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INTERNATIONAL QUALIFICATIONS

INTERNATIONAL AS
GEOGRAPHY
GG02

Paper 2 Human Geography 1

Mark scheme

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Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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International AS Geography mark scheme

How to mark

Aims

When you are marking your allocation of scripts your main aims should be to:

- recognise and identify the achievements of students
- place students in the appropriate mark band and in the appropriate part of that mark band (high, low, middle) for **each** Assessment Objective
- record your judgements with brief notes, annotations and comments that are relevant to the mark scheme and make it clear to other examiners how you have arrived at the numerical mark awarded for each Assessment Objective
- ensure comparability of assessment for all students, regardless of question or examiner.

Approach

It is important to be **open-minded** and **positive** when marking scripts.

The specification recognises the variety of experiences and knowledge that students will have. It encourages them to study geography in a way that is relevant to them. The questions have been designed to give them opportunities to discuss what they have found out about geography. It is important to assess the quality of **what the student offers**.

Do not mark scripts based on the answer **you** would have written. The mark schemes have been composed to assess **quality of response** and not to identify expected items of knowledge.

Assessment Objectives

This component requires students to:

AO1	Demonstrate knowledge and understanding of places, environments, concepts, processes, interactions and change, at a variety of scales.
AO2	Apply knowledge and understanding in different contexts to interpret, analyse and evaluate geographical information and issues.
AO3	Use a variety of relevant quantitative, qualitative and fieldwork skills to: • investigate geographical questions and issues • interpret, analyse and evaluate data and evidence • construct arguments and draw conclusions.

The marking grids

Do not think of levels equalling grade boundaries.

Depending on the part of the examination, the levels will have different mark ranges assigned to them. This will reflect the different weighting of Assessment Objectives in particular tasks and across the examination as a whole.

Using the grids

Having familiarised yourself with the descriptors and indicative content, read through the answer and annotate it (as instructed below) to identify the qualities that are being looked for and that it shows. You can now check the levels and award a mark.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptors for that level. The descriptors for the level indicate the different qualities that might be seen in the student's answer for that level. If it meets all the descriptors for the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptors and the answer. With practice and familiarity you will find that for better answers you will be able to skip through the lower levels of the mark scheme quickly.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best-fit approach for defining the level and then use the variability of the response to help decide the mark within the level.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark.

It is often best to start in the middle of the level's mark range and then check and adjust. If there is a lot of indicative content fully identifiable in the work you need to give the highest mark in the level. If only some is identifiable or it is only partially fulfilled, then give the lower mark.

The exemplar materials used during standardisation will also help. There will be an answer in the standardising materials that will correspond with each level of the mark scheme. This answer will have been awarded a mark by the lead examiner. You can compare the student's answer with the example to determine if it is of the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the lead examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

In addition to the levels descriptors, question specific indicative content is provided as a guide for examiners. This is not intended to be exhaustive and you must credit other valid points.

An answer that contains nothing of relevance to the question must be awarded no marks.

Annotating scripts

You should write a summative comment at the end for each Assessment Objective and indicate the marks for each Assessment Objective being tested at the end of the answer in the margin in sequence. It is vital that the way you arrive at a mark should be recorded on the script. This will help you with making accurate judgements and it will help any subsequent markers to identify how you are thinking. Please do not write negative comments about students' work or their alleged aptitudes.

Section A – Global systems and governance **Total for this section: 20 marks**

Question	Part	Marking guidance	Total marks
01	**1**	**What is a mid-ocean ridge?** Key – C: A long rift valley mountain range that forms in the ocean when two tectonic plates separate	**1** **AO1=1**
01	**2**	**Which of the following are BOTH features of economic interdependence?** Key – A: Business links between countries **and** the development of trade between countries	**1** **AO1=1**
01	**3**	**Which of the following causes reduced access to global markets?** Key – D: Increased economic division between countries	**1** **AO1=1**
01	**4**	**Agencies and organisations can work to promote growth and stability, but they may also worsen inequalities and injustices.** **This is an issue linked to which of the following?** Key – B: Global governance	**1** **AO1=1**
01	**5**	**Which of these is an environmental problem linked to the unequal flow of people?** Key – A: Growth of large cities leading to increased atmospheric pollution	**1** **AO1=1**

Question	Part	Marking guidance	Total marks
02		**Analyse the data shown in FIGURE 1a and FIGURE 1b.**	**6** **AO3=6**

Level	Marks	Descriptor
2	**4–6**	**AO3** – Clear selection and analysis of the evidence that has been provided which makes appropriate use of data to support. Clear connections between different aspects of the data.
1	**1–3**	**AO3** – Some basic selection and analysis of the evidence that has been provided which makes limited use of data to support. Basic or limited connections between different aspects of the data.
0	**0**	No creditable content.

