Mark Scheme (Results)

Summer 2023

Pearson Edexcel GCSE in
Geography Spec A (1GA02) Paper 2

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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

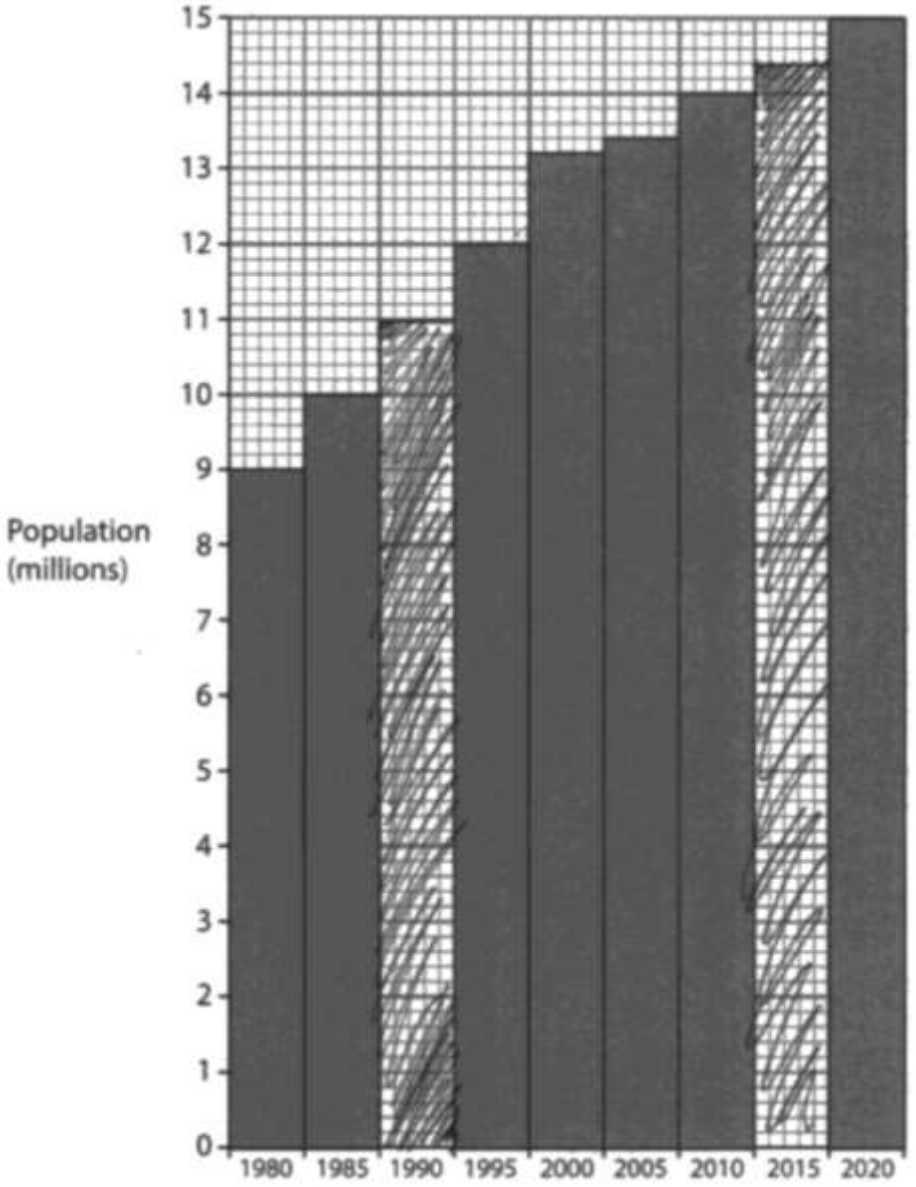
Question number	Answer	Mark
1(a) (i)	D Between 80% and 90% <u>Incorrect responses:</u> Options A, B and C are not correct as these values do not correspond to the dark blue colour in the key	(1)

Question number	Answer	Mark
1(a) (ii)	Namibia (1)	(1)

Question number	Answer	Mark
1(a) (iii)	Award 1 mark for a reason why some countries have low percentages of their population living in urban areas, and 1 mark for further explanation, up to a maximum of 2 marks. Industrialisation has not happened / primary sector employment (e.g., farming) is still important (1) which means that there are more jobs available in rural areas / fewer job opportunities in urban areas (1). A country may still have a low level of development (1) which means that many people are still required in the primary sector (1). People living in rural areas have a low income (1) which means they cannot afford to move to an urban area (1). Some countries have less rural to urban migration than others (1) as more job opportunities exist in rural areas (1). A country might be very mountainous / experience an extreme climate (1) which means that it is difficult to develop larger settlements (1). The cost of living is high in urban areas (1) which means that people decide to stay in rural areas (1). People choose to stay in rural areas to look after family members (1) as transport links between urban and rural areas are not developed (1). Some areas have a high death rate (1) due to poor medical care (1). Accept any other appropriate response	(2)

