Mark Scheme (Results)

Summer 2022

Pearson Edexcel GCSE
In Geography Spec A (1GA0) Paper 02

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Summer 2022
Publications Code 1GA0_02_2206_MS

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question 1 – Changing cities

Question number	Answer	Mark
1(a) (i)	Accept: **B** 1506 (1) <u>Incorrect responses:</u> Options **A, C** and **D**: The A1081 does not pass through any of these grid squares	**(1)**

Question number	Answer	Mark
1(a) (ii)	1508 = Bernards Heath (1) 1405 = St Julians (1)	**(2)**

Question number	Answer	Mark
1(a)(iii)	Settlement site: "the land on which a settlement stands". Award 1 mark for identifying a possible site factor in grid square 1407 (1), and a further mark for explanation of this factor, up to a maximum of 3 marks. Near to a river (River Vey) (1) which provides a transport route to nearby settlements (1) which facilitates trading (1). Near to a river (River Vey) (1) which provides an important water supply (1) for drinking / washing / cleaning / fishing / transport (1). Flat land / contour lines a wide apart (1) which means that it is easier to build houses on (1) which means that a larger population can live here / and it is easier to farm on (1). Woodland / trees / forested areas nearby (1) which can provide fuelwood / food / timber (1) which is important for cooking / heating / construction (1). **Accept any other appropriate response.**	**(3)**

Question number	Answer	Mark
1(a) (iv)	Award 1 mark for each correct identification of land use, up to a maximum of 3 marks. Max 1 if there is only information about one of the grid squares Do not double-credit one type of land use. e.g "1409 has many houses, 1505 has fewer houses" = one mark. 1409 is more built up than 1505 (1) 1409 is mainly residential (1) There is a school in 1409 (1) There is a golf course in 1505 (1) There is main road running through 1409 (1) **Accept any other appropriate response.**	**(3)**

Question number	Answer	Mark
1(b) (i)	**B** 15 to 29 <u>Incorrect responses:</u> Options **A**, **C** and **D** all have a smaller number of residents	**(1)**

Question number	Answer	Mark
1(b)(ii)	Working to show: (134838 x 100) / 729977 (1) = 18.5 (1) OR (134838/729977) x 100 (1) = 18.5 (1) Maximum of 1 mark if the correct answer is given without the correct working shown. Maximum of 1 mark if the working is shown (division and multiplication by 100), but the correct answer is not written to one decimal place. **Accept any other appropriate workings.**	**(2)**

Question number	Answer	Mark
1(c)	Movement / re-location (of power / people / industry / shops) away from central areas / the city centre / CBD (1). **Accept any other appropriate response**	**(1)**

Question number	Answer	Mark
1 (d)(i)	**B** More migrants came from the North West than from the North East and the East Midlands combined. **E** A total of 5,000 people migrated from Yorkshire and the Humber and the North East combined. <u>Incorrect responses:</u> **A** The same number of migrants came from the West Midlands and the East Midlands. **C** A total of 3,000 migrants came from the West Midlands and the East combined. **D** Fewer migrants came from the South East than the North East.	**(2)**

Question number	Answer	Mark
1(d)(ii)	15,600	**(1)**

Question number	Answer	Mark
1(d)(iii)	Award 1 mark for an impact of how migration has affected housing in a named city (1) and one mark for further development (1). A UK city needs to be named either on the 'Named UK city' line or within a response for marks to be awarded. Accept generic responses if they fit the named UK city. In-migration has led to housing supply not meeting demand (1) leading to rising house prices / homelessness / people living in crowded conditions / pressure to build more houses (1) Out -migration has led to falling house prices / increased availability of housing (1) which has led to home-owners being in negative equity / increasing first-time buyers / those on low incomes moving into the area (1) In-migration has placed an increased strain on the supply of housing in Bristol (1) this is due to an increase of 24,000 migrants moving to the city between 2004 and 2009 (1) Many terrace houses have been converted into flats (1) so that landlords can maximise profits (1) More high-rise buildings are being constructed (1) which means that green-belt / potential greenfield sites are preserved (1). **Accept any other appropriate response.**	**(2)**