Indicative Content

This question requires analysis of two proportional symbol maps, one showing the busiest ports in Asia in 2012, the other showing the busiest ports in Asia in 2019. Analysis could include comparison of the data and locations, both high and low amounts, as well as key differences and anomalies. There should be application of the data from the key, as well as use of locational examples.

AO3

- The ports show a south-west to north-east geographical spread of just over 5000 km.
- Eleven of the ports are more centralised, within a 2000 km spread, with Kehin more isolated to the north-east and three to the south-west.
- The majority of ports have increased in volume in the time period shown, with only Hong Kong and Kaohsiung showing a decrease.
- Shanghai has seen the biggest increase in volume, by nearly a quarter, going from 32.5 million containers per year in 2012 to 43.3 million containers per year in 2019.
- Port Klang and Keihin have the smallest increases, of only 0.4 million containers per year, although Keihin has shown a larger proportional increase of just over 5% compared to only 3% at Port Klang.
- The range of port sizes in 2012 was 24.9 million containers per year (7.6 to 32.5). This increased to 35.3 million containers per year in 2019 (8.0 to 43.3).

Question	Part	Marking guidance	Total marks
03		**'Transnational corporations (TNCs) create both positive and negative impacts on countries in which they operate.'** **To what extent do you agree with this statement?** **Use a TNC example you have studied to support your answer.** **AO1** – Knowledge and understanding of the nature and role of transnational corporations (TNCs). Knowledge and understanding of a specified TNC and its impacts on those countries in which it operates. Knowledge and understanding of the globalisation critique. **AO2** – Application of knowledge and understanding to assess the extent to which there is agreement with the statement. Application of knowledge and understanding to consider balance of impacts and form a judgement on overall impacts in relation to the statement.	**9** **AO1=4** **AO2=5**

Level	Marks	Descriptor
3	**7–9**	**AO1** – Demonstrates detailed knowledge and understanding of a specified transnational corporation's (TNCs) impacts in countries in which it operates. **AO2** – Applies knowledge and understanding to the novel situation, offering detailed analysis and evaluation, drawn appropriately from the context provided. Connections and relationships between different aspects of study are thorough and relevant.
2	**4–6**	**AO1** – Demonstrates clear knowledge and understanding of a specified transnational corporation's (TNCs) impacts in countries in which it operates. **AO2** – Applies knowledge and understanding to the novel situation, offering clear analysis and evaluation, drawn appropriately from the context provided. Connections and relationships between different aspects of study are evident and relevant.
1	**1–3**	**AO1** – Demonstrates basic knowledge and understanding of a specified transnational corporation's (TNCs) impacts in countries in which it operates. **AO2** – Applies limited knowledge and understanding to the novel situation, offering some basic analysis and evaluation. Connections and relationships between different aspects of study are basic with limited relevance. Analysis and evaluation are basic and of limited relevance.
0	**0**	No creditable content.

Indicative Content

This question requires links to be made between different parts of the specification content on Global Systems and Governance. Specific focus needs to be on the nature and role of transnational corporations, especially the detailed reference to a specified TNC and its impacts on those countries in which it operates. Links can also be made to the globalisation critique section of the specification, as well as other areas if relevant. There should be a range of impacts in the answer with a judgement made to the extent to which there is agreement with the statement in the question. Limit to maximum Level 2 if responses only refer to positive **or** negatives.

AO1

- Knowledge and understanding of the nature and role of transnational corporations (TNCs).
- Knowledge and understanding of a specified TNC and its impacts on those countries in which it operates.
- Knowledge and understanding of the globalisation critique.
- Knowledge and understanding from other areas of the specification if accurate and relevant to the question.

