A-LEVEL
Geography

7037/2 - Paper 2 - Human Geography

Mark scheme

7037

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Version/Stage: 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 Assessment Writer.

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

Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

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 descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets 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 descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

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, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which 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 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.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

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

Explanation of annotations

Annotation	Meaning/Use
?	Unclear
[	Left square bracket
]	Right square bracket
^	Omission mark
Acc?	Poor accuracy
AO1	Assessment Objective 1
AO2	Assessment Objective 2
DP	Developed point
H Line	Incorrect
JUST	Level or point just awarded
L1	Level 1
L2	Level 2
L3	Level 3
L4	Level 4
LF	Loses focus
NAQ	Not answered the question
NC	Nothing Creditworthy
REP	Repetitive
SEEN	Reviewed but no marks awarded
Tick	Correct point
TV	Too vague
V Wavy	Not relevant/incorrect
Highlight	Highlight
On Page Comment	On Page Comment
Off Page Comment	Off Page Comment

Section A

Qu	Part	Marking guidance	Total marks
01	1	**Explain the concept of the 'global commons'.** <u>Mark scheme</u> Award one mark each for points of knowledge or understanding. Allow extra marks for developed points (d). <u>Notes for answers</u> Allow credit for specific knowledge of what the 'global commons' are and why they need protection. Candidates must outline the concept and explain why we they need protection for full marks. Max 1 mark for list of examples without elaboration. • The global commons refers to the Earth's shared resources (1), such as the deep oceans and atmosphere (1) (d). • The global commons includes those areas that have no national governance but are used jointly by all people (1). The only land-mass considered to be part of the global commons is Antarctica (1). • Some people define the commons to be even broader to include resources that are shared by all but not controlled by any single country (1) for example, cyber-space, language and science (1) this is referred to as the 'common heritage of humanity' (1) (d). • Access to such shared resources has historically been difficult but advances in technology mean that such resources are in danger of being over exploited (1) for example the potential oil reserves in Antarctica (1). • The notion of the tragedy of the commons (1) as there is no single jurisdiction there is always the potential for overexploitation (1). If an individual country / group acts independently this will be contrary to the whole group and the shared resource becomes depleted (1) (d). • As current resources become depleted there will be an increasing need for the global commons to meet the needs of the world's population (1).	4 **AO1 = 4**
01	2	**Complete Figure 1c and analyse the temperature variations shown in Figures 1a, 1b and 1c.** AO3 – Analysis of climatic statistics to examine variations in the features of climate in Antarctica.	6 **AO3 = 6**

Mark scheme

1 mark for completing the LQ and UQ correctly

1 mark for calculating the IQR. Accept a negative number. No requirement to put ^{o}C.

4 marks for analysing the temperature variation

Notes for answers

Interquartile Range:
Upper-quartile UQ = $\frac{n + 1}{4}$ th position = **-4.7 ^{o}C**

Lower quartile LQ = $\frac{3(n + 1)}{4}$ th position = **-10.4^{o}C**

Interquartile Range = **5.7^{o}C**

This question requires analysis of temperature variation between 1950 and 2016. They should use both figures for maximum marks. For maximum marks there should also be use of specific data.

No credit for straight descriptive lifts.

AO3

- Temperatures obviously fluctuate in both figures (1). From the lowest temperature in 1959 of -8.2^{o}C to the highest in 1989 of -1.2^{o}C (1). There is a higher degree of variation in the mean July (winter) temperatures than the annual mean (1).
- The overall range in July temperatures is 12.2^{o}C and it is approximately 7.1^{o}C for annual temperatures (1). Once the anomalies are removed the IQR shows that actually there is much less variation in July temperatures of only 5.7^{o}C, compared to annual temperatures (1).
- Overall trends in figure 1b suggest that temperatures are increasing at Faraday and over time the amount of variation is decreasing (1). Between 2006 and 2016 the range was about 3^{o}C whereas between 1950 and 1960 it was more than double than that (1).
- Further evidence of this trend of increasing temperatures is provided by the fact in 1a the 4 warmest July temperatures

		have occurred since 2000, whereas the 2 coldest temperatures were found in 1976 and 1980 (1). Credit annotation of the graph, e.g. average line if referenced in answer.	

01	3	**Using Figure 2 and your own knowledge, assess the extent to which this pattern is similar to the global trade in a food commodity or manufactured product you have studied.** **AO1** – Knowledge and understanding of the patterns of world trade in oil and the food commodity or manufacturing product studied. **AO2** – Applies knowledge and understanding to the novel situation to analyse and evaluate the extent to which there are similarities and differences in the pattern. <u>Mark scheme</u> **Level 2** (4–6 marks) **AO1** – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change. **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 with clear relevance. **Level 1** (1–3 marks) **AO1** – Demonstrates basic knowledge and understanding of concepts, processes, interactions, change. **AO2** – Applies limited knowledge and understanding to the novel situation offering basic analysis and evaluation drawn from the context provided. Connections and relationships between different aspects of study are basic with limited relevance. <u>Notes for answers</u> This question requires knowledge of the world trade in either a food commodity or manufactured product. Answers should show awareness of the extent to which this world trade compares with world trade in oil. The answer will be very dependent on the choice. No credit for description of Figure 2 in isolation. **AO1** • Trade patterns of food commodities are very much dependent on the where the food can be grown. This pattern has become more complex with new technologies allowing food to be grown more universally. • Food commodities will vary depending on the example. For example bananas are mainly grown in between the tropics and production is centred on Latin America, West Africa and Indonesia and India. 80% of exports are produced in Latin America and the Caribbean. The largest importers are the EU	6 **AO1 = 2** **AO2 = 4**

		and the US. 90% of the price stays in HICs. • Manufactured goods flows are mainly and traditionally a movement of high value manufactured products from the more developed/high income countries to the less developed/low income countries, and of low value manufactures from the less developed countries to the more developed, although this is no longer so clear cut. • World trade in manufactured products will very much depend on the example chosen. Textiles are predominantly manufactured in south and south-east Asia, particularly in the low labour cost areas of Bangladesh and Vietnam. There are also pockets of manufacturing in Eastern Europe. The largest importers are the rich developed countries such as the US, UK and Japan **AO2** • To some extent there will be similarities with whatever example is used. Figure 3 shows that the biggest consumers of oil are the EU and US/Canada. The EU consumes 22.4 million barrels, which is the largest value. It imports oil from a variety of locations. This is similar to most world trade patterns. For example it compares favourably with world trade in bananas or textiles. • Analysis of the similarities in the export patterns. For example many of the countries exporting oil are found in the tropics such as Latin America or in west Africa, this is similar for coffee and tea production. Many LICs are oil exporters. This will be similar to many primary food commodities. • Consideration of the extent to which the amount of oil exported is similar to the food commodity or manufactured product. For example, although LICs such as those in west Africa do export oil the amounts are often far less than food commodities. The pattern of oil may have more in common with manufactured products but this will depend on the product studied. • The extent to which the spread of countries is similar. Oil is very much a global product. It is exported from all continents except Australasia. The import patterns have an even larger spread. • The pattern of oil export is likely to be very different to the food commodity or manufactured product. Export of oil is dominated by the Middle East, producing 28.4 million barrels, more than double the next largest exporter (USA/Canada). This is unlikely to be the same for their product. They may consider the extent to which domination of one world region is also present for their commodity. For example, banana trade is dominated by exports from Latin America. Imports of most products dominated by EU countries and the US. • The extent to which there are differences between oil and the commodity studied. They may consider this geographically or economically. • An evaluation of the usefulness of the oil flow map would also be creditworthy as they may highlight that the oil map is only showing flows above 1million barrels so therefore any countries / regions receiving less than this will not be shown.	