Question number	Answer	Mark
1(b)	Award 1 mark for each comparative statement: Increase in Asia and an increase in North America (1). Asia has seen a proportionally larger increase than North America (1) Percentage urban population has always been higher in North America (1). One mark available for the use of supporting data from both regions e.g., change of 33.6% in Asia and 19.7% in North America (1). Use of supporting data is not required for full marks. Accept any other appropriate response	(3)

Question number	Answer	Mark
1(c)	Award 1 mark for a reason why suburbanisation has occurred, and 1 mark for further explanation, up to a maximum of 2 marks. Availability of land in central/inner urban areas has reduced (1) which means that development costs in central/inner urban areas has increased (1). Sites in the urban-rural fringe are often near to road / rail links (1) which provides good transport access / less congestion compared to more central locations (1). Crime rates are lower / less air pollution than in the central/inner urban area (1) which means that the quality of life will be better (1). Increase in numbers of people working from home (1) means that people are not reliant on being near to the CBD for an office (1). Urban-rural fringe offers a quieter / more picturesque view from homes / offices (1) which means that these locations are more attractive to potential developers (1). Population of the UK is increasing (1) which means that the demand for new / additional housing is also increasing (1). Cost of living might be lower / house prices could be cheaper in the suburbs (1) which means that people will have more disposable income (1). Near to shops / place of work (1) which means that less money will be spent on transport (1). NB: **'pollution' needs to be clear (air, noise etc.)** Accept any other appropriate response	(2)

Question number	Answer	Mark
1(d)(i)	One mark for each correctly plotted bar.  	(2)

Question number	Answer	Mark
1(d) (ii)	B Between 1995 and 2000 <u>Incorrect responses:</u>	

	Options A, C and D are not correct as these time periods do not experience a population growth of 1.2 million	(1)

Question number	Answer	Mark
1(d)(iii)	Working to show: 15 (new value) - 9 (initial value) / 9 (initial value) x 100 (1) = 66.7% (written to one decimal place) (1) Maximum of one mark if no working out is shown, or if the answer has not been written to one decimal place.	(2)

Question number	Answer	Mark
1(e) (i)	(River) Hugli (1)	(1)

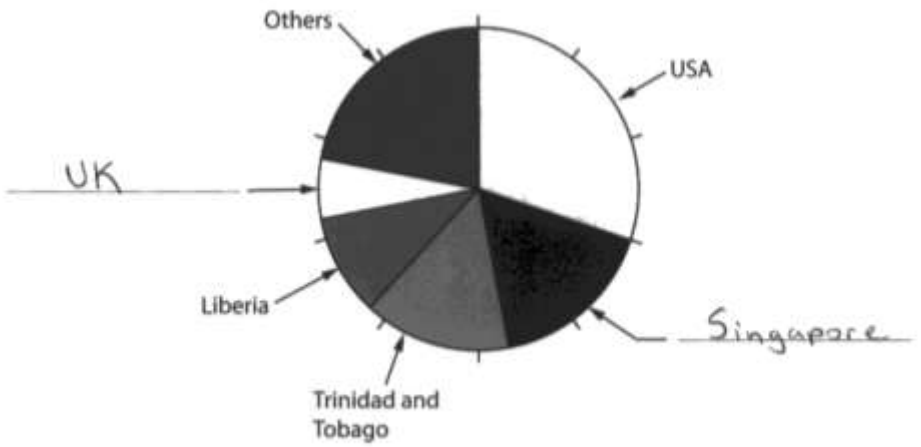
Question number	Answer	Mark
1(e) (ii)	Award 1 mark for identifying a possible reason for rapid population growth, and 1 mark for further explanation, up to a maximum of 2 marks each. There must be evidence from Figure 1d in both sections for full marks. Do not credit 'mirrored' responses. Max 2 if no evidence from Figure 1d. People have moved there (from the countryside) (1) developed with a pull factor (e.g., better medical services) that is shown on Figure 1d (1) – *or reverse*. People have moved there (from the countryside) (1) developed with a push factor (e.g., soil erosion) that is shown on Figure 1d (1) *or reverse*. Idea of natural increase (birth rates have gone up, death rates have fallen etc.) (1) as there are a large proportion of 18–30-year-olds living in Kolkata (1). Government investment / 'Smart Cities Mission' (has improved Kolkata) (1) which could have included the development of modern housing / new job opportunities (1). River Hugli flows through Kolkata (1) could provide transportation links to the rest of India / water supply for industry (1). Flat coastal area around the Bay of Bengal (1) would make it easy to build houses on (1). Accept any other appropriate response	(4)

