INTERNATIONAL AS
GEOGRAPHY
GG02

Paper 2 Human Geography 1

Mark scheme

January 2023

Version: 1.0 Final

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.

Further copies of this mark scheme are available from aqa.org.uk

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: 40 marks**

Question	Part	Marking guidance	Total marks
01	1	**The oceans are recognised as a global common because they…** Key – B: contain natural resources which all countries should have access to.	**1** **AO1=1**
01	2	**'Joint actions taken by countries and organisations for survival and safety' describes which of the following?** Key – A: Global security systems	**1** **AO1=1**
01	3	**Which of the following is the correct order of ocean zones from sea surface to sea floor?** Key – B: Epipelagic, Mesopelagic, Bathypelagic, Abyssopelagic	**1** **AO1=1**
01	4	**Which of the following are BOTH positive impacts on people caused by international trade?** Key – C: More job opportunities **and** access to a wider range of products.	**1** **AO1=1**
01	5	**A negative environmental impact of shipping that directly affects the world's oceans is…** Key – D: loss of ocean biodiversity due to oil pollution.	**1** **AO1=1**

Question	Part	Marking guidance	Total marks
02		**Analyse the changes in access to the Internet between 2007 and 2017 shown in FIGURE 1 and 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 changes between two data maps showing the percentage of population within each country that had access to the Internet, one in 2007 and one in 2017. Analysis could include comparison of the data and locations, as well as identification of the key differences, trends and data manipulation for higher marks.

AO3

- In 2007 the more developed global regions of North America, Europe and some countries in Asia were the only areas with more than 60% population access to the Internet. Other regions were lagging behind, with Africa in particular standing out as almost all countries had 0–20% access.
- In 2017 the global perspective was very different. Whilst Europe and North America have developed further in some countries, this has not been considerably, and other regions have come close to catching up, such as a number of countries in South America, Asia and the Middle East. A number of countries in Africa have developed considerably more access, although there are still nearly half with only 0–20%.
- There are a number of locations that have high percentages on both maps. For instance, both Japan and Canada had 60–80% population access in 2007 which then increased to over 80–100% in 2017.
- A number of locations have also remained very low in both maps with no real change. Bangladesh and Nigeria, for instance, are at only 0–20% on both maps.
- In North America there has been inconsistent increase – USA has remained at the same percentage whilst Canada has moved up one category but Mexico has increased two categories, moving from 20–40% in 2007 to 60–80% in 2017.
- There has been clear increase in almost all of South America with only one country remaining in the same percentage category from 2007 to 2017 (French Guiana is 0–20% in both). A number of countries, including Chile and Argentina, have moved up two categories, although from different starting points. Whilst the majority of the countries in South America were 20–40% or lower in 2007, in 2017 the majority are 60–80%.
- Europe has become more consistent in percentage access over the time period, with almost all countries having 60% or more in 2017, whereas all categories were shown in 2007. Central and northern countries have remained in the same category whilst a number of countries have moved up a

category, such as Spain and Italy both moving from 40–60% to 60–80%. Belarus has seen the biggest increase, going from 0–20% in 2007 to 60–80% in 2017.
- African countries remain relatively low in both maps, but some key changes stand out. Gabon and South Africa, for instance, have gone from 0–20% in 2007 to 40–60% in 2017. A number of countries, such as Mozambique have increased from 0–20% to 20–40%, but there are still around half of countries at 0–20%.
- Like South America, Asia has shown some significant improvement over the time period. The majority were 0–20% in 2007 but many have moved up by two or more categories by 2017. Notable increases have been Saudi Arabia which has gone from 20–40% to 80–100% and Kazakhstan which has gone from 0–20% to 60–80%. Many have increased by one category, such as India and Indonesia which have gone up from 0–20% to 20–40%.
- Overall the biggest changes have been seen in Asia, as Saudi Arabia and Kazakhstan demonstrate, and the least growth has been seen in Africa, with around half of the continent still under 20% access in 2017.