01	4	**'Transnational corporations (TNCs) are the most significant factor in creating unequal flows of people and money within global systems.'** **With reference to a TNC, assess the extent to which you agree with this statement.** **AO1 –** Knowledge and understanding of the nature, role and impacts of a specified TNC. Knowledge and understanding of global systems and reasons for unequal flows of people and money. **AO2** – Application of knowledge and understanding to analyse and evaluate the extent to which a TNC contributes to unequal flows of money and people. <u>Notes for answers</u> The question requires links to be made between distinct elements of Global systems and international trade, specifically between the role of TNCs and unequal flows of money and people. Allow credit for >1 TNC. **AO1** • The concept of the global system and the flows of people and money within the system. • The causes of inequalities between and within countries as a result of globalisation. Unequal flows of people and money at different scales – global, regional and local. • Unequal flows of money lead to an increasing gap in wealth. Evidence suggests that this gap is decreasing between rich and poor countries but the gap within countries is widening as the wealthier residents are able to take more advantage of changes in education, technology and labour demands. • Workers are able to move more freely due to globalisation. However this movement is mainly from poor to richer countries. This creates an unequal flow of people. • Benefits of flows of people include the transfer of skills and new ideas. Labour shortages are addressed and it reduces unemployment in host countries. Negative include the 'brain-drain' as the most talented individuals are attracted by higher wages and improved working conditions. Outsourcing causes unemployment in original country. • Knowledge of the nature of TNCs and their contribution to a global system. TNCs are found across all sectors of industry and many are truly global in the sense that they produce global brands which are sold across the globe for example Coca-Cola. • TNCs are hierarchical and operate on a top-down basis from a HQ in a developed country. This means that branches are vulnerable to change as they are not part of the decision-making process for example there may be sudden factory closures or re-location resulting in sever job-losses.	20 **AO1 = 10** **AO2 = 10**

		• Knowledge of the nature of a specific TNC. For example Nike based in Oregon, USA employs 44 000 people worldwide in the production of sportswear, equipment and services. It has a revenue in excess of $24billion. It has factories and offices located in 45 countries across the globe. Most of these are based in south and south-east Asia. Nike subcontracts or uses independently owned factories on a very much top-down based approach. • Changes in the TNC operations over time for example Nike began moving factories from the US to Asia in the 1970s to capitalise on potential Chinese labour force. **AO2** • Evaluation of the social and economic impacts of a specific TNC on the host country. For example, outsourcing has created considerable employment in countries like Vietnam. However, there have also been concerns about child labour. Economically the success of Nike has attracted other TNCs to invest in Vietnam. • Evaluation of the social and economic impacts on country of origin. For example, the increased tax revenue for the USA and local taxes in Oregon. However, there is high local unemployment due to lack of manufacturing in the US. • Analysis of the role of TNCs in creating unequal flows of people. In the host country, there is increased rural-urban migration as farm workers seek out higher wages in TNC factories or call-centres. This creates a greater level of inequality between urban centres and rural areas. In the country of origin, there is a movement in of highly qualified individuals who are paid the highest wages for creativity in design and marketing. Conversely in inner city areas there is high unemployment due to the indirect loss of jobs through manufacturing plants moving to areas of lower wage costs. • Analysis of the role of TNCs in creating unequal flows of money. Majority of the profits are returned to the country of origin. Many TNCs take advantage of tax breaks and don't contribute to the host country, for example the recent controversy in the UK over TNCs such as Starbucks. In the host country, contrary to popular beliefs TNCs often pay higher wages – average wage is 40% higher than that paid by local firms this can result in local firms having to close due to lack of workers. On the other hand, many TNCs use local firms to complete part of the production process increasing investment in the local area. • Analysis of other factors creating unequal flows of people. For example, evidence of forced labour found in Qatar where migrants building the World Cup stadiums have their documentation held and have few rights. The Qatari government is exploiting some of the poorest migrants from poor countries such as Nepal. Higher wages in richer countries encourage a 'brain-drain' from poorer countries. For example, the UK	

		government actively encouraged the migration of Filipino nurses, leaving a lack of trained nurses in the Philippines. • Analysis of other factors creating unequal flows of money. These are varied and wide-ranging. Credit any factors which might be responsible. For example Colonialism, trade agreements, exploitation of resources. • Evaluation of the extent of the link between TNCs and unequal flows of money and people. TNCs can reduce inequality in flows of people by stemming flow of migrants for example Adidas operates many factories in Eastern Europe reducing the flow to western Europe. • Overall conclusion should seek to consider the extent to which TNCs are responsible in creating unequal flows of people and money. Any conclusion is valid as long as it is supported by evidence in the response.	

Marking grid for Question 1.4

Level/ Mark Range	Criteria/Descriptor
Level 4 (16–20 marks)	• 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 (AO2). • 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 (AO1).
Level 3 (11–15 marks)	• 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 (AO2). • 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 (AO1).

Level 2 (6–10 marks)	• 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 (AO2). • 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 (AO1).
Level 1 (1–5 marks)	• 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 (AO2). • 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. (AO1).
Level 0 (0 marks)	• Nothing worthy of credit.

Section B

Qu	Part	Marking guidance	Total marks
02	1	**Explain why an outsider perspective might give a different sense of place to an insider perspective.** <u>Mark scheme</u> Award one mark each for points of knowledge or understanding. Allow extra marks for developed points. For full marks there must be a clear contrast between and outsider and insider perspectives. Do not credit opposite points. <u>Notes for answers</u>	4 **AO1 = 4**

		• An insider perspective often means you live in the place, whereas an outsider perspective may mean that it is a place you have never visited (1). • An outsider perspective may mean you live in a place but you feel you don't belong (1) for example a recent immigrant who doesn't understand the culture (1) so this means may feel excluded from that place (1). • A festival go-er visiting Glastonbury will see it very differently from someone who has lived there for many years (1) their sense of place will be dominated by the festival itself (1) whereas the local resident will know what Glastonbury is like for the rest of the year (1). However someone who lives in the town who becomes homeless due to rising house-prices may also have outsider perspective (1) (d). • An outsider perspective may mean that your sense of place comes from media representations such as TV programmes (1). This means that your sense of place is determined by the programme makers (1) for example you may think that the East End of London is like Eastenders, high crime rates and large markets on every day (1). • An outsider perspective may develop because some groups of people feel excluded (1) for example Traveller groups who live on the edge of a rural village (1) are sometimes made to feel unwelcome when the village residents try to have them evicted (1). The villagers themselves may feel that they have a real sense of community which will be very different to how the travellers feel (1).	

02	2	**Analyse the data shown in Figure 3a and Figure 3b.** **AO3 –** Analysis of the data shown in two sources relating to average income and personal well-being in London boroughs <u>Mark scheme</u> **Level 2** (4–6 marks) **AO3** – Clear analysis of the quantitative and qualitative evidence provided which makes appropriate use of data to support. Clear connections between different aspects of the data. **Level 1** (1–3 marks) **AO3** – Basic analysis of the quantitative and qualitative evidence provided which makes limited use of data to support. Basic or limited connections between different aspects of the data. <u>Notes for answers</u> The question requires an analysis of both data sources. Connections could be made both within and / or between the figures. There could	6 **AO3 = 6**

		be both a comparison and a contrast of the two maps. They may consider the extent to which there is a relationship between them. **AO3** • There is no clear spatial pattern of well-being. The highest overall well-being for both satisfaction and happiness is Kensington and Chelsea. 4 boroughs have the lowest levels of overall satisfaction and these are found in north, south and east London such as Hackney and Lambeth. • Generally, there is a clear relationship with satisfaction and happiness. However, it is less clear in the middle scale of satisfaction as 2 boroughs had higher levels of happiness for yesterday but 1 had lower levels. • Figure 3b shows that the highest earnings are found mainly in west London boroughs with the highest being £105k + in Kensington and Chelsea. Lowest average earnings are found in Newham. On the whole, the western boroughs have higher average earnings than the eastern boroughs the exception is Tower Hamlets which earns £10-20000 more than Hammersmith and Fulham. • Analysis of the relationship between the figures. The happiest borough is Kensington and Chelsea on both well-being scores. This also has the highest average income of> £105k. so the statement could be said to be true. Tower Hamlets has a higher score on well-being and is also more satisfied overall than Newham which has much lower levels of average earnings. • Analysis of the extent to which the relationship is less clear. Westminster scores low on both well-being scores but has one of the highest average incomes in London. Islington and Tower Hamlets have the same average income but very different well-being scores.	

02	3	**Using Figure 4a, Figure 4b and your own knowledge, suggest how physical geography contributes to the character of a place.** **AO1 –** Knowledge and understanding of how physical geography can contribute to the character of the place. Knowledge of physical geography shown in figure 4a and 4b **AO2 –** Application of knowledge and understanding to this novel situation. Interprets 4a and 4b to suggest how physical geography may have shaped the character of the place. <u>Mark scheme</u>	6 **AO1 = 2** **AO2 = 4**

Level 2 (4–6 marks)

AO1 – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change.

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 with clear relevance.

Level 1 (1–3 marks)

AO1 – Demonstrates basic knowledge and understanding of concepts, processes, interactions, change.

AO2 – Applies limited knowledge and understanding to the novel situation offering basic analysis and evaluation drawn from the context provided. Connections and relationships between different aspects of study are basic with limited relevance.

Notes for answers

The question requires an understanding of how an endogenous factor – physical geography may have contributed to the character of places shown in the map extract and photograph.

AO1

- Knowledge and understanding of how physical geography contributes to the character of a place. For example steep relief means that buildings are usually of a low density.
- Examples from their own place studies of where physical geography has played a role in developing the character. For example the growth of a seaside town on the coast with hotels, gift shops and a pier.
- Description of the character of the place shown in 4a and 4b. Small village located in a rural area. Linear in layout. Buildings made of slate.
- Description of the physical geography evident from the figures eg steep hills, local geology obviously slate.