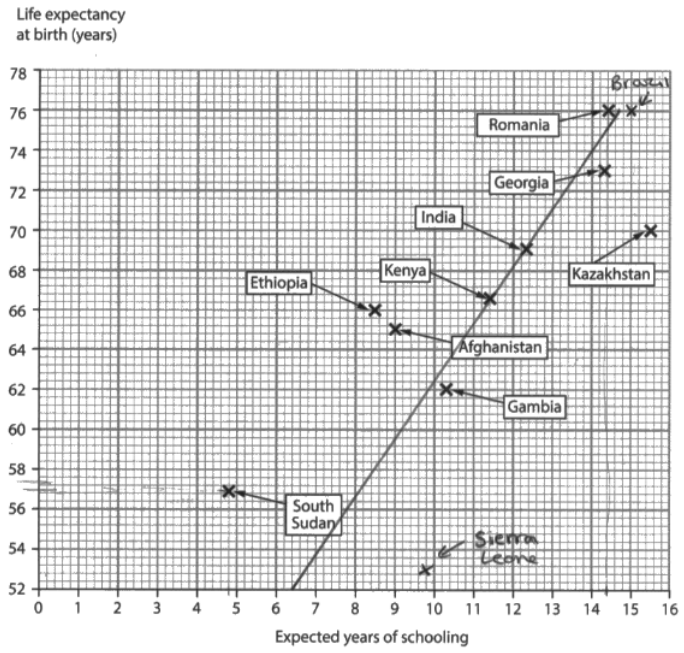
Question number	Answer	Mark
1(e)	Award 1 mark for identifying a factor influencing the level of urbanisation in the UK (1), and a further one mark for development through explanation, up to a maximum of 2 marks each. Responses can refer to an increase or a decline in the level of urbanisation, and are likely to include ideas about industrialisation, natural increase, physical factors and migration. Avoid double-reward for the same factor. Idea of movement / migration to cities (1) with an appropriate push or pull factor e.g. job opportunities, better healthcare etc. (1). Some regions have received more investment by companies / government (1) which has created new job / education opportunities (1). Some parts of the UK did not urbanise during the industrial revolution (1) due to the lack of nearby raw materials (1). Some urban areas are experiencing natural increase / rising birth rates (1) as many migrants of child-bearing age have moved there (1). Some regions of the UK are experiencing high levels of unemployment / growing crime rates / lack of government investment (1) which has caused people to leave (1). Some regions of the UK have more upland areas / mountains (1) which means that it is harder to build houses / communication networks (1) **Accept any other appropriate response.**	**(4)**

Question number	Indicative content
1(f)	**AO2 (4 marks)/AO3 (4 marks)** **AO2** • Problems caused by rapid population growth can be categorised into social (e.g. healthcare and housing), economic (e.g. unemployment and industrial growth) and evironmental (e.g. air/water pollution and waste disposal). • One approach to solving these problems is through top-down approaches which are influenced by government policy, and often have a long-term plan attached to them to ensure the project is sustainable. • Examples of top-down approaches might include a government-led housing project aimed at reducing slum dwellers or transport schemes designed to increase the use of public transport and decrease the number of cars on the road. • Another approach is the use of bottom-up strategies - this is when the community are in charge of what happens; local community in the decision-making process to ensure the aims of the project directly meet their needs. • Examples of bottom-up projects might include self-help schemes or local fund raising activities designed to improve service provision in the area. **AO3** Evaluation will depend on the specific case study, but may include: • An evaluation of bottom-up projects might refer to potential success as they involve local people in the planning and delivery of the project – which helps to sustain the project over time; these types of projects also have the advantage of getting off the ground quickly as they don't require a great amount of funding or manpower to make it happen. • However, a major disadvantage of bottom-up projects is that the impact may be quite localised due to the small amount of people and/or funding involved. In addition to this, when things go wrong/machinery breaks down, the funding or government support may not be available to sustain the project, so that it comes to an end. • An evaluation of top-down projects might include details of advantages such as major funding and cooperation being available to combat the actual causes of problems on a large- scale, • However, top top-down approaches do have their downsides too e.g. corruption may exist within some governments with nepotism and/or mis-spending of funds may occur. Also, these projects often involve many stakeholders who can delay the delivery of the project; also, there is the possibility of budget cuts or the mis-spending of funds by corrupt government employees • A final conclusion might consider which approach best responds to the actual needs of the different groups in the city; this is because there is often a combination of different problems that need to be addressed – and various approaches are often needed to tackle all of these.

Level	Mark	Descriptor
	0	No acceptable response.
Level 1	1–3	• Demonstrates isolated elements of understanding of concepts and the interrelationship of places, environments and processes. (AO2) • Attempts to apply understanding to deconstruct information but understanding and connections are flawed. An unbalanced or incomplete argument that provides limited synthesis of understanding. Judgements that are supported by limited evidence. (AO3)
Level 2	4–6	• Demonstrates elements of understanding of concepts and the interrelationship of places, environments and processes. (AO2) • Applies understanding to deconstruct information and provide some logical connections between concepts. An imbalanced argument that synthesises mostly relevant understanding, but not entirely coherently, leading to judgements that are supported by evidence occasionally. (AO3)
Level 3	7–8	• Demonstrates accurate understanding of concepts and the interrelationship of places, environments and processes. (AO2) • Applies understanding to deconstruct information and provide logical connections between concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently leading to judgements that are supported by evidence throughout. (AO3)