AO2

- Evaluation of the positive impacts TNCs have in countries in which they operate. Eg Coca-Cola has invested in many countries, such as a US$90 million research and development centre in Shanghai. The Coca-Cola foundation provides grants to many companies, such as social development and environmental sustainability in Anandana, India. Coca-Cola have also initiated sustainable agricultural schemes in China, constructing rainwater harvesting systems.
- Evaluation of the negative impacts TNCs have in countries in which they operate. Eg Coca-Cola have been linked to poor working conditions and political unrest in Guatemala, with encouragement of workers to abandon union membership to work for them. They have been linked to over-extraction of water supplies and even water pollution, such as in Kerala, India. The EU have also found high traces of pesticide residue in Coca-Cola as well as high links to obesity due to the sugar content of its product.
- Evaluation of the overall impacts and extent to which there is agreement with the statement.

Question	Part	Marking guidance	Total marks
04		**Evaluate the effectiveness of Non-Governmental Organisations (NGOs) in protecting oceans from threats caused by pollution.** **AO1** – Knowledge and understanding of the role of NGOs in monitoring threats and enhancing protection of the oceans. Knowledge and understanding of threats to the world's oceans. Knowledge and understanding of ocean governance. Knowledge and understanding of the oceans as a global common. **AO2** – Application of knowledge and understanding to evaluate the effectiveness of NGOs in in protecting oceans from threats caused by pollution. Application of knowledge and understanding to draw conclusions about the effectiveness of NGOs in protecting oceans from the threats caused by pollution.	**20** **AO1=10** **AO2=10**

Level	Marks	Descriptor
4	**16–20**	**AO2** – Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question. **AO2** – Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout. **AO2** – Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts. **AO1** – Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout. **AO1** – Full and accurate knowledge and understanding of key concepts and processes throughout. **AO1** – Detailed awareness of scale and temporal change which is well integrated where appropriate.
3	**11–15**	**AO2** – Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question. **AO2** – Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding. **AO2** – Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts. **AO1** – Generally clear and relevant knowledge and understanding of place(s) and environments. **AO1** – Generally clear and accurate knowledge and understanding of key concepts and processes.

		AO1 – Generally clear awareness of scale and temporal change which is integrated where appropriate.
2	**6–10**	**AO2** – Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question. **AO2** – Some partially relevant analysis and evaluation in the application of knowledge and understanding. **AO2** – Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts. **AO1** – Some relevant knowledge and understanding of place(s) and environments which is partially relevant. **AO1** – Some knowledge and understanding of key concepts, processes and interactions and change. **AO1** – Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies.
1	**1–5**	**AO2** – Very limited and/or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question. **AO2** – Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence. **AO2** – Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts. **AO1** – Very limited relevant knowledge and understanding of place(s) and environments. **AO1** – Isolated knowledge and understanding of key concepts and processes. **AO1** – Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies.
0	**0**	No creditable content.

Indicative Content

The question links different parts of the Global Systems and Governance part of the specification. The main focus is the oceans as a global common section, especially the role of NGOs in monitoring threats and enhancing protection of the oceans. The question requires candidates to evaluate the effectiveness of NGOs in protecting oceans from threats caused by pollution. Answers should focus on a range of threats caused by pollution and evaluate how effective NGOs have been in protecting the oceans from these threats. A final summary and overall evaluation may also be provided.

AO1

- Knowledge and understanding of the role of NGOs in monitoring threats and enhancing protection of the oceans.
- Knowledge and understanding of threats to the world's oceans.
- Knowledge and understanding of ocean governance.
- Knowledge and understanding of the oceans as a global common.
- Knowledge and understanding from other areas of the specification if accurate and relevant to the question.