AO2

- Interpretation of photo / painting to suggest how relief has impacted on the character of the villages. Relief is steep in the area shown by surrounding mountains, this has resulted in 4b being built along the valley meaning it is linear in shape. Buildings appear to be low density.
- Interpretation of the photo / painting to suggest how geology might have contributed to the character of the place. In 4a the houses are clearly made out of slate. They were possibly built for miners indicating that the character of the place revolves around the geology. This is also true of 4b.

		• The availability of slate has given rise to large slag heaps of waste material which are piled up alongside the houses. This affects the character of the place in the sense that it is dominated by its past and mining links. • Interpretation of other map evidence that might have contributed to the character of the area. The steep mountains and dark colour of the house give a 'brooding appearance'. Both images look very dark. • The dominance of slate in the picture and photo means that there is less greenery visible. This very much gives an industrial character to the places. • Analysis of change over time would also be valid. The physical geography may give rise to tourism – through mountain walking but also historical tourism. This will affect the character of the place as it ensures that the houses and buildings are preserved. • There may be an overall assessment of the contribution made by physical geography to the character.	

02	4	**'The changing character of a place over time is more effectively represented by statistical and cartographical sources than artistic sources such as painting, poetry and photography.'** **With reference to either your local or distant place, critically assess the extent to which you agree with this statement.** **AO1 –** Knowledge and understanding of the changing character of a place. Knowledge and understanding of how places are represented by qualitative and quantitative data. **AO2 –** Applies this knowledge and understanding to evaluate the use of different sources in showing how the distant or local place changes over time. <u>Notes for answers</u> The question links different parts of the theme of changing places, specifically the contrasting representations of place through different data sources and the changing character of either the local or distant place. Responses can be based on any data sources that fit the statement. The context should be **change** in the specific places studied. There should be reference to both statistical and cartographical sources. **AO1** • Knowledge and understanding of the characteristics of the place chosen. This might include socio-economic characteristics, demographics, employment, built environment, land-use. • Knowledge and understanding of how the place characteristics	20 **AO1 = 10** **AO2 = 10**

		have changed over time. Change over time could be described at a variety of scales and this will very much depend on the place chosen. For example, it may include change over hundreds of years or it may just be recent changes due to regeneration or a new housing estate. • Identification of endogenous and exogenous factors contributing to the character of places, such as physical geography, economic development, demographics, land-use, built environment, links with other places. • Generic awareness of the usefulness of different quantitative sources in determining the character of places. For example, census data is useful in determining the demographics of a place. Cartographic techniques show land-use such as agriculture or retail areas. • An understanding of the limitations of statistical and cartographical techniques. Maps historically were hand-drawn and only included features that the map-maker wanted you to see. Statistics can give you a skewed idea, for example census data can suggest that everyone was living in poverty if you only look at a narrow range of results. • Generic awareness of the usefulness of different qualitative artistic sources, such as music, paintings or photography. For example, photographs can give an accurate representation of change that we are able to visualise. • An understanding of the limitations of artistic sources. The issues surrounding subjectivity and the purpose of the art. • An understanding of what is meant by 'representation of place'. Knowledge of how and why places are represented. **AO2** • Analysis of how and the reasons why the place studied is represented in different forms. How the representations of the place may change over time due to the changing characteristics or needs of the stakeholders. • Analysis of how statistical sources are used to represent changing characteristics in the place studied. For example, census data can be used to show different demographics and employment types, levels of education etc. Specific reference to the changing characteristics shown by the statistical source. • Evaluation of the usefulness of the statistical source in representing the change accurately. Consideration of the limitations of the source in showing the change. They may consider that statistics can be manipulated. Many people don't complete the census. • Analysis of how cartographical sources are used to represent changing characteristics in the place studied. For example, maps can show changes in a settlement such as new housing estates, giving you an idea of the scale of the change. Specific	

		reference to the changing characteristics shown by the cartographical source. • Evaluation of the usefulness of the cartographical source in representing the change accurately. Consideration of the limitations of the source in showing the change. They may consider that maps in the pasts were often hand-drawn and therefore open to subjectivity. OS maps limit what is shown – for example it is not possible to always be able to tell land-use and there may be no indication of what buildings are used for. Maps are not always updated that frequently. • Analysis of different artistic sources used in showing changing characteristics of the place studied. Paintings can be used to show historical change. Use of before and after photos to show how characteristics of retail areas have changed due to immigration for example. Music can represent people's lived experiences of change over time. • Evaluation of the reliability of artistic sources in providing an accurate representation of changing characteristics of the place studies. A consideration of the intended audience and subsequent subjectivity. • Different perceptions of what constitutes an effective representation could also be considered. • A critical assessment of how their place may be represented in a variety of forms and all of these may be used by different audiences and have different meanings to different groups of people. • Critical assessment of the extent to which the statement is true. Reflection on the effectiveness of how the place studied is represented. A valid response would be to consider the ways in which their own lives have been affected by the ways in which their place is represented. • Overall assessment of the extent to which statistical and cartographical techniques provide a more effective representation of places.	

Marking grid for Question 2.4

Level/ Mark Range	Criteria/Descriptor

Level 4 (16–20 marks)	• 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 (AO2). • 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 (AO1).
Level 3 (11–15 marks)	• 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 (AO2). • 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 (AO1).
Level 2 (6–10 marks)	• 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 (AO2). • 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 (AO1).
Level 1 (1–5 marks)	• 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 (AO2). • 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. (AO1).

Level 0 (0 marks)	• Nothing worthy of credit.

Section C

Qu	Part	Marking guidance	Total marks
03	1	**Select the correct pair of consequences that result from the development of edge cities.** D	1 **AO1 = 1**
03	2	**Choose the correct definition for urbanisation from the list below.** B	1 **AO1 = 1**
03	3	**Which of the following describes the process of decentralisation?** D	1 **AO1 = 1**
03	4	**Which of the following is an accurate description of characteristics of the water cycle in an urban area?** C	1 **AO1 = 1**
03	5	**Analyse the data shown in Figure 5a and Figure 5b.** AO3 – Analysis of the spatial variation in temperature deviation from the median across Portland Mark scheme **Level 2** (4–6 marks) **AO3** – Clear analysis of the quantitative evidence provided which makes appropriate use of data to support. Clear connections between different aspects of the data. **Level 1** (1–3 marks) **AO3** – Basic analysis of the quantitative evidence provided which makes limited use of data to support. Basic or limited connections between	6 **AO3 = 6**

		different aspects of the data. <u>Notes for answers</u> The question requires analysis of the temperature variations across Portland. They should analyse the differences in 5b using 5a to examine variations in land-use. They should seek connections between the two maps and / or within figure 5b. There is no credit for explanation of the heat island effect in Portland. **AO3** • Highest increased temperatures above 1.4^{o}C are found in a broad belt extending along the Columbia River in the north of the city. This extends right along the northern boundary. • There is also a band of higher than the median temperatures along both sides of the Willamette River. This is probably the CBD as high concentration of museums and retail. • There is also a high spot in south-east Portland in Powell Butte Nature Park. • The lowest temperatures are found running in a broad NW-SE belt on the western edge of the city, where Forest Park is located. • The south-east corner also mainly has lower temperatures. There are also isolated spots of lower temperatures found in more central areas. • Generally, temperatures are lower in green areas such as Forest Park. This can also be see round the edges of Smith Lake. However, this is not always the case as there is higher temperatures found in Powell Butte Park even though this area is mainly lower temperatures. • The areas surrounding the airport has much higher temperatures and the highest variations are found here. • Students may note that some of the highest variations are seen in the northern tip of Portland. This area appears to be less built up and has a large lake and green areas. Therefore, this might be unexpected.	

03	6	**Using Figures 6a, 6b, 6c, 6d and your own knowledge, assess the extent to which you agree that Vancouver is an example of a post-modern western city.** **AO1** – Knowledge and understanding of the concept of a post-modern western city. **AO2** – Application of knowledge and understanding to analyse and evaluate the extent to which the evidence in figure 6 suggests that Vancouver fits the concept of a post-modern western city.	9 **AO1 = 4** **AO2 = 5**

Mark scheme

Level 3 (7–9 marks)

AO1 – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout.

AO2 – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Analysis and evaluation is detailed and well supported with appropriate evidence. A well balanced and coherent argument is presented.

Level 2 (4–6 marks)

AO1 – Demonstrates some appropriate knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant though there may be some minor inaccuracy.

AO2 – Applies some knowledge and understanding appropriately. Connections and relationships between different aspects of study are emerging / evident with some relevance. Analysis and evaluation evident and supported with some appropriate evidence. A clear but partial argument is presented.

Level 1 (1–3 marks)

AO1 – Demonstrates basic/limited knowledge and understanding of concepts, processes, interactions and change. These offer limited relevance with inaccuracy.