Marks for SPGST		
Performance	**Marks**	**Descriptor**
SPGST 0	0	*No marks awarded* • Learners write nothing. • Learners response does not relate to the question. • Learners achievement in SPaG does not reach the threshold performance level, for example errors in spelling, punctuation and grammar severely hinder meaning.
SPGST 1	1	*Threshold performance* • Learners spell and punctuate with reasonable accuracy. • Learners use rules of grammar with some control of meaning and any errors do not significantly hinder meaning overall. • Learners use a limited range of specialist terms as appropriate.
SPGST 2	2–3	*Intermediate performance* • Learners spell and punctuate with considerable accuracy. • Learners use rules of grammar with general control of meaning overall. • Learners use a good range of specialist terms as appropriate.
SPGST 3	4	*High performance* • Learners spell and punctuate with consistent accuracy. • Learners use rules of grammar with effective control of meaning overall. • Learners use a wide range of specialist terms as appropriate.

Question 2 – Global development

Question number	Answer	Mark
2(a)(i)	Award 1 mark for each correct plot. (plots do not need to be labelled with the country name)  **Figure 2a**	**(2)**

Question number	Answer	Mark
2(a)(ii)	Award 1 mark for an accurately drawn best-fit line. (line needs to go through two plots: either India and Kenya or South Sudan and Georgia)	**(1)**