Question number	Answer	Mark
1(e) (iii)	Award 1 mark for a possible negative environmental impact of rapid population growth for the area shown in Figure 1d, and one mark for further explanation, up to a maximum of 3 marks. People (living in squatter settlements / informal housing) might dump waste into the river (1) causing it to become polluted (1) leading to a decline in biodiversity (1). The growth of squatter settlements / informal housing makes the environment look less attractive (1) which could put potential investors off (1) which would have a negative impact on the economy (1). Increased air/noise pollution (1) as an increase in population brings an increase in vehicles (1) which can have a negative impact on the nearby wildlife / health of residents (1). The river may suffer from over-extraction / overfishing (1) because of a growing demand for fresh water/food (1) which could damage river habitats / wildlife (1). Increase frequency of flooding around the Bay of Bengal (1) as population growth leads to the building of more houses / factories (1) which leads to more surface run-off (1). Trees are cut down (1) to make way for new housing / industry (1) resulting in habitat loss (1). There could be an increase in greenhouse gas emissions (1) due to more factories being built (1) which would contribute to climate change (1). No marks for just 'pollution' – need to be specific. The 'environmental' impact must be clear/made before any credit is given to 'social' and/or 'economic' ideas. Accept any other appropriate response.	(3)

Question number	Indicative content
1(f)	AO2 (4 marks)/AO3 (4 marks) AO2 • Retailing is the activity of selling goods or services to buyers for personal, family or household use. • Across the UK, has also been a shift in shopping habits in recent years: there has been a growth in out-of-town and edge-of-town shopping centres and retail parks, development of large indoor shopping centres – both within and outside urban areas, and a growth in online shopping. • These changes have had a major impact on UK cities, affecting the central business district (CBD), inner city and suburban retail areas. • In the past, many 'convenience' goods were bought in small local / corner shops or local / suburban shopping centres. Shops in the CBD tended to compete with each other to sell the more expensive 'comparison' goods. This meant that shoppers would inevitably require a trip by car or on public transport to CBD. • More recently, greater car ownership, availability of public transport, internet connectivity, a wider 'entertainment' experience at out-of-town locations and mass-advertising have combined to a shift in shopping habits – which has had a serious impact on retail in CBDs and the local economy. • These changes have brought both good and bad impacts for the city. For example, there has been a negative economic impact as result of shops being forced to close-down or choosing to re-locate; but it has also forced town planners and developers to re-think how CBDs are used – and this has led to a 'fight back' of the CBDs in several cities. AO3 The assessment of the impacts of changes in retailing will vary depending on the chosen 'named city'. The use of place-specific detail (AO1) might be used to strengthen an answer. • It is likely that an assessment of the different impacts will recognise the process of de-centralisation – and will focus on the impacts of this for different parts of the city: the CBD, inner city, suburbs, and urban-rural fringe. • In some UK cities such as Gateshead, the process of de-centralisation has had a 'polo effect', leaving a socioeconomic 'hole' in the centre of the city due to widespread closure of retail outlet; for example, it is estimated that the movement of shops in Birmingham to out-of-town locations like Merry Hill led to a 12% decline in trade in the CBD. • In addition to negative social and economic effects, this process of de-centralisation can also lead to negative environmental impacts, both in the CBD and in the edge of town locations. • Some of the impacts are connected; for example, increased traffic and congestion on the roads around cities increases pollution from exhaust