AO2 – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Analysis and evaluation basic and supported with limited appropriate evidence. A basic argument is presented.

Notes for answers

The question requires knowledge of the concept and characteristics of a post-modern city. Answers should show awareness of the extent to which Vancouver fits these characteristics.

AO1

- Knowledge and understanding of the concept of a post-modern city. The term describes the changes that took place in Western cities in the late twentieth century. It mainly reflects changes in architecture and urban structure but also reflects a change in socio-economic characteristics.
- Understanding of the move away from functional architecture to one that is more an expression of art such as the Guggenheim in

Bilbao or the Shard.

- Knowledge of the changes in socio-economic characteristics such as increased ethnic diversity but increased social segregation. Move from mass production of goods to a service sector focusing on knowledge based industries. Telecommunication industries tend to dominate.
- Knowledge of more fragmented urban forms that characterise post-modern cities – development of edge cities and hi-tech corridors.
- Urban government is dominated by private and public partnerships. Services provided by the market rather than public funding.
- An understanding of the concept of post-modernism. A philosophical movement that is shrouded in uncertainty. It sees modern society as outdated. Post-modernism celebrates greater diversity be it in ethnicity or architecture.

AO2

- Evaluation of the extent to which Vancouver fits the overall concept of a post-modern city. It is a western city. The idea is based on US cities such as LA so as with other post-modern cities, it may not fit the concept as well.
- Analysis of the architecture shown in the photographs. 6a actually suggests more of functional landscape. Buildings are relatively uniform with a functional appearance. There is a predominance of skyscrapers. However, 6b certainly suggests the idea of post-modernism with the glass dome – idea of flagship development. There is also some evidence of varied architecture as well with the skyscrapers taking on different shapes and using a variety of materials.
- The photos also suggest a degree of polarisation. The area in the photograph looks overwhelmingly wealthy and the marina area also supports this. An assessment of the degree to which poorer residents are excluded would be a legitimate consideration.
- Analysis of the photographs to consider urban form – the degree of fragmentation is difficult to assess. They may consider that the settlements on the Northern shore are edge cities. They are some distance from downtown Vancouver and are likely to be mainly residential as they look low rise. Therefore, this would support the idea of post-modernism.
- The pie-chart indicates a large degree of ethnic diversity as only 46% white. However, it is dominated by White and Asian (especially if you include Chinese) so students may conclude that it isn't that ethnically diverse as it is dominated by only two groups. The degree to which this support post-modernism will depend on viewpoint of what constitutes ethnic diversity.
- Analysis of employment data indicates that the service sectors dominate (5 x the number employed in goods producing sectors). This supports the concept of post-modern city. They may note

		that technology is not the largest sector and is one of the lower employers. • A legitimate response would be to consider the range of evidence available. It is not possible to judge certain characteristics such as social and economic inequality or government. Planning also can't be considered. Students may also consider the reliability or usefulness of the sources. For example, the photographs are just snapshots of the city so don't give an extensive picture of the architecture. • Overall evaluation may conclude that Vancouver certainly displays elements of a post-modern city. This is perhaps most evident in the architecture and urban form. It is also ethnically diverse and has a service-based economy.	

03	7	**Evaluate the relative importance of strategies used to develop sustainable cities in overcoming environmental problems for one urban area that you have studied.** **AO1** – Knowledge and understanding of strategies used to develop sustainable cities and knowledge and understanding of the environmental challenges found in one urban area studied. **AO2** – Application of knowledge and understanding to analyse and evaluate the extent to which strategies to develop sustainable cities could be utilised in an urban area studied. <u>Mark scheme</u> **Level 3** (7–9 marks) **AO1** – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout. **AO2** – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Analysis and evaluation is detailed and well supported with appropriate evidence. A well balanced and coherent argument is presented. **Level 2** (4–6 marks) **AO1** – Demonstrates some appropriate knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant though there may be some minor inaccuracy. **AO2** – Applies some knowledge and understanding appropriately. Connections and relationships between different aspects of study are emerging /evident with some relevance. Analysis and evaluation evident	9 **AO1 = 4** **AO2 = 5**

		and supported with some appropriate evidence. A clear but partial argument is presented. **Level 1** (1–3 marks) **AO1** – Demonstrates basic/limited knowledge and understanding of concepts, processes, interactions and change. These offer limited relevance with inaccuracy. **AO2** – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Analysis and evaluation basic and supported with limited appropriate evidence. A basic argument is presented. <u>Notes for answers</u> The question links two aspects of the contemporary urban environments section of the specification, namely sustainable urban development and the case-studies of urban areas. Students can also draw on the key idea of environmental problems in urban settings. **AO1** • Knowledge of strategies used to develop sustainable cities. Examples could include transport, recycling, affordable housing, renewable energy, sustainable urban drainage. • Understanding of the concept of sustainable cities. Meeting the needs of the present without compromising the ability of future generations to meet their own needs. • Knowledge and understanding of environmental challenges in urban areas. These might include waste disposal, lack of green space, traffic congestion, air pollution and water pollution. • Case-study of an urban area. Knowledge of the physical environment and the role played in environmental issues. Understanding of the environmental challenges found in the urban area. • The character of the study area – experiences and attitudes of population. **AO2** • Evaluation of the extent to which sustainable strategies are successful. Recycling schemes very much dependant on willingness and education of resident population. Water harvesting and recycling used in BEDZED has been successful in reducing water consumption by 50% • Analysis of extent of usefulness of sustainable strategies in the study area. For example, bike rental schemes may not be applicable in all urban areas if there is not a large cycle network. The development of public transport could be applied to most urban areas. • Evaluation of the success of sustainable strategies in the study area. For example, in Bangalore, rainwater harvesting employed in new housing developments. However, this is limited to housing provided for IT workers and not provided for the city's slums.	

		• Analysis of the effect of attitudes of the local population towards sustainable development. This is very much dependent on the case-study used. They may consider for example that in a LIC, the emphasis is more on improving economic and social well-being rather than environmental concerns. They may argue that sustainable development is a luxury that most residents / governments can't afford. • Extent of success of strategies to develop sustainable urban living may depend on the environmental problems found in the study area. For example, overcoming waste issues may be easier to tackle in London compared to overcoming water shortages in Mexico City. • Overall evaluation of the relative importance of sustainable strategies and their likely success in overcoming environmental challenges in the study area.	

03	8	**'Britain's urban regeneration policies since 1979 have failed to address problems of economic inequality and social segregation. The gap between the richest and the poorest urban residents has widened.'** **To what extent do you agree with this statement?** **AO1 –** Knowledge and understanding of urban regeneration policies in the UK since 1979. Knowledge and understanding of the patterns of and issues associated with social segregation. **AO2 –** Application of knowledge and understanding to analyse and evaluate the relative success or failure of regeneration policies in tackling issues of social segregation. <u>Notes for answers</u> The question links various aspects of the Contemporary urban environments section of the specification, specifically urban policy and regeneration in Britain since 1979 with issues associated with social segregation and strategies to manage these. **AO1** • Knowledge and understanding of the key ideas of social segregation and economic inequality. The idea of urban 'regeneration' will be important as the focus of the question. • Knowledge and understanding of regeneration policies since 1979. These may include inner-city development corporations, city challenge, sustainable communities to name but a few. Credit any legitimate policies since 1979 to present day. • Knowledge of regeneration policies at a variety of scales from large-scale such as London Docklands to smaller scale projects such as New Islington. • An awareness of different aims of regeneration policies – economic, social and environmental.	20 **AO1 = 10** **AO2 = 10**

		• The causes of social segregation and issues associated with social segregation. • Inequalities tend to exist in terms of access to job opportunities, education, housing and basic public services such as water and sanitation. Knock-on impacts of this are poorer health, higher unemployment and a lack of social mobility. The poor get stuck in a cycle of poverty from which it is hard to escape. • Awareness of strategies to manage social segregation such as improvement to the built environment, improved provision of schools, improved access to affordable housing, greater provision of public transport. • Measures to deal with social variations eg health care such as spatial availability of clinics; health education programmes eg access to healthy living eg sports and leisure facilities. **AO2** • Assessment of the success and failures of different regeneration policies since 1979 such as UDCs, City Challenge, and NDCs. This may be generic or focused on a particular case-study. • Analysis of the varying aims of regeneration policies since 1979 in tackling social inequality. Temporal change may be considered as policies evolve over time from property-led schemes of the 1980s through to the more community focused projects of the 21st century. • Evaluation of the effectiveness of regeneration policies in tackling social inequality and segregation. For example, inner city development projects focused more on economic needs and failed to address housing needs of residents, forcing poorer residents out, increasing social inequality. Whereas, 21st century projects such as sustainable communities focused on improving access to housing through affordable housing schemes. The degree to which this was successful may be considered. • Evaluation of the success or otherwise of regeneration schemes in tackling the issue of affordable housing is key in addressing issues of social segregation. Some urban areas such as London and Manchester have seen average rents rise by over 50% since 2010. • Analysis of how different regeneration schemes have widened the gap between rich and poor. For example, redevelopment of the Royal William Yard in Plymouth by a partnership scheme resulted in gentrification of surrounding streets, pushing out less-wealthy residents, hence widening the gap. • Other strategies to reduce social inequality may be considered as an alternative to regeneration strategies such as access to job schemes, the living-wage, Sure-Start schemes. This approach would only be creditworthy if used to suggest that alternatives to regeneration might have an impact.	