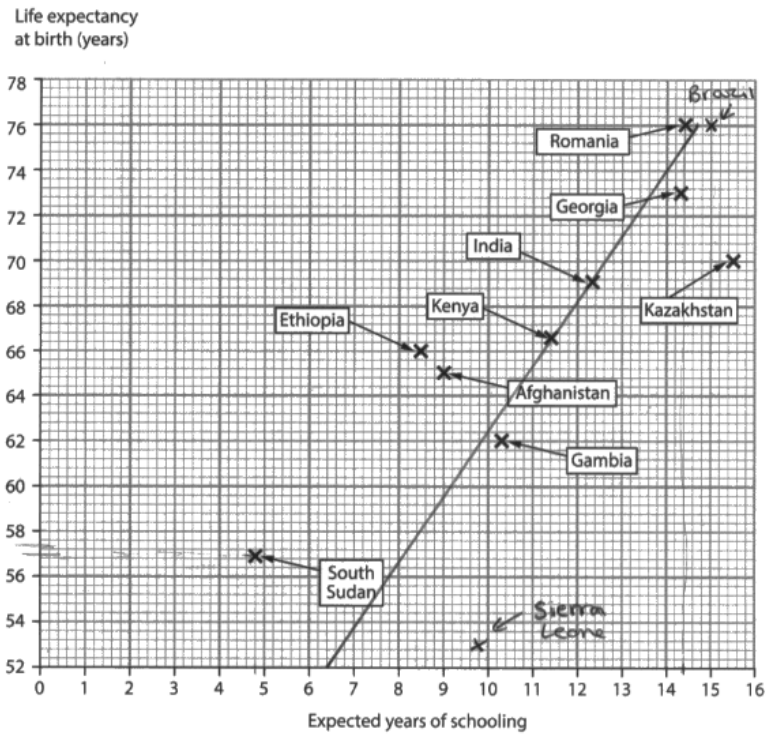


Figure 2a

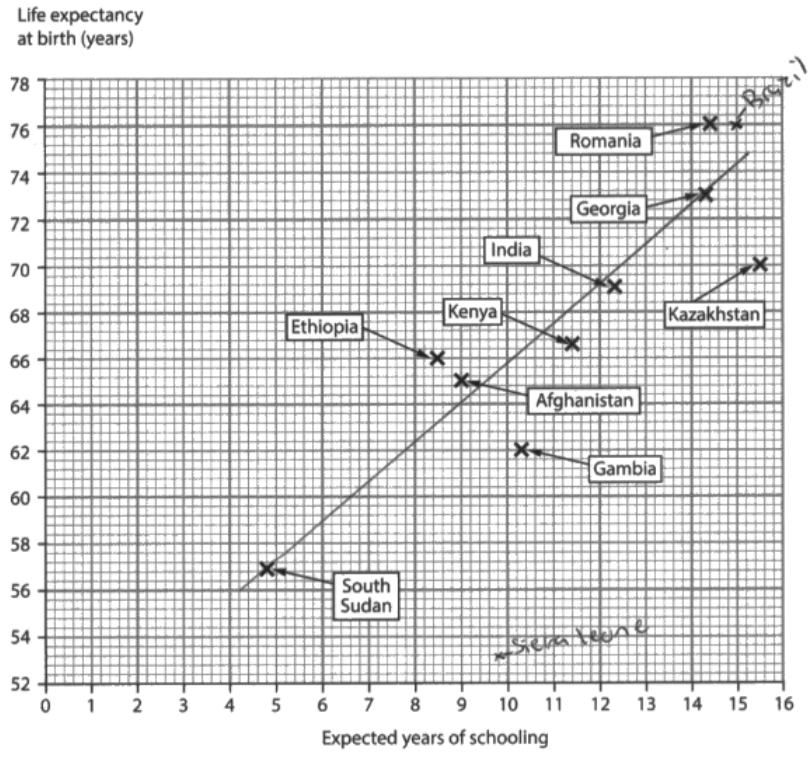


Figure 2a

Question number	Answer	Mark
2(a)(iii)	Award 1 mark for identification of overall pattern, and a further 1 mark for the use of supporting data (either life expectancy or expected years of schooling for a country), up to a maximum of 2 marks. There is a positive correlation between life expectancy and expected years of school (1) e.g., South Sudan has a low life expectancy expected years of schooling of 4.8 years (1) whereas Romania has a higher life expectancy and expected years of schooling of 14.4 years. The expected years of schooling increases as life expectancy increases (1) e.g., Brazil has both the highest life expectancy and the highest expected years of schooling of 15 years (1).	**(2)**

Question number	Answer	Mark
2(a) (iv)	Award 1 mark for identifying one factor that affects life expectancy (1) and a second mark for explanation (1), up to a maximum of 2 marks each. Max. 3 marks if no clear reference (named country and/or numerical data) to Figure 2a in at least one of the reasons. Do not credit 'mirrored' responses. Some countries are poor / developing (1) which means that they cannot afford to invest in healthcare systems (1). Some countries (e.g., Brazil / Romania) have a high GDP per capita (1) which means that they can afford to develop healthcare systems (1). Life expectancy is only 53 years in Sierra Leone because there is a lack of food (1) which causes people to die of starvation (1). Some countries might have poor sanitation / lack of clean drinking water (1) which means that disease spreads more rapidly than in other countries (1). There might be more natural disasters in Sierra Leone (1) which destroys crops / limits food supply, leading to a life expectancy of just 53 years (1). There might be a lack of doctors / medicines / healthcare in Gambia (1) which means that more people die of untreated disease, leading to a life expectancy of 62 years (1). There are fewer wars taking place in Romania (1) which means that less people are killed in combat, keeping the life expectancy relatively high at 76 years (1). There have been improvements in modern medicine / vaccinations in Brazil (1) which means that less people die from disease and life expectancy is 76 years (1). Improvements in water and sanitation in some countries (1) have meant that disease spreads less rapidly (1). Some countries have a better education system / larger number of expected years of schooling than others (1) which means that people are likely to know more about healthy lifestyles (1). **Accept any other appropriate response**	**(4)**

Question number	Answer	Mark
2(a)(v)	**D** Gross National Income per capita Incorrect responses: **A**, **B** and **C** are not measures used in the calculation of HDI scores	**(1)**

Question number	Answer	Mark
2(b)	Award 1 mark for identifying a historical factor (1), and a further one mark for development through explanation of why this factor has affected development in the UK. The Industrial Revolution (1) led to some parts of the UK developing more quickly as trade / population increased in these cities (1). Uneven government investment (1) accelerated the development of some parts of the UK (e.g., the south-east) due to better infrastructure (1). Trade with the USA / colonies (1) led to the development of ports (e.g., Liverpool) on the west side of the UK (1). Colonialism / the British Empire (1) led to the growth of London as this was the centre of key decision-making (1). The Second World War (1) led to some urban areas being badly damaged, and in need of repair / investment (1). Deindustrialisation (1) reduced the level of development in some cities as businesses closed down / the local economy declined (1). **Accept any other appropriate response.**	**(2)**

Question number	Answer	Mark
2(c) (i)	**C** Tertiary sector Incorrect responses: Options **A, B** and **D** are sectors not shown in Figure 2b (call centres are part of the tertiary (service) sector.	**(1)**

Question number	Answer	Mark
2(c) (ii)	Award one mark for any of the following: Creation of jobs / unemployment falls (1) More stable income for local people (1) Less physically demanding work / safer working conditions (compared to primary and secondary sectors) (1) TNC might offer education / training programmes for workers (1) TNC might invest in infrastructure / new roads / broadband Idea of multiplier effect (1) Improvements in housing / healthcare / living conditions (1) **Accept any other appropriate response.**	**(1)**