Question	Part	Marking guidance	Total marks
03		**'Highly developed economies such as the United States and the European Union only create trade links for their own benefit.'** **Evaluate this statement with reference to economies you have studied.** **AO1** – Knowledge and understanding of trading relationships between highly developed economies, emerging major economies and less developed economies. Knowledge and understanding of unequal global flows. Knowledge and understanding of unequal global power relationships. **AO2** – Application of knowledge and understanding to discuss the extent to which highly developed economies create trade links for the benefit of themselves alone. Application of knowledge and understanding to consider balance and counter viewpoints to the argument, considering a range of links and impacts.	**9** **AO1=4** **AO2=5**

Level	Marks	Descriptor
3	7–9	**AO1** – Demonstrates detailed knowledge and understanding of trade links created by highly developed economies and the impacts of these links. **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 trade links created by highly developed economies and the impacts of these links. **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 trade links created by highly developed economies and the impacts of these links. **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, with specific focus on trading relationships between highly developed

economies, emerging major economies and less developed economies. Links can be made to unequal global flows and unequal global power relationships in particular, although relevant ideas could also be drawn in from other areas of the specification. The extent posed within the question may be considered using a range of range of viewpoints or examples discussed in order to justify a decision.

Max Level 2 if example(s) used are not clearly highly developed economies.

AO1

- Knowledge and understanding of trading relationships between highly developed economies, emerging major economies and less developed economies.
- Knowledge and understanding of unequal global flows.
- Knowledge and understanding of unequal global power relationships.
- Knowledge and understanding of the vulnerability of global commons to external pressures.
- Knowledge and understanding from other areas of the specification if accurate and relevant to the question.

AO2

- Discussion of the extent to which highly developed economies do create trade links for the benefit of themselves alone. Eg the EU created links with China in order to import steel for infrastructure requirements. Although this originally benefitted China too as they had excess steel to offload, the EU later imposed duties of imports to help protect steel manufacturing industries within the EU and to limit the impacts of 'steel dumping' which China was believed to have been doing to undercut competitors. Similarly, the USA have also imposed tariffs on Chinese steel imports after setting up initial trade links for this purpose. The USA have also recently pulled out of trade links and partnerships that they do not feel they are benefitting from.
- Discussion of the extent to which highly developed economies do not create trade links just for the benefit of themselves alone. Eg the EU has made a specific trade and development policy to help support less developed countries. Trade links with these countries are managed more specifically, with access to infrastructure and technology support, and both fair trade and free trade is prioritised.
- Discussion of the extent to which trade in general is designed to help the more developed country in partnership. Eg more developed economies like the USA have better access to technology and can invest in improving infrastructure to help develop trade routes and trade links more widely. As they have more economic power they can also impose tariffs more readily to help manage trade links if needed.
- Discussion of the extent to which trade in general can help benefit all parties involved. Eg the World Trade Organization and similar institutions focus on promoting free trade and limiting both tariffs and disputes to benefit all countries involved. Most regions now have trade blocs with large ones, such as the African Union, now having the power to develop wider trade links and compete with more developed economies like the USA and EU.
- Overall judgement of extent. Eg highly developed economies negotiate links which are often bilateral and mutually beneficial initially, but they manage these links to focus on maximising benefits and limiting issues as the steel import example from China helps to show.

Question	Part	Marking guidance	Total marks
04		**Evaluate the effectiveness of different agencies in promoting global growth and stability without creating inequality.** **AO1** – Knowledge and understanding of global governance. Knowledge and understanding of agencies involved in helping to develop and manage global governance. Knowledge and understanding of the aims of agencies to promote growth and stability. Knowledge and understanding of the concern that agencies can exacerbate inequalities. **AO2** – Application of knowledge and understanding to evaluate the effectiveness of different agencies in promoting global growth and stability without creating inequality. Application of knowledge and understanding to draw conclusions on this issue.	**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, specifically the global governance section. The question requires evaluation of effectiveness of different agencies in promoting global growth and stability without creating inequality. Examples of agencies involved in global governance may be used in order to evaluate their effectiveness, considering both successes in developing global governance and issues that have created inequality. A conclusion may then be drawn to the effectiveness of agencies in global governance overall.

AO1

- Knowledge and understanding of global governance.
- Knowledge and understanding of agencies involved in helping to develop and manage global governance.
- Knowledge and understanding of the aims of agencies to promote growth and stability.
- Knowledge and understanding of the concern that agencies can exacerbate inequalities.
- Knowledge and understanding from other areas of the specification if accurate and relevant to the question.