		• Analysis of the severity of social segregation. The gap between rich and poor will be greater in some urban areas than others. Therefore, the success of regeneration schemes may be dependent on the severity of the gap in the first place. • Analysis of how change over time has moved from a top-down approach to a more holistic approach. The extent to which has been successful in reducing the gap between rich and poor. • An analysis of how the successes and failures of regeneration strategies are measured by successive governments. The biased nature of reports may be considered. The reporting of failure of projects by may be a political advantage to different political parties. • A legitimate comment would be an understanding that the aims of regeneration have not always been about reducing social inequality, therefore their success shouldn't perhaps be judged on their success in reducing the gap. • The gap between rich and poor may have widened as a result of factors other than regeneration schemes. For example deindustrialisation, studentification etc. • Overall conclusion may highlight the complexity of urban regeneration policies. It is difficult to evaluate success considering social inequality as a stand-alone factor. Success can be measured in a wide-variety of ways and it is difficult to be accurate in measuring that success. They may consider the political element of judgement. • An overall judgement of the extent of the success or failure of regeneration policies in reducing the gap between rich and poor should be addressed as a final conclusion. Any conclusion is valid as long as it supports the body of the essay.	

Marking grid for Question 3.8

Level/ Mark Range	Criteria/Descriptor
Level 4 (16–20 marks)	• 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 (AO2). • 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 (AO1).
Level 3 (11–15 marks)	• 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 (AO2). • 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 (AO1).
Level 2 (6–10 marks)	• 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 (AO2). • 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 (AO1).
Level 1 (1–5 marks)	• 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 (AO2). • 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. (AO1).
Level 0 (0 marks)	• Nothing worthy of credit.

Qu	Part	Marking guidance	Total marks
04	1	**Morbidity can be defined as:** A	1 **AO1 = 1**
04	2	**Which of the following population data would be appropriate to present as a dot map?** C	1 **AO1 = 1**
04	3	**Choose the example from the list below that supports a Malthusian perspective on population growth.** D	1 **AO1 = 1**
04	4	**Which of the following statements is true of the concept of the first Demographic Dividend?** C	1 **AO1 = 1**
04	5	**Analyse the data shown in Figure 7a and Figure 7b.** **AO3** – Analysis of predicted changes to crop yields due to climate change and current levels of undernourishment in the population. <u>Mark scheme</u> **Level 2** (4–6 marks) **AO3** – Clear analysis of the quantitative evidence provided which makes appropriate use of data to support. Clear connections between different aspects of the data.	6 **AO3 = 6**

Level 1 (1–3 marks)

AO3 – Basic analysis of the quantitative evidence provided which makes limited use of data to support. Basic or limited connections between different aspects of the data.

Notes for answers

The question requires analysis of both maps. Students should look for patterns in predicted changes to crop yields and patterns of current levels of child malnutrition. Connections could be made between and / or within the two maps.

AO3

- Most crop-producing regions are expected to see a negative change in crop yields. Less than a third of this land will have an increase of yields by 2050.
- The areas showing the largest decreases are found across the all continents except Europe. They tend to be found between the tropics. The areas showing the positive change are found mainly in the Northern Hemisphere and occur in a large belt across North America and Northern Europe / Asia descending further South in Central Asia. There are also very high levels of positive change found along the west coast of South America and in New Zealand.
- Africa is predicted to mainly have decreased yields with the exception of 5 countries in South and East Africa. Northern Africa will see the highest predicted decreases in yields.
- Whilst there is a tendency for the areas showing decreased yields to occur in LICs, many areas of high decreases also found in HICs such as Australia and USA.
- Areas of undernourishment > 5% are found across the globe with the exception of North America, Europe and Australasia. The highest levels above 35% are found mainly in Eastern Africa. Countries with 25-35% are again mainly found in Africa but they also occur in Asia and Central America.
- Many of the areas predicted to have lower crop yields are areas already undernourished. This is particularly evident in central and southern Africa and South Asia. For example, Namibia has high rates of predicted decrease in crop yields and 25-35% of its population undernourished.
- Most of the areas with projected crop increases currently are not countries with high levels of malnutrition. For example, Canada, Scandinavia and large parts of Russia.
- However many of the areas with the highest rates of predicted change do not have particularly high levels of undernourishment. This is particularly evident in Australasia, southern Europe and much of South America. For example Australia has some of the highest predicted loss in yields but has less than 5% of its population undernourished.
- Students should make connections between the data shown. For example, if the predicted decreases of 50% change in northern

		Africa occur then undernourishment rates are likely to increase from the current level of <5% • The correlation between countries with high levels of undernourishment (North Korea, Zimbabwe) and countries where crop yields are projected to fall rapidly is worrying. It appears that many of the places most at risk from pressure on crop yields are also the places where undernourishment is already rife. • They may also note that the picture is not that simple to interpret as 7a is divided into regions whereas 7b is at a country level. For example parts of the USA are likely to suffer large reductions in yields but we don't know how the % undernourished varies across the USA.	

04	6	**Using Figure 8 and your own knowledge, evaluate strategies used to ensure food security.** **AO1** – Knowledge and understanding of strategies used to ensure food security. **AO2** – Application of knowledge and understanding to evaluate Ghana's strategy and other strategies in ensuring food security. <u>Mark scheme</u> **Level 3** (7–9 marks) **AO1** – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout. **AO2** – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Analysis and evaluation is detailed and well supported with appropriate evidence. A well balanced and coherent argument is presented. **Level 2** (4–6 marks) **AO1** – Demonstrates some appropriate knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant though there may be some minor inaccuracy. **AO2** – Applies some knowledge and understanding appropriately. Connections and relationships between different aspects of study are emerging / evident with some relevance. Analysis and evaluation evident and supported with some appropriate evidence. A clear but partial argument is presented. **Level 1** (1–3 marks) **AO1** – Demonstrates basic/limited knowledge and understanding of concepts, processes, interactions and change. These offer limited	9 **AO1 = 4** **AO2 = 5**

relevance with inaccuracy.

AO2 – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Analysis and evaluation basic and supported with limited appropriate evidence. A basic argument is presented.

Notes for answers

The question requires an evaluation of strategies to improve food security. Answers should apply knowledge and understanding to the food strategy shown in Figure 8 and alternative strategies studied. The question refers to 'strategies' so the strategy in Figure 8 should be evaluated with at least one other strategy considered. No requirement to name the alternative strategy.
Only credit lifts from figure 8 if applied to the question.

AO1

- Knowledge and understanding of term food security. The availability and adequate access at all times to sufficient, safe and nutritious food.
- An awareness of regions / countries at risk of food insecurity. Highest risks found in Africa, Middle East and South Asia. Strategies used to ensure food security will be dependent on level of food security and local conditions / governance.
- Strategies to increase food security focus either on improved food production or reduction of food waste.
- Knowledge of strategies using biotechnology such as the Green Revolution. New seeds can tolerate specific conditions such as drought or salinity.
- Aeroponics and hydroponics grow plants without the need for soil. This benefits areas that have infertile soils or high levels of soil erosion. It is used widely in Almeria, Spain growing much of the EUs fruit and vegetables.
- Irrigation improves food production in areas that have an unreliable water supply and can increase crop yields by 400% It can also bring marginal land under cultivation to areas of high levels of food insecurity.
- Waste reduction schemes mean more food available for consumption. Such strategies widely used across the EU.
- Knowledge and understanding of social protection schemes to improve food security. For example, free school meal programmes in the UK aimed at reducing hunger and poor nutrition in vulnerable families.

AO2

- Analysis of Figure 8 to address how it is attempting to improve food security in Ghana. Growing a wider variety of crops, focusing on 5 which are staple foods in Ghana. Investing in new varieties of seeds to increase yields. Encouraging private investment and purchasing of land to increase levels of cultivation.