Question number	Answer	Mark
2(c) (iii)	3,120	**(1)**

Question number	Answer	Mark
2(d)	Award 1 mark for a point about a geopolitical relationship between a named developing / emerging country and another country (1) and a further for extension through description, up to a maximum of 3 marks. China and the USA have been involved in a trade war since 2018 (1) where USA have imposed tariffs in the importation of Chinese goods (1) which has had a negative impact on China's economy / reduced the export of Chinese flat-panel televisions (1) Bangladesh and China are in the process of completing a zero-tariff trade agreement (1) which means that 97% of items exported from Bangladesh to China will be tariff-free (1) which will help boost Bangladesh's economy and increase its level of development (1) There is an ongoing disagreement between Tanzania and Malawi about the ownership of a lake on the border between the two countries (1) with Tanzania arguing that they own half of the lake (1) but Malawi has given the rights for oil exploration to a UK company (1) Trade agreements exist between India and the UK (1) due to historical links / India being part of the British Empire (1) which has improved India's level of development as a large market for selling goods is available (1) **Accept any other appropriate response.**	**(3)**

Question number	Answer	Mark
2(e)	Award 1 mark for identifying a negative environmental impact of rapid development, and a further 1 mark for an explanation about why this has happened or a consequence of this, up to a maximum of 2 marks each. Type of 'pollution' must be clear. Air pollution (1) caused by the growing number of cars / factories / can lead to breathing difficulties (1). Biodiversity declines (1) because industrial waste is dumped into rivers / deforestation is taking place (1) Trees are cut down (1) to make room for buildings / leading to habitat loss / a reduction in biodiversity / soil erosion (1) Water pollution (1) caused by chemical run-off from factories / kills wildlife / leads to eutrophication (1). Noise pollution (1) caused by the increased amount of machinery used / can disturb wildlife (1). Over-extraction of raw materials / natural resources (1) can lead to supplies running out / cost of production increasing / destruction of habitats (1). **Accept any other appropriate response.**	**(4)**

Question number	Indicative content
2(f)	**AO2 (4 marks)/AO3 (4 marks)** **AO2** • Low paid jobs / few jobs available are often found in the periphery due to a lack of investment by the government / TNCs. • Periphery regions may have poor soils and harsher climates which makes it difficult to grow cash crops. • Periphery regions may be a long way from core regions which will discourage investment as additional infrastructure (e.g., transport / communication networks need to be in place. • The infrastructure may be much more developed in core areas which will make trading easier – and the area more attractive to potential investors. • There might be a lower (working) population in peripheral areas due to poor healthcare / out-migration ('brain drain'). • Education systems might not be very well developed which means the work force might be lacking skills / qualifications. • Peripheral regions might be more prone to natural hazards which limit economic growth. **AO3** Assessment will include some reflective comment about why each factor is significant – and how these reasons might be connected. Assessment of the most important factor(s) will depend on the specific case study, but may include: • There could be a range of human and physical factors that have led to an unevenness of development; an assessment of individual factors might come to a judgement about which category (human or physical) is most important. • It could be argued that physical factors are more important than human factors; for example, a lack of (valuable) raw materials / energy resources will deter investment and limit the extent to which industrialisation takes place in an area. • Human factors are also significant though – but could be triggered by physical factors; for example, a lack of job opportunities due to little industrialisation could lead to fewer people of working age / more retired people living in the periphery which means that there could be many unfilled job vacancies – and a 'spiral of decline' develops. • Fewer industries / businesses are found in the periphery which leads to less highly paying jobs; this is significant as it leads to a chain of events i.e., increased out-migration as people head to 'core' areas, increasing the development gap between these areas.

Level	Mark	Descriptor
	0	No acceptable response.
Level 1	1–3	• Demonstrates isolated elements of understanding of concepts and the interrelationship of places, environments and processes. (AO2) • Attempts to apply understanding to deconstruct information but understanding and connections are flawed. An unbalanced or incomplete argument that provides limited synthesis of understanding. Judgements that are supported by limited evidence. (AO3)
Level 2	4–6	• Demonstrates elements of understanding of concepts and the interrelationship of places, environments and processes. (AO2) • Applies understanding to deconstruct information and provide some logical connections between concepts. An imbalanced argument that synthesises mostly relevant understanding, but not entirely coherently, leading to judgements that are supported by evidence occasionally. (AO3)
Level 3	7–8	• Demonstrates accurate understanding of concepts and the interrelationship of places, environments and processes. (AO2) • Applies understanding to deconstruct information and provide logical connections between concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently leading to judgements that are supported by evidence throughout. (AO3)

Question 3 – Resource management

Question number	Answer	Mark
3(a)	**A** Coal **D** Oil <u>Incorrect responses:</u> Options **B**, **C** and **E** are not fossil fuels.	**(2)**