<table>
<tr><td>Question number</td><td colspan="2">Indicative content</td></tr>
<tr><td></td><td colspan="2">emissions which contributes to the greenhouse effect. Retails parks have been developed in out-of-town locations, such as Bluewater and Lakeside on the outskirts of London; this can lead to negative environmental effects on the area and reduces the available open green spaces between one urban area and another.
• For city dwellers, these changes in retailing can also bring positive impacts, for example they are often able to park for free and do not have to travel into busy congested city centre locations, with all of the shops under one roof, for example Meadowhall near Sheffield - covered from the weather. There may also be crèches and play areas for children which can make the shopping experience more enjoyable.
• Online shopping offer 24-hour access, and many supermarkets and retail parks such as The Trafford Centre on the outskirts of Manchester are open until late in the evening, which has a positive impact on residents in the city who require greater flexibility in terms on balancing work and leisure etc. However, many online retailers such as Amazon and Ocado have been successful in attracting new customers, it has meant that many shops in the CBD have had to close down.</td></tr>
<tr><td>Level</td><td>Mark</td><td>Descriptor</td></tr>
<tr><td></td><td>0</td><td>No acceptable response.</td></tr>
<tr><td>Level 1</td><td>1–3</td><td>• 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)</td></tr>
<tr><td>Level 2</td><td>4–6</td><td>• 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)</td></tr>
<tr><td>Level 3</td><td>7–8</td><td>• 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)</td></tr>
</table>

Question 2 – Global development

Question number	Answer	Mark
2(a)(i)	One mark for correctly labelling both countries on Figure 2a. (a) Study Figure 2a and Figure 2b below.  **Figure 2a**	(1)

Question number	Answer	Mark
2(a) (ii)	D 40% <u>Incorrect responses:</u> Options A, B and C are incorrect as Liberia (10%) and USA (30%) adds up to 40% (option D).	(1)

Question number	Answer	Mark
2(a)(iii)	Trinidad and Tobago (1) **Do not accept just 'Trinidad' or just 'Tobago'**	(1)

Question number	Answer	Mark
2(a)(iv)	Award 1 mark for any of the following, up to a maximum of 2 marks: Increases GDP / generates income / wealth (1) Strengthens (political) links between countries (1) To obtain raw materials/goods (1) Generate employment opportunities (1)	

	Accept any other appropriate response	(2)

Question number	Answer	Mark
2(b)	Award 1 mark for identifying a geopolitical relationship (between two or more countries, or between a country and an international organisation) that has affected development, and 1 mark for further explanation about why this relationship has affected development, up to a maximum of 2 marks. Disagreements/conflict between India and Pakistan over Kashmir (1) has led to money/resources used for military purposes OR money/resources not invested in developing industry (1). India has trade agreements with China / UK / UAE / Saudi Arabia / USA (1) which means that it can import raw materials from these countries (1). India imports crude oil from Saudi Arabia (1) which means it can run the machinery in its factories that manufacture products to sell (1). China is a member of the World Trade Organisation (1) which helped it to settle a trade dispute with the USA (1). Ethiopia and Egypt have agreements over the access to the river Nile (1) which means that Egypt is able to receive a reliable water supply (1). Accept any other appropriate response.	(2)

Question number	Answer	Mark
2(c)	Award 1 mark for identifying a physical factor, and a further 1 mark for further explanation, up to 2 marks each. Large areas of flat land (1) allow the development of settlements / industry (1). Some countries have large areas of fertile soil (1) so they are able to grow crops (1). Some countries might be less at risk / vulnerable to natural hazards (1) which means that less money is spent on re-building / hazard prevention programmes (1). Some countries have large areas of coastline (1) which will make trading with other countries easier (1). Some countries have raw materials underground (1) reducing the need to import them / meaning that income can be made from exporting them (1). A large river running through the country (1) can be used for transporting goods to the ocean (1). Accept any other appropriate response	(4)

Question number	Answer	Mark
2(d) (i)	Working to show: Addition of all life expectancies and the division by the number of countries = 478.7 / 6 (1) Correct answer written to one decimal place = 79.8 (1) Maximum of one mark if no working out is shown, or if the answer has not been written to one decimal place.	(2)

Question number	Answer	Mark
2(d) (ii)	Award 1 mark for each descriptive comment about the relationship, up to a maximum of 3 marks. There is a positive relationship between GNI per capita and life expectancy / as GNI per capita increases, life expectancy increases (1) Identification of Singapore's GNI per capita or Switzerland's life expectancy as an anomaly (1). Greater range / variance in GNI per capita data compared to life expectancy data (1). One mark available for the se of a named country plus data to support a valid comment (1). Accept any other appropriate response	(3)

Question number	Answer	Mark
2(d) (iii)	A Advances made in the treatment of some diseases C Increased access to safe drinking water <u>Incorrect responses:</u> Options B, D and E are incorrect as these reasons would lead to a decrease in life expectancy.	(2)

Question number	Answer	Mark
2(d) (iv)	Award 1 mark for: average/mean/expected number of years of schooling/education (1) Do not accept 'literacy rate' or just 'education'	(1)