		• Evaluation of the likely successes in Figure 8. The amount of land that is cultivated will increase. Greater levels of investment may mean that marginal land in the arid north can be cultivated. Private companies can probably invest in irrigation schemes and use biotechnology to increase crop yields. By focusing on five staple foods, such as cassava, they can feed the local population rather than growing food that is not eaten locally. • Evaluation of the possible problems of the Figure 8 strategy. Local farmers have not been consulted and they may well feel neglected by the government. Local farmers may not be able to afford new seed varieties or will get into debt. They may be out-competed by TNCs and will lose out on land. TNCs may export much of the food so this will not benefit local people. • Analysis and evaluation of alternative strategies to ensure food security. Irrigation increases crop yields and the amount of land that can be cultivated. However large-scale schemes can be very damaging to the environment. Local rivers can be drained of useable water meaning local people lose their water supply. Salinisation is frequently an issue in hot areas. Hydroponics is very expensive and so doesn't benefit local farmers who lose out to TNCs. However it does provide jobs to local people and can increase the variety in local diets. • Overall assessment may emphasise that success of strategies to increase food security may depend on a variety of factors. However local farmers often lose out where large scale government-led schemes are used. The impact of different stakeholders may be considered as well as the overall level of food security.	

04	7	**Assess the extent to which population change in one country you have studied fits the demographic transition model.** **AO1** – Knowledge and understanding of population change in one country. Knowledge and understanding of the demographic transition model. **AO2** – Applies knowledge and understanding to analyse and evaluate the extent to which the country studied fits the demographic transition model. <u>Mark scheme</u> **Level 3** (7–9 marks) **AO1** – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout. **AO2** – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Analysis and evaluation is detailed and well supported with appropriate evidence. A well balanced and coherent argument is presented. **Level 2** (4–6 marks) **AO1** – Demonstrates some appropriate knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant though there may be some minor inaccuracy. **AO2** – Applies some knowledge and understanding appropriately. Connections and relationships between different aspects of study are emerging/evident with some relevance. Analysis and evaluation evident and supported with some appropriate evidence. A clear but partial argument is presented. **Level 1** (1–3 marks) **AO1** – Demonstrates basic/limited knowledge and understanding of concepts, processes, interactions and change. These offer limited relevance with inaccuracy. **AO2** – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Analysis and evaluation basic and supported with limited appropriate evidence. A basic argument is presented. <u>Notes for answers</u> This question makes connections between different themes in the	9 **AO1 = 4** **AO2 = 5**

		population and the environment section, namely the demographic transition model in the population change section and the requirement to study population change in one country. **AO1** • Awareness of factors in natural population change. Key vital population rates, specifically birth and death rates. Knowledge and understanding of the factors affecting population change. • Knowledge of changes in birth and death rates in the country studied. For example, in China there has been a rapid decrease in the birth rate due to the one-child policy. Death rates have also fallen considerably but recently have begun to rise due to an ageing population. • Knowledge of specific patterns of overall population change in the country studied. Likely future scenarios of change based on current rates. • Temporal change in overall population growth rates in the country studied and reasons for such change. • An understanding of the DTM. It represents change in European countries over time. It has 5 stages (originally 4) but there may be a need for a 6th stage. The DTM shows change in birth and death rates and the subsequent overall population change. • Awareness of the limitations of the DTM. Based on European countries over a period of 200+ years. LICs have undergone changes in much shorter space of time. The DTM doesn't take migration into account or population policies such as China's one-child policy. **AO2** • Evaluation of the overall fit of the DTM to the country studied. This will vary according to the case-study. For example, Uganda is on the transition between stage 2 and 3. Birth rates are beginning to show a fall and there has been a considerable fall in DR from 18.4 in 2000 to just under 11 in 2014. • Analysis of the change in birth rates in the country studied in relation to the DTM. India appears to be in stage 3 of the DTM as the BR is currently around 22. However, this fall has been very rapid and it was high about 40 during the 1970s. • Analysis of change in death rates in the country studied in relation to the DTM. For example, Japan has a death rate currently at 10.5 which has been rising since the 1980's. This suggests stage 5, although this rise is more than the DTM suggests for stage 5. • Evaluation of possible factors that may impact on population change and the fit with the DTM. For example, in the case of Uganda, government agencies and NGOs have worked hard at reducing the Death Rate. The DTM doesn't take human intervention into account. Change in Uganda is much more rapid than the European countries the DTM was based on.	

		• Analysis of the impact of migration in the country studied on its applicability to the DTM. This will depend on country studied. For example, in Germany, population policies have encouraged the immigration of young people. This may increase the birth rate which doesn't fit with the DTM. • Evaluation of alternative future population trends in relation to the DTM. For example, India may well have a rapidly ageing population which means it might miss out stage 4 altogether. • The overall extent to which the DTM is applicable to the country studied. Students may come to an overall conclusion and this should be based on the evidence presented.	

04	8	**'The role of international agencies and NGOs in combating disease will increasingly need to focus on the health impacts resulting from global environmental change.'** **To what extent do you agree with this statement?** **AO1** – Knowledge and understanding of health impacts caused by global environmental change and other factors. Knowledge and understanding of the role of agencies/organisations in eradication, mitigation and education. **AO2** – Application of knowledge and understanding to evaluate how effectively agencies and organisations can tackle health impacts caused by environmental change, and the degree to which this will become more important over time. <u>Notes for answers</u> The question requires links between several aspects of the Population and the Environment section of the specification, specifically environment, health and well-being, population change, environmental change and global population futures. These should be examined in the light of health impacts that occur as a result of environmental change and the management and mitigation of such diseases by NGOs and international agencies such as WHO. **AO1** • Knowledge and understanding of the health impacts of ozone depletion – skin cancer and cataracts are likely to feature. • Knowledge and understanding of the health impacts of climate change – thermal stress, changing distribution of malaria and other vector-borne diseases. Health impacts increased rates of drought and famine may also be considered. • Knowledge of the role of agencies/organisations in eradication, mitigation and education. • Awareness of the aims of NGOs and international agencies such as the WHO which include control of disease through the	20 **AO1 = 10** **AO2 = 10**

		reduction of disease incidence, prevalence, morbidity, or mortality to a locally acceptable level as a result of deliberate efforts; continued intervention measures are then required to maintain the reduction. • Understanding of current strategies, including eradication, mitigation and education. Strategies may be top-down/bottom-up in approach, local to global in scale. Prevention strategies eg health awareness programmes, early detection etc. • In the case of malaria, WHO recommends protection for all people at risk of malaria with effective malaria vector control – insecticide-treated mosquito nets and indoor residual spraying – effective in a wide range of circumstances. Other strategies include monitoring of antimalarial drug campaigns, surveillance tracking and development of vaccines. • Consideration of future policies and strategies, for example universal access to malaria prevention, diagnosis and treatment. Global targets include reducing malaria case incidence by at least 90% by 2030, eliminating malaria in at least 35 countries by 2030 and preventing a resurgence of malaria in all countries that are malaria-free. • Understanding of economic and social development and the role in combatting disease. • Consideration of other diseases / health issues unrelated to global environmental concerns that require management by international agencies and NGOs. **AO2** • Evaluation of the recent effectiveness of disease control. Control may be contrasted with elimination or eradication of the disease which in most cases is not feasible. The impact of changing disease / distribution of disease in controlling and management. • Evaluation of the importance of agencies in combating the health impacts that occur as a result of global environmental change. The need for global, national and local intervention. • Analysis of the extent of future risks in the light of environmental change. Increased spread and distribution of vector borne diseases may present new challenges. • Evaluation of different health risks, some more difficult to control and treat, eg skin cancer and others relatively easily with finances available, eg malaria. The role of new technologies and access to such technology in managing disease. • Varying levels of success of agencies involved in health risk reduction. Relative effectiveness of range of management (primary, secondary, tertiary care and source or prevention and sink or treatment concept). • Evaluation of effectiveness of strategies which are controlled by agencies with possibly differing goals: institutional global, eg the WHO, the UN and G8 to national, eg NHS, plus NGOs, eg Medicine Sans Frontiers, and Red X, to foundations, eg Bill and	

		Melinda Gates. Complex national care systems may be contrasted with barefoot doctors. • Effectiveness linked to socio-economic factors. Climate change may affect those living in poorest regions more. These will be countries least able to manage new or increased levels of diseases. Consideration of impact of changed distribution of vector-borne disease on more affluent countries such as USA. • Evaluation of the changing map of temperature and moisture which may lead to latitudinal and altitudinal shifts in the distribution of certain vectors, potentially exposing local populations to new diseases. Warmer winters may allow more vectors to survive from one season to the next, leading to faster and earlier disease development. • Evaluation of recent concerns regarding extinction of plants, especially in tropical areas. This may affect availability of drugs in future. • The extent to which management will need to focus on global environmental change rather than other health issues may be considered. For example, as societies become more affluent in poorer regions, there may need to be increased focus on non-communicable diseases such as heart disease and cancers. Deaths from such diseases may far outweigh those caused by environmental change. • Conclusion may indicate that all areas will be under increased threats from health risks from global warming but developing nations less likely to have finances and medical infrastructure to cope with increased problems associated with dengue and malaria. This signifies the need to strengthen health systems to deal with potential issues and greater global cooperation in responding to health issues.	