Question number	Answer	Mark
3(b)	Award 1 mark for one from each of the following lists, up to a maximum of 2 marks: **Biotic** i.e., living parts of the biosphere: Animals (1) Birds (1) Plants (1) Fungi (1) Insects (1) Trees / woodlands (1) **Abiotic** i.e., non-living resources from the lithosphere, atmosphere and hydrosphere: Minerals (1) Soil (1) Sunlight (1) Water (1) Rainfall (1) Coal / oil /natural gas (1) Rocks (1) Air / oxygen (1) Wood (1) **Accept any other appropriate response**	**(2)**

Question number	Answer	Mark
3(c)(i)	Europe	(1)

Question number	Answer	Mark
3(c) (ii)	Award 1 mark for each of the following, up to a maximum of 2 marks. Overall increase (1) from 10 million tonnes to 140 million tonnes / by 130 million tonnes (1) Allow +/- 10 million tonnes **Accept any other appropriate response**	(2)

Question number	Answer	Mark
3(c) (iii)	Award 1 mark for identifying one possible reason why meat production in Asia has increased more than Europe overall / Europe has a greater meat production than Asia prior to 2000 (1), and a further 1 mark for an explanation about why this might have happened, up to a maximum of 3 marks. Demand for meat products is increasing faster in Asia (1) due to a rising population (1) as a result of falling death rates / higher rate of natural increase (1) More intensive farming methods in Asia (1) to meet growing demand (1) as people become wealthier / can afford to buy more meat (1) Increasing globalisation (1) due to technological developments / spread of the internet and mass media in Asian countries (1) has made people more aware about western diets / McDonalds culture (1) Developing / emerging countries in Asia are now becoming more developed (1) as a result of FDI (1) which means that people have higher incomes / can afford to buy more meat (1) Between 1961 and 1990, meat production was higher in Europe compare to Asia due to more advanced farming methods being available (1) which meant that farmers could use their land more intensively (1) which met the growing demand for meat from European countries (1). **Accept any other appropriate response.**	(3)

Question 4 – Energy resource management

Question number	Answer	Mark
4(a)	**A** Energy from sources that cannot be reused or replenished <u>Incorrect responses:</u> None of the other options describe non-renewable energy resources	**(1)**

Question number	Answer	Mark
4(b)	Energy/electricity/power produced by moving water / water turning a turbine Do not accept 'the sea', 'tides' or 'waves'. **Accept any other appropriate response**	**(1)**

Question number	Answer	Mark
4(c)	Award 1 mark for identifying one advantage for the environment of the development of uranium, and a further 1 mark for extension of this point through further explanation, up to a maximum of 2 marks. Award 1 mark for identifying one disadvantage for the environment of the development of uranium, and a further 1 mark for extension of this point through further explanation, up to a maximum of 2 marks. **Advantages** Uranium is a long-term option / reduces reliance on other energy resources (1) which means that existing resources will last longer (1). Uranium is a clean energy resource / does not emit nitrogen oxides / sulphur dioxide / carbon dioxide when used (1) which means that it does not contribute towards the greenhouse effect / global warming as much as burning fossil fuels (1). Uranium does not have to be burnt during the generation of electricity (1) which means that it is better for human health / reduces the problems of acid rain / global warming (1). **Disadvantages** Potential for leaks of radioactive material into the atmosphere / water supply (1) which will kill living organisms (1) Accidental explosions / leakages of radioactive material are very dangerous (1) and would mean that the surrounding environment will remain uninhabited for many years (1). Waste can be very damaging / dangerous (1) which means that it must be stored / disposed of correctly (1) **Accept any other appropriate response**	**(4)**

Question number	Answer	Mark
4(d) (i)	Award 1 mark for any of the following: Fracking could generate investment (1) Fracking could create jobs (1) Fracking could give us cheaper energy in the future / increase our energy security (1) Access gas which then can be used (1) **Accept any other appropriate response**	**(1)**

Question number	Answer	Mark
4(d) (ii)	**A** 20% <u>Incorrect responses:</u> None of the other options are the correct percentage	**(1)**

Question number	Answer	Mark
4(d) (iii)	Award 1 mark for a reason why most of the residents were **against fracking**, and a further 1 mark for extension of this point through further explanation, up to a maximum of 4 marks. Fracking might lead to earthquakes (1) which could lead to structural damage of local properties (1) which might make it increasingly difficult for homeowners to get home insurance (1) which will lower the property value of their home / make it difficult to sell their house (1). Fracking could lead to the contamination of water sources (1) because a large amount of water and chemicals is needed during the process (1) which might kill wildlife / plants who live in the water (1) which will ultimately lower the biodiversity of the area (1). Fracking could lead to the contamination of water sources (1) which might happen if the drilling equipment accidentally breaks a water pipe (1) which means that local residents might become poorly/die (1) need to access water from alternative sources e.g., bottled water, boil water etc. (1) Huge amounts of water are needed (1) Which will lead to large lorries arriving daily to deliver the water to the drilling site (1) which will lead to traffic congestion / air pollution (1) increasing carbon emissions / problems of global warming / greenhouse effect (1). **Accept any other appropriate suggestion about why people might be against fracking.**	**(4)**

