ACs leads to dependence on low-value foods, ready meals and takeaway foods i.e. poor food security relates to choices concerning poor diet • government has responsibility to ensure that healthy food is affordable and accessible – and that the

conclusions that are evidence based as to the impact of poor food security on the lives of people and level of economic development.

Level 3 (5-7 marks)
Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis of the impact of poor food security on the lives of people and level 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 impact of poor food security on the lives of people and level of economic development.

Level 2 (3-4 marks)
Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis of the impact of poor food security on the lives of people and level 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 impact of poor food security on the lives of people and level of economic development.

Level 1 (1-2 marks)
Demonstrates **basic** application of knowledge and understanding to provide a simple analysis of the impact of poor food security on the lives of people and level of economic development.

Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to the impact of poor food

population is well informed about health matters
- increasing costs of treating illnesses related to obesity

AO2 - 10 marks
Application of knowledge and understanding to analyse and evaluate the impact of poor food security on the lives of people and level of economic development could potentially include:

- evaluation of the impact of poor food security on people in less developed countries /regions / areas
- evaluation of the impact of poor food security on people in more developed countries / regions / areas
- understanding that the impacts of poor food security change over time, for example LIDCs and EDCs now also have increasing incidence of obesity
- understanding that the impacts of poor food security on the lives of people vary with scale – e.g. between countries / within countries, inter-regional, urban-rural, intra-urban
- the impact of poor food security on the lives of people can be related to age-related issues with poor nutrition particularly affecting infants and children
- impacts of poor food security on the lives of people can be environmental, social, economic, and political
- understanding that the impact of poor food security on the lives of people can be related to the full range of impacts in the 'nutrition spectrum' from 'severely underweight' to 'severely obese'
- the relationship between poor food security and the level of economic development of places is generalised and conceals other factors irrespective of the level of a place's economic development. The impacts of poor food security on people's lives are also related to an individual's circumstances so that access to sufficient food to lead a healthy life may depend on employment, income, access to services,

| | | | security on the lives of people and level of economic development.
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. | | education |

Question	Answer	Mark	Guidance

19*	**'The risks from tectonic hazards have increased over time.' Discuss.**
	
	AO1
	Level 4 (8-10 marks)
	Demonstrates **comprehensive** knowledge and understanding of how risks from tectonic hazards have increased over time or not.
	
	Level 3 (5-7 marks)
	Demonstrates **thorough** knowledge and understanding of how risks from tectonic hazards have increased over time or not.
	
	Level 2 (3-4 marks)
	Demonstrates **reasonable** knowledge and understanding of how risks from tectonic hazards have increased over time or not.
	
	Level 1 (1-2 marks)
	Demonstrates **basic** knowledge and understanding of how risks from tectonic hazards have increased over time or not.
	
	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 risks from tectonic hazards have increased over time or not.
	
	Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated
			Indicative content
			
			AO1 - 10 marks
			Knowledge and understanding of how risks from tectonic hazards have increased over time or not could potentially include:
			
			Factors that have contributed to increased risks:
			• increase in global population
			• more people living in towns and cities
			• more property at risk
			• many seismic zones are areas with increasingly high population densities
			• records show the higher risk from earthquakes rather than volcanoes
			
			Factors that have contributed to decreased risks:
			• the increasing effectiveness of strategies to manage a hazard by
			   o modifying the event
			   o modifying vulnerability
			   o mitigation loss
			• the increasing ability to cope with the risks by
			   o monitoring more effectively
			   o improving the degree of preparedness through modern technology
			
			Some reference to data as evidence to support the argument might be expected
			
			AO2 - 10 marks
			Application of knowledge and understanding to analyse and evaluate how risks from tectonic hazards have decreased over time or not could potentially include:

evaluation that offers secure judgements leading to rational conclusions that are evidence based as to how risks from tectonic hazards have increased over time or not.

Level 3 (5-7 marks)
Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis of how risks from tectonic hazards have increased over time or not.

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 risks from tectonic hazards have increased over time or not.

Level 2 (3-4 marks)
Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis of how risks from tectonic hazards have increased over time or not.

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 how risks from tectonic hazards have increased over time or not.

Level 1 (1-2 marks)
Demonstrates **basic** application of knowledge and understanding to provide a simple analysis of how risks from tectonic hazards have increased over time or not.

Demonstrates **basic** application of knowledge and understanding to provide an un-supported evaluation that offers simple conclusions as to how risks from tectonic hazards have increased over time or not.