Marking grid for Question 4.8

Level/ Mark Range	Criteria/Descriptor
Level 4 (16–20 marks)	• 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 (AO2). • 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 (AO1).
Level 3 (11–15 marks)	• 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 (AO2). • 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 (AO1).
Level 2 (6–10 marks)	• 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 (AO2). • 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 (AO1).
Level 1 (1–5 marks)	• 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 (AO2). • 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. (AO1).
Level 0 (0 marks)	• Nothing worthy of credit.

Qu	Part	Marking guidance	Total marks
05	1	**Which of the following is a correct list of gases that are major contributors to the enhanced greenhouse effect?** C	1 **AO1 = 1**
05	2	**What is an inferred resource?** B	1 **AO1 = 1**
05	3	**Which of the following is an example of a local water conflict?** B	1 **AO1 = 1**
05	4	**Which of the following impacts would <u>not</u> be considered as part of an Environmental Impact Assessment (EIA) in relation to resources?** D	1 **AO1 = 1**
05	5	**Analyse the data shown in Figure 9a and Figure 9b.** **AO3** – Analysis of map data showing the extent of the relationship between greenhouse gas emissions and use of renewable energy. <u>Mark scheme</u> **Level 2** (4–6 marks) **AO3** – Clear analysis and interpretation of the quantitative evidence provided, which makes appropriate use of data in support. Clear connection(s) between different aspects of the data and evidence. **Level 1** (1–3 marks) **AO3** – Basic analysis and interpretation of the quantitative evidence	6 **AO3 = 6**

		provided, which makes limited use of data and evidence in support. Basic connection(s) between different aspects of the data and evidence. <u>Notes for answers</u> The question requires analysis of greenhouse gas emissions and renewable use in European countries. Answers should seek connections between and / or within figure 9a and 9b. **AO3** • Some evidence that the countries with lower percentages of renewable energy use are also the countries with highest greenhouse gas emissions. For example Belgium has <14.0% electricity generated by renewables and also has the highest levels of greenhouse gas emissions >12.22 tonnes of CO_2. • Romania and Sweden have some of the lowest greenhouse gas emissions in Europe and also have higher levels of renewable energy use. • However the pattern is not totally clear as several countries such as Iceland and Ireland have very high levels of greenhouse gas emissions but higher use of renewables. In the case of Iceland is it one of the highest greenhouse gas emitters and one of the highest users of renewable energy. • Many of the Mediterranean countries such as Spain, Italy and Portugal have relatively high levels of renewable use > 33.1% and also have lower levels of greenhouse gas emissions. • The Central European countries tend to have higher levels of greenhouse gas emissions and some of these also have the lowest use of renewables, for example Poland has 9.44 – 12.21 tonnes of CO_2 emissions and less than 14% renewable use. • The pattern of renewable use is quite sporadic with no clear spatial pattern. Highest use is spread across Europe – Iceland, Portugal, Sweden and Austria. With the exception of Belgium the lowest amounts are all found in Eastern Europe. • The overall pattern of close correlation is apparent but there are several instances where high greenhouse gas emissions are not matched by high renewable use and vice versa.	

05	6	**Using Figure 10a, Figure 10b and your own knowledge, assess the extent to which renewable energy can be used to achieve energy security.** **AO1** – Knowledge and understanding of the role of renewable energy strategies in increasing energy supplies. Knowledge and understanding of a renewable energy strategies. **AO2** – Applies knowledge and understanding to analyse and evaluate the success of the Scandale Beck Strategy to increase energy supply,	9 **AO1 = 4** **AO2 = 5**

		and energy security. Analysis of the extent to which energy security can be achieved through the use of renewables. Mark scheme **Level 3** (7–9 marks) **AO1** – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout. **AO2** – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Analysis and evaluation are detailed and well supported with appropriate evidence. **Level 2** (4–6 marks) **AO1** – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant though there may be some minor inaccuracy. **AO2** – Applies clear knowledge and understanding appropriately. Connections and relationships between different aspects of study are evident with some relevance. Analysis and evaluation are evident and supported with clear and appropriate evidence. **Level 1** (1–3 marks) **AO1** – Demonstrates basic knowledge and understanding of concepts, processes, interactions and change. This offers limited relevance with inaccuracy. **AO2** – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Analysis and evaluation are basic and supported with limited appropriate evidence. Notes for answers The question requires understanding of renewable energy strategies to increase energy supply and to apply knowledge and understanding to the source in assessing the degree to which attempts to increase the renewable energy supply have been successful in achieving energy security. Only credit lifts from figure 10a / 10b if applied to the question. **AO1** • Knowledge and understanding of sources of energy, both primary and secondary. Components of demand and energy mixes. Awareness of the contribution of renewables to the global energy mix. • Awareness of strategies to increase energy supply, specifically development of renewable sources.	

- Understanding of the environmental and sustainability issues and debates relating to renewables.
- Knowledge of how renewable scheme such as Scandale Beck work. For example HEP needs a drop in the height of water, in this case it is 200m in an upland environment. This turns a turbine to generate electricity and then water is returned to the beck so that there is no loss of water in the system.
- Knowledge of specific case studies of renewable energy, such as London Array wind farm or Iceland geothermal, including their contribution to energy supply.
- Understanding of economic and demographic trends affecting energy consumption.
- Understanding of possible resource futures linked to technological, economic, environmental and political developments.

AO2

- Analysis of Figure 10a to show how the scheme is contributing to an increased energy supply. It is estimated that it can supply 571 homes and 2400 mWH a year. This is also sustainable as CO_2 emissions are reduced by 1 186 tonnes.
- Analysis of Figure 10a to show how the scheme meets energy needs without compromising the local environment and local economy. It is long-lasting so should continue to provide energy whilst also providing local employment during construction. Environmentally it is designed so that there is no impact on fish stocks. However, this is a natural upland environment and there may be some visual impacts on the area.
- Evaluation of the effectiveness of the strategy in securing a regular energy supply. Figure 10b suggests that the amount of energy fluctuates. A legitimate approach would be to seek to explain this by considering the controlling factors on renewables for example in this case, rainfall amounts.
- Assessment of the overall success of Scandale Beck in terms of meeting energy security. It is a small-scale scheme but is able to power 571 homes whilst also being sustainable.
- Applied analysis of the Scandale Beck scheme in comparison to other forms of renewable energy such as biomass, wind, solar, geothermal, and wind. National renewable energy markets rapidly increasing and projected to continue to grow strongly in the coming decade and beyond. Many renewable energy resources exist over wide geographical areas, in contrast to other energy sources, which are concentrated in a limited number of countries. HEP however is restricted to specific areas, related to river flow and precipitation levels. Success of renewables is partially impeded by the relatively expensive technology needed, contrasting efficiency at current levels, the perceived impact of some renewable energy on the environment, or the loss of agricultural land used for food in the production of bio-mass for energy.
- Responses may focus on the overall level of success of renewables, particularly HEP schemes in comparison to Scandale

		Beck. • Assessing the level of success may be linked to growing need to find alternatives to fossil fuel energy sources in order to attain energy security. Political agreements mean there will have to be reductions in carbon released into the atmosphere, leading to a reduction in the use of oil and coal, and a growing recognition of the need to reduce consumption in homes, industry and transport. Changes in the rates of economic growth in various countries and regions will have consequences for their demands for power and their future energy mixes. • Consideration of alternative energy futures in relation to the development of renewable energy schemes such as Scandale Beck. As technological advances occur then schemes such as this may become more profitable. The need for such schemes may increase with increased political tensions in the Middle East and the greater need for energy self-sufficiency. • There should be an overall assessment of the success of Scandale Beck in increasing energy supply and the contribution this can make to achieving energy security.	