AO2

- Awareness of the role that different agencies play in helping to promote and manage global governance, growth and stability. Eg the United Nations (UN) has a range of sub-sections, including the security council which focuses on global peacekeeping and the World Health Organization (WHO) that helps to manage the spread and eradication of disease. The World Trade Organization (WTO) is another organisation that focuses more on helping to manage global trade, focusing mainly on promoting free trade and limiting trade disputes.
- Evaluation of the effectiveness of different agencies in promoting global governance, growth and stability. Eg the UN is a global organisation with almost all countries in the world represented. It aims to take a fair and balanced approach to issues, but it has limited power beyond meetings and policies so countries have ignored some decisions in the past. The WTO similarly represents almost all countries in the world, covering 98% of global trade and has settled a range of disputes in the past, but some rulings tend to favour richer nations and large trade blocs and trade agreements tend to overshadow the organisation.
- Awareness of how agencies can develop inequality. Eg as the USA, and other more developed nations, provide the most finance to the UN's budget they seem to have more say in key decisions. Also, not all nations represent the Security Council and there are five permanent members with veto power that gives them an unfavourable advantage over key decisions. The WTO still allows trade deals to continue that have tariffs and restrictions that benefit richer nations, especially in the primary sector such as agriculture.
- Evaluation of how effectively agencies can limit, reduce or respond to inequality. Eg alongside the five permanent members of the security council in the UN there are ten others that are voted in for a two-year period to give balance. The WTO have set up specific legal frameworks to manage trade disputes and have set targets to encourage more free flowing trade between developed and less developed economies.
- Evaluation of the overall effectiveness of agencies in promoting global growth and stability without creating inequality. Eg the UN is arguably the world's largest and most important organisation due to its range of branches and global scope. It aims to help facilitate peace and development with some effectiveness at limiting conflicts, reducing poverty and limiting disease. However, rulings can be ignored by rich and powerful nations and other groupings, such as the G8 and G20 who are often more effective at making decisions, although these then tend to favour the more powerful nations.

Section B – Resource security   **Total for this section: 40 marks**

Question	Part	Marking guidance	Total marks
05	1	**The role of transnational corporations in global energy is to…** Key – A: extract and distribute energy between locations.	**1** **AO1=1**
05	2	**Which of the following are BOTH physical factors that affect water supply?** Key – D: Suitable rock type **and** reliable rainfall	**1** **AO1=1**
05	3	**Which of the following is a strategy used to increase energy supply?** Key – A: Development of renewable sources	**1** **AO1=1**
05	4	**Which of the following are BOTH negative environmental impacts of dam or barrage construction?** Key – C: Habitat destruction **and** creation of greenhouse gases	**1** **AO1=1**
05	5	**A disagreement between two or more groups over the rights to water access it known as…** Key – B: water conflict.	**1** **AO1=1**

Question	Part	Marking guidance	Total marks
06		**Analyse differences between the energy mixes of the countries shown in FIGURE 3.**	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 differences between the energy mixes of China, USA, India, Russia and Japan based on 2017 data displayed in a compound bar chart. Answers should identify key differences between the mixes, with reference to specific data, main trends and data manipulation for higher marks.

AO3

- For coal use China leads the way with nearly 2000 Mtoe, the vast majority of its primary energy. The USA and India use less than a quarter of the amount of coal, with less than 400 Mtoe. Interestingly India has slightly more coal use, although has a smaller total energy use overall. Russian and Japan both have only a third of this. As a proportion of consumption China has the most coal use with it making up two thirds of its energy source. Second is India with less than half used on coal.
- For oil use the USA has the highest amount with nearly 800 Mtoe. China has around half this amount and both India and Japan a quarter. As a proportion of energy use oil makes up the most in the USA, with over a third of the total energy source. Japan has a similar proportion and similarly to the USA is its biggest source overall. China, India and Russia all have less than a quarter of total energy production from oil.
- The USA also leads for natural gas with around 600 Mtoe. China, India and Japan have less than a quarter of this amount, but Russia is in second with 400 Mtos. For Russia, gas is its biggest single source, accounting for half of primary energy. For the USA it is under a third and for the other countries less than a quarter.
- China leads the way with renewables, with just over 200 Mtoe, only slightly more than India. The USA has half this amount. For Russia and Japan the amount is negligible. It makes up the largest proportion overall of India's sources at around a quarter. For all other countries it makes up less than a tenth of overall sources.
- For 'other' sources the USA is the highest with around 200 Mtoe. Russia is second with a quarter of this and then China with a fifth. For India and Japan the amount is negligible.
- For the overall primary energy breakdown China has the most with nearly 3000 Mtoe. Two thirds of this is coal. The USA comes second with approximately 2200 Mtoe and has a more balanced mixture of energy, with oil as the largest source just ahead of natural gas. India has a primary use of around

800 Mtoe. Coal makes up over a third of this mix, with renewables the second highest amount. Russia has 700 Mtoe overall, with natural gas making up about half of this, followed by oil and coal. Japan has the least overall use, with only half of India's total, around 400 Mtoe. This is mostly a mixture of oil, coal and natural gas, with oil making the largest contribution of over a third.