AO2

- Evaluation of the effectiveness of NGOs in protecting oceans from threats caused by oil pollution. Eg the International Maritime Organization (IMO) adopted the International Convention for the Prevention of Pollution from Ships (MARPOL) in 1973 and has worked on a number of processes to limit oil pollution in the past 40 years. MARPOL has been updated a number of times and provides key recommendations and limits for activities. However, there have been some significant oil spills in this time, such as the Exxon Valdez in 1989, and it focuses mostly on shipping pollution, so there have also been significant oil spills from drilling, such as the Deepwater Horizon oil spill in 2010.
- Evaluation of the effectiveness of NGOs in protecting oceans from threats caused by plastic pollution. Eg Greenpeace and other environmental organisations have helped to highlight the impact plastics and microplastics are having on the ocean. Their ongoing campaigning has enabled laws to be developed in a number of countries to ban or limit the use of single-use plastics and plastic packaging. However, plastic pollution in the oceans is continuing to grow, with areas such as the Pacific now having huge plastic pollution gyre.
- Evaluation of the effectiveness of NGOs in protecting oceans from threats caused by other sources of pollution. Eg noise and air pollution caused by shipping and tourism has an impact on ocean ecosystems. Noise pollution has been linked to impacts on whale migration and communication. Air pollution can be diffused into oceans linking to further acidity. The IMO is trying to limit both causes of these threats, but arguably has not done as much as with oil pollution. The new UN High Seas Treaty is also set to limit usage of large areas of ocean and the impact from shipping which will include pollution.
- Overall evaluation of the effectiveness of NGOs in protecting oceans from threats caused by pollution.

Section B – Resource security **Total for this section: 20 marks**

Question	Part	Marking guidance	Total marks
05	**1**	**Which of the following strategies BOTH reduce water demand?** Key – C: Use of water meters in homes **and** 'grey water' recycling systems	**1** **AO1=1**
05	**2**	**Sulphur dioxide and nitrogen oxides are released into the air. These gases mix and react with water, oxygen and other chemicals in the atmosphere to form pollutants.** **This describes the causes of which of the following?** Key – A: Acid rain	**1** **AO1=1**
05	**3**	**A resource area has been scientifically tested and estimated, with sufficient confidence, to be economically viable for extraction. However, not enough testing has been done to determine the quantity available.** **This describes which of the following?** Key – C: An indicated reserve	**1** **AO1=1**
05	**4**	**What is water stress?** Key – C: When the water resources in a region or country are insufficient for its needs.	**1** **AO1=1**
05	**5**	**Which of the following is an example of natural resource exploration?** Key – B: Using geological surveys to identify possible oil sources	**1** **AO1=1**

Question	Part	Marking guidance	Total marks
06		**Analyse the data shown in FIGURE 2.**	**6** **AO3=6**

Level	Marks	Descriptor
2	**4–6**	**AO3** – Clear selection and analysis of the evidence that has been provided which makes appropriate use of data to support. Clear connections between different aspects of the data.
1	**1–3**	**AO3** – Some basic selection and analysis of the evidence that has been provided which makes limited use of data to support. Basic or limited connections between different aspects of the data.
0	**0**	No creditable content.

Indicative Content

This question requires analysis of a divergent compound bar graph water withdrawals by source for fifteen countries in the Middle East and North Africa. Answers should refer to key trends shown, as well as any similarities and differences between the countries. There is lots of potential for answers to include specific source data within points, as well as possible further manipulation too.

AO3

- Whilst no countries are 100% sustainable or 100% unsustainable, there is more sustainable balance overall, with Morocco, Lebanon, Kuwait and Tunisia all having 90% sustainability or more, but no countries reaching this for unsustainability. The highest for this is Libya with 80% unsustainability.
- Groundwater makes up the largest amount of unsustainable usage. In a third of countries shown this is the only unsustainable usage and in all countries there is at least some unsustainable groundwater use.
- Egypt has the largest proportion of unsustainable surface water use with over four fifths of its unsustainable water use coming from this source. Morocco is the only other country that has more than half of its unsustainable water use from groundwater, but its overall unsustainable water use as a whole is less than a quarter of Egypt's.
- Sustainable water use is much more varied, partly because there are double the categories for this. Groundwater is again the most common source, with all countries apart from Bahrain having at least some sustainable groundwater use. For at least a third of countries it is their main sustainable source.
- Desalination is a key sustainable source in some countries, with it making up three quarters or more of sustainable water use in Bahrain, Qatar and Kuwait. Two thirds of countries shown have at least some desalination use.
- Sustainable surface water makes up a large amount of sustainable sources in some countries, with Morocco and Egypt having it as their largest single source and the majority of countries using it in at least some way.
- Reuse of treated wastewater makes up a small percentage of use in the countries shown. The largest is Israel with about 20%, but no other country has more than 10% of total sources, although all but two countries use it in some way.