05	7	**Evaluate the success of strategies used to reduce the demand for water in achieving long-term sustainability.** **AO1** – Knowledge and understanding of the strategies used to reduce demand for water. Knowledge and understanding of issues surrounding sustainability in terms of water use. **AO2** – Application of knowledge and understanding to analyse and evaluate the success of strategies in reducing demand for water and so increasing the availability of future water supplies. Mark scheme **Level 3** (7 – 9 marks) **AO1** – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout. **AO2** – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Analysis and evaluation are detailed and well supported with appropriate evidence. **Level 2** (4 – 6 marks) **AO1** – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant though there may be some minor inaccuracy. **AO2** – Applies clear knowledge and understanding appropriately. Connections and relationships between different aspects of study are evident with some relevance. Analysis and evaluation are evident and supported with clear and appropriate evidence. **Level 1** (1 – 3 marks) **AO1** – Demonstrates basic knowledge and understanding of concepts, processes, interactions and change. This offers limited relevance with inaccuracy. **AO2** – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Analysis and evaluation are basic and supported with limited appropriate evidence. Notes for answers The question requires links to be made between different parts of the specification content on Resource security, specifically strategies to manage water consumption in order to reduce demand and the sustainability issues with water management.	9 **AO1 = 4** **AO2 = 5**

		AO1 • Knowledge and understanding of strategies used to reduce demand at a variety of scales from local to national and domestic to corporate use. • Knowledge and understanding of technology used to reduce demand. In the UK about a third of water use is in toilet flushing so reducing demand involves such strategies as dual-flush toilets, displacement bags in the cistern. • Awareness of global variations, eg in Bangalore property owners have water supply cut if they fail to install rainwater-collection tanks. In Australia, rebates offered for installing water-saving devices. • Knowledge and understanding of strategies used to reduce agricultural use for example drip-feed irrigation systems reducing ploughing and using mulches. • Awareness of issues surrounding sustainable use of water. The challenges of changing mind-sets of individuals and corporate bodies. • Awareness of conflicts that might arise over sustainable use as a result of addressing the needs of all water-users. • Understanding of the different demands on water globally and how attitudes towards reducing demand will vary according to level of water supply and water stress. **AO2** • Evaluation of the success of strategies to reduce demand at domestic levels. For example in the UK 57% of homes do not have a water meter, despite long-term government campaigns. 59% do not have dual-flush toilets. The likelihood of these in securing future water resources. • Evaluation of the varying success of strategies in different countries, for example new technologies are unaffordable in many LICs, many of these areas suffer greater levels of water stress. They may consider the role of using disincentives such as Bangalore compared to the use of incentives in Australia. • Evaluation of the success of strategies at different user levels. For example the success of domestic strategies compared to agricultural use. An assessment of the extent to which success is more evident for one type of user than another. • An analysis of different values and attitudes towards reducing demand. • Evaluation of the success of sustainable water projects used in LICs employing appropriate technologies such as Water Aid have introduced composting toilets in Mozambique – the extent that this is sustainable may be seen at a variety of levels. However this is only one project and would not be suitable for all water-users. • Analysis of the conflict between reducing demand in the home and the huge water losses at a corporate level and the subsequent impact on achieving sustainability. For example in UK, 43% of homes have installed water meters. In Southern Water areas - this saves about 30million litres a day but Southern	

		water reportedly lose about 87million litres a day due to leaks from water pipes. • Analysis of the issues surrounding strategies to reduce demand and economic, social and environmental sustainability. The use of new technologies may not be economically sustainable in reducing demand from agriculture due to increased population pressure. • Analysis of possible alternatives futures on the success of strategies to reduce demand. Water may become an even more precious resource in some areas whilst in other areas there may be increased availability. This will inevitably influence the willingness of people to reduce demand. • Students are not required to come to conclusion, but credit conclusions that support the evidence provided. Candidates may come to conclusion as to which are the most successful strategies in achieving long-term sustainability.	

05	8	**'Challenges presented by the physical environment affecting the availability and cost of a resource, will be overcome by future technological and economic developments.'** **With reference to a specific place, to what extent do you agree with this statement?** **AO1 –** Knowledge and understanding of the physical environment of a specified place and its effect on the availability and cost of a resource. Knowledge and understanding of future technological and economic developments in relation to a resource. **AO2 –** Application of knowledge and understanding to evaluate the relative importance of physical and human factors associated with the availability of resources both now and in the future. Application of knowledge and understanding to analyse the importance of future developments on a specified place. <u>Notes for answers</u> The question links different parts of the Resource security section, specifically a specified case-study of a place to analyse how the physical environment affects availability and cost with alternative resource futures. The answer will very much depend on place and resource used. The spec requires a study of a specified place with reference to one resource, however whilst they should only refer to one specified place they could consider more than one resource. Answers should project from present conditions to examine alternative possible futures.	20 **AO1 = 10** **AO2 = 10**

		AO1 • Physical geography climatic factors affecting availability and cost, eg the climate of Northern Alaska makes accessing oil reserves more challenging, thereby increasing the cost of extraction. High levels of precipitation in Lake District mean that water can be stored in reservoirs for use in periods of drought. Climate gives opportunities for development of renewable resources for example wind energy in Spain. • Drainage can be harnessed for HEP projects such as Dinorwig in North Wales. In London, much of the water supply is taken from River Thames tributaries that flow over clay meaning that overland flow is increased. • Geology can affect the availability and cost of resources. Geological conditions for accessing minerals mean they are often in areas of mountainous relief, eg reserves of copper in the Andes. This increases the cost of extraction. Geology plays important role in development of geothermal energy. Aquifers increase the availability of water, allowing other factors such as climate to be overcome. • Knowledge and understanding of a specified place in terms of how the physical geography affects availability and place. Some likely examples are Mexico City (water) – groundwater is the main supply of water. Precipitation is variable – very low levels in the winter / spring. It sits on a huge aquifer but there are huge supply problems. Alaska (oil) – geology means large oil reserves found in periglacial areas, issues with extraction in cold environments. New Zealand – energy. Location on tectonic plates mean it has significant geothermal energy potential. High rainfall and glacial troughs mean that HEP is viable and low-cost energy supply. • Knowledge and understanding of ore mineral futures in terms of technological and economic developments. Processing of rare-earths and the economic viability of this. Technological advancements such medical imaging may increase demand for such rare-earths. Technological advancements improve the extraction of ores. For example copper can be extracted from copper-sulphide spoil heaps using bacteria. Metal prices are likely to remain high making extraction more profitable. • Knowledge and understanding of the factors that are likely to affect future water use and supply. According to the UN, by 2025, as much as two-thirds of the world population could be under water stress conditions. Changes in technology may affect the availability or supply of water, demand for water and levels of water use. Increases in temperature or decreases in vegetated area or biological diversity are likely to diminish available supplies. • Knowledge and understanding of future energy developments. Development of renewables may make oil extraction less economical. Development of new energies eg hydrogen fuel cells. Changing demands for energy – likely to move away	

		from OECD countries. Increasing demand in Asian markets. Increase in development of affordable energy. **AO2** • Evaluation of the extent to which the physical environment presents a challenge in terms of the availability and cost of a resource in a specified place. For example the Kennecott Bingham copper mine presents the challenge of mining in a mountainous environment. In 2013 there was a large landslide, however this challenge was mitigated by the economic setting of the US – effective monitoring and evacuation and ability to afford the recovery work. • Analysis of the likelihood and ability of future technologies in overcoming physical constraints. For example saltwater greenhouse technology whereby arid areas pump seawater into a greenhouse and use cardboard pads to provide a large evaporation area. Use of remote sensing to identify mineral deposits avoiding the need for exploration drills in cold environments. • Analysis of possible economic futures in overcoming physical constraints. Population growth is likely to make currently unviable extraction more possible. Energy demand likely to increase so make renewable energy more profitable for example in the creation of small-scale HEP projects in mountainous environments. • Analysis of the extent to which future technologies can overcome physical challenges in the specified place. For example, in Mexico City, extraction of water from deeper aquifers may be possible. Ecological rainwater capture also being explored. However, these may be thwarted by economic costs. Fracking may have an important impact on the need to drill in Alaska. Therefore less need to overcome the physical challenge of cold environments. • Analysis of the extent to which future economic developments will overcome physical challenges in the specified place. The greater demands of the US economy will increase pressure on drilling for oil in Alaska. As countries such as China and India develop economically, there will be a global demand for increased oil production in Alaska. Mexico City is now the 8th richest city in the world, this makes new technologies much more affordable. • Analysis of the extent to which the physical environment is not the biggest challenge in terms of availability / cost in the specified place. For example, in Mexico City one of the biggest challenges is leaks – 40% of all water is lost before it reaches the customers. In Alaska, the biggest challenge is an environmental one – preserving the migration routes of the Caribou. The technology is already present in overcoming the challenges of the permafrost. In New Zealand, there were protests by local people over the building of a new HEP project.	

		• Analysis of how future changes will be affected by growing populations, levels of business activity, urbanisation patterns and climate change. LICs are likely to see huge increases in energy demand. There may be greater use of large scale transfer schemes, dams and reservoirs, but sustainable small scale developments may be the way forward in many poorer countries. • Answers should evaluate the relative importance of the physical environment and the likelihood of future developments and reach a conclusion. Any conclusion is possible as long as it supported by evidence in the body of the answer. The conclusion will be very much dependant on the specified place and the resource used.	

Marking grid for question 5.8

Level/ Mark Range	Criteria/Descriptor
Level 4 (16–20 marks)	• 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 (AO2). • 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 (AO1).
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Level 2 (6–10 marks)	• 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 (AO2). • 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 (AO1).
Level 1 (1–5 marks)	• 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 (AO2). • 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. (AO1).
Level 0 (0 marks)	• Nothing worthy of credit.