Question number	Indicative content
4 (e)	**AO2 (4 marks)/AO3 (4 marks)** **AO2** • As a result of growing global energy consumption, rising populations, changes in levels of economic development and environmental concerns (e.g., climate change), there's a need to manage energy supplies in a sustainable manner. • As the global population continues to increase and existing (non-renewable) energy resources begin to run out, countries will have to find ways to increase energy supplies; therefore, many countries are now including an increasingly larger proportion on renewable energy resources in their energy mix. • There is a wide range of different types of renewable energy resources that are being developed; The AO2 material within a response will often consider 'what' is being developed – and possibly 'why' countries are developing it. • Therefore, one might expect information about: Biomass (this is recently-formed material derived from living things); Hydroelectric power (HEP generated when river water is trapped behind a dam and used to turn turbines); Wave power and tidal power (wave energy harnesses the power of small movements on the surface of the sea; tidal energy harnesses larger movements of the tides); Geothermal power (uses heat within the Earth to generate electricity); Solar power (solar panels turn sunlight into electricity); Wind power (wind turbines convert air movements into electricity) • Each of these types of renewable energy resource has advantages and disadvantages e.g., for wind power: the UK wind speeds are consistent and so this is a good way to generate electricity; however, the actual construction of wind turbines results in greenhouse gas emissions being produced. • One of the biggest advantages of developing renewable energy resources is that they often result in a reduction of greenhouse gas emissions; however, renewable energy resources are also being developed in some parts of the work due to the availability / suitability of a particular resource (e.g., geothermal and HEP in Iceland, solar in Morocco etc.) or the availability of funds / infrastructure / technology to develop these alternative energy sources. • Conflict can lead to countries trying to increase renewable energy to reduce reliance on gas and oil imports **AO3** Assessment will include reflective comments about why renewable energy resources are being developed – and whether the reduction of greenhouse gases is the most significant reason for this. • AO3 material is likely to comprise of a detailed consideration of the pros and cons of renewable energy; this will inevitably refer to the advantage of no CO_2 being emitted (compared to fossil fuels) – which therefore reduced greenhouse gas emissions – as a significant reason why renewable energy resources are being developed. Also, another significant factor is that all renewable resources will never run out (i.e., provides energy security) – non-renewable energy sources are finite and will someday be depleted

	• In addition to a reduction in greenhouse gas emission, the development of renewable energy resources has other advantages – and an assessment of these will rank some more important / significant than others. • Another advantage of developing renewables is that there are often low running costs once set up; however, renewables do have a cost prior to being operational – both financial and environmental (e.g., the emission of greenhouse gases in the manufacture of wind turbines). • An advantage, for example for solar and biomass powered stations can be set up anywhere; this is something that might be an increasingly significant factor in the future as poulation rises and non-renewable resources become scarcer. • An advantage of tidal power and geothermal resources is that they do not depend on the weather; this is something that might be an increasingly significant factor in the future as climate is predicted to change – for example more extreme or inconsistent weather conditions which affect the reliability of some methods of producing energy. •

Level	**Mark**	**Descriptor**
	0	No acceptable response.
Level 1	1–3	• Demonstrates isolated elements of understanding of concepts and the interrelationship of places, environments and processes. (AO2) • Attempts to apply understanding to deconstruct information but understanding and connections are flawed. An unbalanced or incomplete argument that provides limited synthesis of understanding. Judgements are supported by limited evidence. (AO3)
Level 2	4–6	• Demonstrates elements of understanding of concepts and the interrelationship of places, environments and processes. (AO2) • Applies understanding to deconstruct information and provide some logical connections between concepts. An imbalanced argument that synthesises mostly relevant understanding but not entirely coherently, leading to judgements that are supported by evidence occasionally. (AO3)
Level 3	7–8	• Demonstrates accurate understanding of concepts and the interrelationship of places, environments and processes. (AO2) • Applies understanding to deconstruct information and provide logical connections between concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently, leading to judgements that are supported by evidence throughout. (AO3)

Question 5 – Water resource management

Question number	Answer	Mark
5(a)	**D** The demand for water is greater than supply <u>Incorrect responses:</u> None of the other options describe water deficit	**(1)**

Question number	Answer	Mark
5(b)	Using (water) resources in a way that ensure that the environment is not damaged / meets the needs of future generations / ensuring that resources do not run out **Accept any other appropriate response**	**(1)**