- evaluation of factors that have contributed to increased risks from tectonic hazards over time
- evaluation of factors that have contributed to decreased risks from tectonic hazards over time
- changes in risk from tectonic hazards may be influenced by economic, social and political factors
- factors contributing to increase or decrease in risks from tectonic hazards might vary according level of economic development and therefore reflect the relative ability in a place to modify the event itself, to modify people's vulnerability and to modify any losses
- understanding that the risks from tectonic events might vary over time as the vulnerability of people living in tectonically active locations also changes over time
- understanding that the types of hazard generated by a specific earthquake or volcanic event may present different risks depending on the physical / human geography of the area concerned
- analysis of the contrast in risks arising from earthquakes and volcanoes
- analysis and evaluation of records in the past 50 years that show an increase in number of disasters due to volcanic eruptions and earthquakes – measured in number of fatalities and relative economic costs
- understanding that any apparent increase in frequency and magnitude of hazard events over time may be the result of more reliable measuring and reporting over the past century. In the case of earthquakes and volcanoes this increase may be less pronounced than other types of hazard since human activity plays no part in causing them

			Quality of extended response Level 4		
			There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with limited structure. The information is supported by limited evidence. **Level 1** The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		

Question			Answer	Mark	Guidance

20*			**'The effectiveness of strategies used to cope with volcanic activity depends on a country's level of economic development.' To what extent do you agree?**
			
			AO1
			Level 4 (8-10 marks)
			Demonstrates **comprehensive** knowledge and understanding of strategies used to cope with volcanic activity and a country's level of economic development.
			
			Level 3 (5-7 marks)
			Demonstrates **thorough** knowledge and understanding of strategies used to cope with volcanic activity and a country's level of economic development.
			
			Level 2 (3-4 marks)
			Demonstrates **reasonable** knowledge and understanding of strategies used to cope with volcanic activity and a country's level of economic development.
			
			Level 1 (1-2 marks)
			Demonstrates **basic** knowledge and understanding of strategies used to cope with volcanic activity and a country's level of economic development.
			
			AO2
			Level 4 (8-10 marks)
			Demonstrates **comprehensive** application of knowledge and understanding to provide a clear, developed and convincing analysis that is fully accurate of the effectiveness of strategies used to cope with volcanic activity and a country's level of economic development.
			
			Demonstrates **comprehensive** application of knowledge and understanding to provide detailed and substantiated
					Indicative content
					
					AO1 - 10 marks
					Knowledge and understanding of strategies used to cope with volcanic activity and a country's level of economic development could potentially include:
					
					Strategies used in developing countries:
					• governments set up
					    ○ research centres to monitor eruptions
					    ○ hazard risk maps e.g. to monitor lahars
					    ○ temporary shelters
					    ○ evacuation strategies
					    ○ disaster-response teams e.g. search and rescue
					• co-ordination of emergency aid
					
					Strategies used in developed countries:
					• lava flows diverted in channels, sprayed to cool, slowed by dropping concrete blocks
					• education / training / evacuation drills
					• predictions and warnings through constant monitoring using modern technology
					• detailed hazard and risks mapping
					• steep rooves constructed to prevent ash build-up
					• well-established, practiced and co-ordinated alert responses by public services
					• closure of airports and air space – atmospheric ash
					• government resources to compensate individuals and businesses and restore infrastructure

evaluation that offers secure judgements leading to rational conclusions that are evidence based as to the effectiveness of strategies used to cope with volcanic activity and a country's level of economic development.

Level 3 (5-7 marks)
Demonstrates **thorough** application of knowledge and understanding to provide a clear and developed analysis of the effectiveness of strategies used to cope with volcanic activity and a country's level 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 effectiveness of strategies used to cope with volcanic activity and a country's level of economic development.

Level 2 (3-4 marks)
Demonstrates **reasonable** application of knowledge and understanding to provide a sound analysis of the effectiveness of strategies used to cope with volcanic activity and a country's level 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 effectiveness of strategies used to cope with volcanic activity and a country's level of economic development.

Level 1 (1-2 marks)
Demonstrates **basic** application of knowledge and understanding to provide a simple analysis of the effectiveness of strategies used to cope with volcanic activity and a country's level of economic development.

Demonstrates **basic** application of knowledge and

AO2 - 10 marks
Application of knowledge and understanding to analyse and evaluate the effectiveness of strategies used to cope with volcanic activity and a country's level of economic development could potentially include:

- evaluation of effectiveness of strategies used to cope with volcanic activity in developed countries
- evaluation of effectiveness of strategies used to cope with volcanic activity in developing countries
- analysis across the development spectrum of a country's ability to modify the event, to modify vulnerability and to modify loss
- understanding that many strategies are more possible / available in developed countries through wealth / access to technology, but increasingly there is co-operation between countries at different levels of development in use of resources e.g. monitoring volcanoes, predicting eruptions and disaster support
- understanding that in many developing countries where there are political tensions or other socio-economic issues the government may be able to give only low priority to the risks from tectonic hazards
- the idea that for many families affected by volcanic eruptions in developing countries the strong bond between villagers and their home village and fields encourages return when safe, but the risks remain and are accepted
- understanding that the effectiveness of strategies used to cope with volcanic activity may depend on the scale of the event / hazards
- understanding that the effectiveness of strategies is influenced by economic, social and political factors

			understanding to provide an un-supported evaluation that offers simple conclusions as to the effectiveness of strategies used to cope with volcanic activity and a country's level of economic development. **Quality of extended response** **Level 4** There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 3** There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 2** The information has some relevance and is presented with limited structure. The information is supported by limited evidence. **Level 1** The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.		

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