Question	Part	Marking guidance	Total marks
07		**'Energy supply is the most important factor in the successful development of water desalination.'** **To what extent do you agree with this statement?** **AO1** – Knowledge and understanding of connections between water supply and energy supply as exemplified through water desalination. Knowledge and understanding of factors involved in energy supply and access. Knowledge and understanding of factors involved in water supply and access. Knowledge and understanding of other important factors involved in water desalination. **AO2** – Application of knowledge and understanding to form a judgement on the extent to which there is agreement with the question on whether energy supply is the most important factor in the successful development of water desalination on a significant scale.	**9** **AO1=4** **AO2=5**

Level	Marks	Descriptor
3	7–9	**AO1** – Demonstrates detailed knowledge and understanding of connections between water supply and energy supply as exemplified through water desalination. **AO2** – Applies knowledge and understanding to the novel situation, offering detailed analysis and assessment, 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 connections between water supply and energy supply as exemplified through water desalination. **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 connections between water supply and energy supply as exemplified through water desalination. **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 with focus on connections between water supply and

energy supply as exemplified through water desalination. Knowledge and understanding must be applied to form a judgement on the extent to which there is agreement with the question on whether energy supply is the most important factor in the successful development of water desalination on a significant scale. Answers may draw in awareness of both energy and water supply factors, as well as other important factors like development level and technology, required for effective water desalination and compare their importance to help form an overall judgement.

AO1

- Knowledge and understanding of connections between water supply and energy supply as exemplified through water desalination.
- Knowledge and understanding of factors involved in energy supply and access.
- Knowledge and understanding of factors involved in water supply and access.
- Knowledge and understanding of other important factors involved in water desalination.
- Knowledge and understanding from other areas of the specification if accurate and relevant to the question.

AO2

- Discussion of the role that energy supply has in the successful development of water desalination at a significant scale. Eg in California desalination is a growing industry due to the increased demand for water and limited fresh water sources. It is energy intensive and there is currently an effective supply of fossil fuels, but there are concerns that this is unsustainable. Technology has therefore been developed to increase the efficiency of energy use by up to 25% and the development of renewable energy production is underway. In Oman desalination has developed at the Barka 4 plant which relies heavily on a supply of natural gas to be operational, but technology has been applied to make it more efficient than normal plants, through the application of energy recovery processes.
- Discussion of the role that water supply has in the successful development of water desalination at a significant scale. Eg a saline water source is essential to create water from desalination. In California there is access to the Pacific Ocean and whilst it can be argued that this is a constant supply it is not always effective to treat and there have been pollution concerns. There has therefore been a move to treat brackish water first which is quicker and easier to convert. The Barka 4 plant in Oman is on the coastline and requires 281 000 cubic meters per day of water from the ocean. This is expected to increase by up to 6% per year to meet regional demand, but the argument is that this is sustainable due to the constant sea access.
- Discussion of the role that other factors have in the successful development of water desalination at a significant scale. Eg in California there are key concerns linked to the economic price of desalination, both in terms of costs required by the industrial processes but also the cost of water once complete compared to other water sources. There have also been protests about the environmental impacts of fossil fuel use and impacts on ecology of water sources used. Technology is also a factor that needs considering in terms of maintenance and upgrading facilities, especially if moving into renewable energy resources in the future. The Barka 4 plant in Oman would not be as well established and effective if it was not for the huge amounts of investment, government support and technological research that has all been applied to help develop its infrastructure, energy efficiency and optimum output.
- Comparison of different factors in helping to form a judgement in relation to the question. Eg whilst energy supply is an important concern the access to water is essential for desalination to take place effectively as this is the created product and as areas like California have shown, technology has been developed to make energy use more efficient whilst still requiring a water supply. The Barka 4 plant in Oman certainly needs energy to be operational, but access to the sea is arguably more important, especially with the projected growth rates and technological innovation put in place to make it one of the most energy efficient plants of its size in the world.