Question number	Answer	Mark
5(c)	Award 1 mark for identifying a reason why the global demand for water has increased, and a further 1 mark for extension of this point through further explanation, up to a maximum of 2 marks each. Growing population in an area (1) as a result of high natural increase / net in-migration (1) Rising living standards / people in countries that have become richer / changing lifestyles (1) which means that they have more money to spend on items that consume water (1) People also tend to eat more meat as living standards increase (1) which also needs more water in its production (1) There has been industrial growth in some parts of the world (1) which means that demand for water will increase as countries develop their manufacturing industries (1) A growth in modern commercial agriculture / leisure industry (swimming pools, golf courses etc.) (1) has increased demand because huge amounts of water is used in irrigation systems (1) **Accept any other appropriate response**	**(4)**

Question number	Answer	Mark
5(d) (i)	Award 1 mark for any of the following: Desalination plants use a lot of energy (1) Desalination creates pollution / toxic / waste products (1) Desalination has high set-up / running costs (1) Damages wildlife habitats (1) **Accept any other appropriate response**	**(1)**

Question number	Answer	Mark
5(d) (ii)	**A** 20% <u>Incorrect responses:</u> None of the other options are the correct percentage	**(1)**

Question number	Answer	Mark
5(d) (iii)	Award 1 mark for a reason why most of the residents were in **favour of desalination**, and a further 1 mark for extension of this point through further explanation, up to a maximum of 4 marks. Desalination could provide thousands of people with fresh drinking water (1) which means that water shortages will be less likely in the UK / less likely as the UK's population size increases (1) which means that less money will have to be spent on water transfer systems (1) which means that government spending can focus on other schemes instead (1). Desalination could provide additional water for farming (1) which is useful for farmers in areas that frequently experience drought / periods of low rainfall (1) as they will still be able to irrigate crops / provide drinking water for animals (1) leading to greater food security in the UK (1). Desalination can help preserve the UK's limited freshwater supplies (1) which reduces the demand / abstraction of groundwater supplies (1) so that rivers are able to maintain a sustainable water level / discharge rainfall (1) which means that habitats / ecosystems are not negatively affected (1). **Accept any other appropriate suggestion about why people are in favour of desalination.**	**(4)**

Question number	Indicative content
5 (e)	**AO2 (4 marks)/AO3 (4 marks)** **AO2** • There are several reasons why some countries are finding it difficult to meet the growing demand for water – and these reasons can vary depending on a country's level of development. • In the UK, there are three key reasons why we sometimes have water supply problems: ageing infrastructure (e.g. old water and sewage pipes cannot cope with the higher volume of water needed now; pipes are poorly maintained and develop leaks / waste water); rainfall imbalance (e.g. higher rainfall is usually in upland areas – away from the major centres of population, and vice versa); seasonal imbalance (e.g. some parts of the UK have a large differences between summer and winter rainfall – leading to seasonal drought). • Whilst emerging / developing might experience similar reasons for water supply problems: untreated water (e.g. water has not been treated with chemicals to make it safe for drinking); pollution of water courses (e.g. from agriculture due to irresponsible use of chemical fertilisers and pesticides or the dumping of waste products from industry / mining) and low annual rainfall. • Low annual rainfall is likely to be prominent in responses as it is included in the question. Causes of low annual rainfall might be linked to climate change, geographical location of a country affecting climate – i.e. naturally high evaporations and low rainfall due to high pressure). • Response might also consider the reasons why many countries do not experience water supply problems e.g. countries along the Equator have enough water. Warm, moist air rises here, which causes high levels of rainfall. Also, countries with the highest latitudes (those that are furthest away from the Equator) have enough rainfall to provide plenty of fresh water. **AO3** Assessment will include reflective comments about why each factor is significant – and how these causes of water supply problems might be connected: • Whilst low rainfall is a significant factor contributing towards the water supply problems in some parts of the world, other factors such as growing populations and/or affluence also explain why existing water supply cannot meet demand. • Demand may also increase due to changing land use patterns, possibly as a result of economic development, increased affluence and tourism e.g., agricultural land being developed as golf courses / holiday complexes – which inevitably places greater pressure on water supply due to irrigation (of golf courses), swimming pools and in hotels. • AO3 material is likely to comprise of a detailed consideration of the impact and frequency of different causes of water supply problems; this might include some reflection on how these problems can be tackled or how they vary between different countries and at different scales. • In addition to low annual rainfall, there are other reasons why water supply problems exist – and these reasons can be connected – and in combination could exacerbate water supply problems. • Whilst low annual rainfall is obviously a major cause of water supply problems in some areas – there are some parts of the world that have water supply problems due to other reasons.

	• Responses might also consider future problems in areas that do not necessarily have water supply problems at the moment e.g., due to global warming – and the impact that this might have on rainfall levels.	
Level	**Mark**	**Descriptor**
	0	No acceptable response.
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