- Reuse of agricultural drainage water is the lowest water source on the whole graph, with only three countries having any use, all at less than 10% of total water use.
- Allow 1–2% room for error in reading of values.

Question	Part	Marking guidance	Total marks
07		**Evaluate how economic developments might affect energy sources in the future.** **AO1** – Knowledge and understanding of energy futures and their relationship with a range of technological, economic, environmental and political developments. Knowledge and understanding of strategies to manage energy consumption. Knowledge and understanding of strategies to increase energy supply. Knowledge and understanding of sustainability issues associated with energy production. **AO2** – Application of knowledge and understanding to evaluate how economic developments might affect energy sources in the future.	**9** **AO1=4** **AO2=5**

Level	Marks	Descriptor
3	**7–9**	**AO1** – Demonstrates detailed knowledge and understanding of energy futures and their relationship with a range of technological, economic, environmental and political developments. **AO2** – Applies knowledge and understanding to the novel situation, offering detailed analysis and evaluation, drawn appropriately from the context provided. Connections and relationships between different aspects of study are thorough and relevant.
2	**4–6**	**AO1** – Demonstrates clear knowledge and understanding of energy futures and their relationship with a range of technological, economic, environmental and political developments. **AO2** – Applies knowledge and understanding to the novel situation, offering clear analysis and evaluation, drawn appropriately from the context provided. Connections and relationships between different aspects of study are evident and relevant.
1	**1–3**	**AO1** – Demonstrates basic knowledge and understanding of energy futures and their relationship with a range of technological, economic, environmental and political developments. **AO2** – Applies limited knowledge and understanding to the novel situation, offering some basic analysis and evaluation. Connections and relationships between different aspects of study are basic with limited relevance. Analysis and evaluation are basic and of limited relevance.
0	**0**	No creditable content.

Indicative Content

This question requires links to be made between different parts of the specification content on Resource Security, specifically the resource futures section, although a number of links may be drawn from the energy security section too. Knowledge and understanding must be applied to evaluate how economic developments might affect energy sources in the future.

AO1

- Knowledge and understanding of how economic development might affect alternative energy futures. .
- Knowledge and understanding of strategies to manage energy consumption.
- Knowledge and understanding of strategies to increase energy supply.
- Knowledge and understanding of sustainability issues associated with energy production.
- Knowledge and understanding from other areas of the specification if accurate and relevant to the question.

AO2

- Evaluation of economic developments that might affect energy sources in the future. For instance:
  - increasing costs of fossil fuels as resources deplete may cause the cost of renewable energy to be more favourable, leading to more investment in renewables
  - fossil fuel cost changes may cause more investment in unconventional fuels and alternative technologies as a replacement for fossil fuels, such as the development of fracking in parts of North America and Europe
  - more money invested in research and development of alternatives may also lead to the development of new energy sources, such as nuclear fusion
  - more money invested in energy exploration may help to discover new reserves
  - investment in energy efficiency may reduce energy demand in the future
  - need for energy security and global supply chains may see more focus on national and small-scale energy sources for domestic or community use.

Question	Part	Marking guidance	Total marks
08		**Evaluate the importance of the physical environment in affecting the availability and use of EITHER water OR energy.** **Use a case study to support your answer.** **AO1** – Knowledge and understanding of a specified place to illustrate and analyse how aspects of its physical environment affects the availability and cost of either water or energy and the way in which either water or energy is used. Knowledge and understanding of the relationship of water supply (volume and quality) to key aspects of physical geography. Knowledge and understanding of the relationship of energy supply (volume and quality) to key aspects of physical geography. **AO2** – Application of knowledge and understanding to evaluate the importance of the physical environment in affecting the availability and use of either water or energy. Application of knowledge and understanding to form a judgement on the most important factors overall.	**20** **AO1=10** **AO2=10**

Level	Marks	Descriptor
4	**16–20**	**AO2** – Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question. **AO2** – Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout. **AO2** – Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts. **AO1** – Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout. **AO1** – Full and accurate knowledge and understanding of key concepts and processes throughout. **AO1** – Detailed awareness of scale and temporal change which is well integrated where appropriate.
3	**11–15**	**AO2** – Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question. **AO2** – Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding. **AO2** – Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts.