Question	Part	Marking guidance	Total marks
08		**Critically evaluate the impacts of EITHER water OR energy supply management on resource security and human welfare.** **Use a case study to support your answer.** **AO1** – Knowledge and understanding of a case study of either water or energy in a global or regional setting to illustrate impacts of its management on resource security and human welfare. Knowledge and understanding of factors that influence water supply. Knowledge and understanding of strategies to increase water supply. Knowledge and understanding of strategies to manage water consumption. Knowledge and understanding of factors that influence energy supply. Knowledge and understanding of strategies to increase energy supply. Knowledge and understanding of strategies to manage energy consumption. **AO2** – Application of knowledge and understanding to critically evaluate the impacts of management on resource security and human welfare.	**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. Candidates need reference to an example of either water or energy resource issues in a global or specified regional setting to illustrate and analyse a key theme and

relationship between resource security and human welfare and attempts to manage the resource. This therefore requires links to other sections within Resource Security and judgement to be made in order to critically evaluate impacts. Evaluations of management of the supply of the chosen resource may have both positive and negative impacts on resource security and human welfare, possibly with an overall judgement of the key impacts. Max Level 2 if response only addresses resource security or human welfare.

AO1

- Knowledge and understanding of a case study of either water or energy in a global or regional setting to illustrate impacts of its management on resource security and human welfare.
- Knowledge and understanding of factors that influence water supply.
- Knowledge and understanding of strategies to increase water supply.
- Knowledge and understanding of strategies to manage water consumption.
- Knowledge and understanding of factors that influence energy supply.
- Knowledge and understanding of strategies to increase energy supply.
- Knowledge and understanding of strategies to manage energy consumption.
- Knowledge and understanding from other areas of the specification if accurate and relevant to the question.

AO2

- Critical evaluation of the impact of water supply management on resource security. Eg in California a range of different steps have been taken to manage water supply due to precipitation and population imbalances in the region. Groundwater management has been put in place to limit over-extraction from aquifers, improvements have been made to infrastructure such as pipelines and aquifers to limit water loss and allow interconnectivity, ten drainage basins are now managed within this network, and desalination has been set up to create further sources. Whilst this has allowed for more water security to some extent, there is still concern about over-extraction from groundwater, rising demand from population and industry and the changing climate meaning that the network is not clearly sustainable for future supply as it has been decreasing over time.
- Critical evaluation of the impact of water supply management on human welfare. Eg in California there have been issues over ownership of land and water with Native American tribes often losing out to companies and the government in disputes. To help ensure constant supply the region has introduced water use restrictions that has meant people have had less access and needed to change methods. Food access has been restricted as the decreasing supply has limited the effectiveness of agriculture in the region. Some families have also had to relocate due to water access issues or loss of work on farms.
- Critical evaluation of overall impacts of water supply management. Eg in California they have attempted to manage water supply to increase sources and decrease factors that limit effective access with some clear success, but more needs to be done in the long term to make sure the supply is sustainable as there are both groundwater security and human welfare impacts that are developing in the region.
- Critical evaluation of the impact of energy supply management on resource security. Eg in the Arabian Gulf a range of factors have been applied to manage energy supplies in a secure way. There are a wide range of drilling sites for both oil and gas which are onshore and offshore to ensure a constant supply. This is carefully managed and monitored with geological surveying of potential test sites always underway. The geopolitical situation is also constantly managed with agreements between the gulf states in place to maintain peace to limit disruption. The trade of workers and technology within the region is also maintained to allow for constant supply and development. However, there is concern that as a finite resource the fossil fuels will run out in the future so more needs to be done to move onto renewable resources too.

- Critical evaluation of the impact of energy supply management on human welfare. Eg in the Arabian Gulf energy supply management has allowed for a lot of excess energy to be used in trade with other countries which has brought money into the region that can be invested in development. This has seen the improvement in urban areas and standard of living on the whole, although there is criticism that it has also increased wealth inequalities and both minority groups and women have been restricted. There are also concerns about unfair treatment of some manual labourers, especially migrants, on energy rigs and pipelines in the region, with some dying due to accidents and heat exhaustion.
- Critical evaluation of overall impacts of energy supply management. Eg in the Arabian Gulf energy is managed effectively to allow a constant supply and excess resources that have been used to improve the standard of living for most people. But there are concerns about the long-term sustainability of the energy source and developing inequalities and human rights in the region linked to the resource.

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