		AO1 – Generally clear and relevant knowledge and understanding of place(s) and environments. **AO1** – Generally clear and accurate knowledge and understanding of key concepts and processes. **AO1** – Generally clear awareness of scale and temporal change which is integrated where appropriate.
2	**6–10**	**AO2** – Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question. **AO2** – Some partially relevant analysis and evaluation in the application of knowledge and understanding. **AO2** – Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts. **AO1** – Some relevant knowledge and understanding of place(s) and environments which is partially relevant. **AO1** – Some knowledge and understanding of key concepts, processes and interactions and change. **AO1** – Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies.
1	**1–5**	**AO2** – Very limited and/or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question. **AO2** – Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence. **AO2** – Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts. **AO1** – Very limited relevant knowledge and understanding of place(s) and environments. **AO1** – Isolated knowledge and understanding of key concepts and processes. **AO1** – Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies.
0	**0**	No creditable content.

Indicative Content

The question links different parts of the Resource Security part of the specification, with specific reference to the case studies section, although there are links to the water and energy security sections, depending on which option is chosen. Candidates need to evaluate the importance of the physical environment in affecting the availability and use of either water or energy, with the use of a case study. They may also form an overall judgement in relation to what they consider to be the most important factor overall. Answers will be limited to a maximum of level 3 if there is reference to only availability **or** use of the chosen resource.

AO1

- Knowledge and understanding of a specified place to illustrate and analyse how aspects of its physical environment affects the availability and cost of either water or energy and the way in which either water or energy is used.
- Knowledge and understanding of the relationship of water supply (volume and quality) to key aspects of physical geography.
- Knowledge and understanding of the relationship of energy supply (volume and quality) to key aspects of physical geography.
- Knowledge and understanding from other areas of the specification if accurate and relevant to the question.

AO2

- Evaluation of the importance of the physical environment in affecting the availability of either water or energy. Eg in California precipitation levels and topography play a key role in water availability. Lower rainfall in areas of high population, combined with high pressure systems limiting rainfall in the winter, mean that there is a lot of water stress in highly populated areas such as Los Angeles and San Diego. Water can be diverted to these areas from storage reservoirs, but these are located in more mountainous areas to the north and east of the state, which is quite far away from the populated areas and consequently there is a need for water transfer and management systems. In the Arabian Gulf the geological conditions are perfect for fossil fuel accessibility, as the underground rock contains oil and gas reserves due to the geological past and it has been brought up to the surface by folded anticlines that have not disturbed the resource. In all, over 20% of proven global energy reserves are located in this region. There is also enough artesian pressure once drilled for the reserves to rise to the surface, making the resources even more accessible and cheaper than anywhere else in the world. Alongside this, the climate is also ideal for solar power generation, with some of the highest solar irradiance levels in the world and limited cloud cover due to the high-pressure desert conditions.
- Evaluation of the importance of the physical environment in affecting the use of either water or energy. Eg in California the warm climate often leads to high amounts of evaporation and drought, with localised wells and groundwater supplies often drying up. This has led to the increasing need for water conservation and lifestyle changes in many areas, for example, the development of community water storage tankers in Porterville, a city within California. Farmers have had to adapt by growing less water intensive crops and using different irrigation techniques, such as drip-feed, or by recycling water from runoff. In the Arabian Gulf the climatic factors mean that there are often high temperatures and low rates of precipitation. This means that a lot of energy is used in both water desalination systems and air conditioning units in order to adapt to the local physical conditions. Currently 5% of all energy in the region is used for desalination and up to 60% of household electricity is used for air conditioning in peak heat periods.
- An overall judgement of the most important factors should be considered.

Assessment Objective grid

	AO1	AO2	AO3	Total
Section A				
01.1	1			1
01.2	1			1
01.3	1			1
01.4	1			1
01.5	1			1
02			6	6
03	4	5		9
04	10	10		20
Section B				
05.1	1			1
05.2	1			1
05.3	1			1
05.4	1			1
05.5	1			1
06			6	6
07	4	5		9
08	10	10		20
Unit total	38	30	12	80