Question number	Answer	Mark
2(e)	Award 1 mark for identifying one impact of investment by TNCs, and 1 mark for further explanation, up to a maximum of 3 marks. TNC investment has led to the creation of job opportunities (1) which means that wages / disposable income increases / unemployment rates fall (1) which leads to the 'multiplier effect' / consumer spending in the local economy (1). There is a boost to the economy as more money via taxes is received by the government (1) which can be spent on improving healthcare (1) which will increase life expectancy / reduce death rates (1). Some TNCs have invested in education and training to employees (1) which provides them with skills / qualifications (1) which will enable them to apply for higher-paying jobs (1). Some TNCs have invested in improving the infrastructure (transport / communications / power) (1) which means that people have greater connectivity with the rest of the country / world (1) which means that the area becomes more attractive for further FDI (1). TNCs can put money into developing raw materials (1) which means that jobs are created for the local population (1) and smaller industries develop to support the TNCs (1). TNCs have helped to bring political stability to some countries (1) which means that FDI is likely to continue (1) which improves the infrastructure / employment opportunities in the host country (1). TNCs are becoming increasingly environmentally aware (1) as they have a global corporate image to uphold (1) which means that they might be able to support a country to develop their own laws with regards pollution / conservation (1). Accept any other appropriate response.	(3)

Question number	Indicative content
2(f)	AO2 (4 marks)/AO3 (4 marks) AO2 • 'Development' can be broadly defined as 'the process where people, a place, or a country change, or make economic or social progress'. There are a number of factors that contribute towards development (including physical, technological, cultural, and political factors) – but the focus of this question is an assessment of the historic and economic factors. • Historical factors include those decisions or developments in the past that continue to have influence upon a country's level of development today, for example the timing of industrialisation or the impacts of colonialism. • Economic factors include average wealth or income, the growth rate of an economy, trade surplus / deficit, the unemployment rate, and the cost of living. • Other economic factors include the amount of funding / investment that is devoted to healthcare and education, equity and opportunities for leisure and recreation – which can influence levels of wellbeing / happiness within a country. • There is inevitably an overlap between some of these factors; there are also close links between these categories, for example with investment into the quality of education within a country impacting upon future incomes, or the legacy of colonial ties in terms of current trade links. AO3 • Judgements about the relative importance of these two factors are likely to acknowledge the importance of other factors as well, notably physical factors. • The relative importance of these specific factors varies from country to country: expect some consideration with regards to the UK's level of development, and that of a named developing/emerging country. • In terms of historical factors, it might be argued that colonialism had slowed the development of the colony; many of these countries helped to supply food and raw materials to countries like Britain and France., and whilst there was investment in colonies, this was often focused on things that would help the trade between the countries – and did not always benefit the colony; however, many trade links still exist – and this can now benefit the developing/emerging country e.g. through Fair Trade. Also, sometimes the borders of colonial countries were set without attention to tribal and cultural differences, causing tensions and instability that still exist today, limiting development. • Economic factors are also important: World trade as developed countries tend to control most trade whilst developing/emerging countries, who might be in debt to a developed country(s) has to compete with similiar countries to sell primary produce - which lowers the prices farmers get. Economic factors are linked to physical factors too, e.g. infertile soils or drought can lead to a poor harvest means, reducing incomes. On the other hand, developed countries have infrastructure in place to manufacture goods – adding value to them and making greater profits. Foreign direct investment (FDI) can help a country to develop – although this is more common in more developed countries, as the technology / infrastucture is already in place for the TNC.

Question number	Indicative content	
	• Developing/emerging countries may not have the economic means to invest in education − and this problem is made worse if they have a high dependency ratio. Having money to invest in a healthcare system is important for a country to develop because it is difficult for sick people to work hard. Safe, clean drinking water is essential for health, and if this is not available, people may be unable to work or care for their families because of illness − thus limiting the development of a country.	
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)	Living things / the organic parts of an ecosystem / the parts of an ecosystem capable of reproduction. Accept any other appropriate response.	(1)

Question number	Answer	Mark
3(b)	Award 1 mark for an understanding of the term 'non-renewable', and a further 1 mark for further explanation, up to a maximum of 2 marks. Fossil fuels can only be used once (1) because they took such a long time to form in the first place (1). Fossil fuels will eventually run out/finite (1) because we are using them up faster than they can be replaced (1). Fossil fuels are finite/eventually run out (1) because they cannot be re-used (1). Accept any other appropriate response.	(2)

Question number	Answer	Mark
3(c)	Award 1 mark for any of the following: Eastern England (1) East Anglia (1) Kent (1) North-East Scotland (1) Suffolk (1) East Midlands (1) Vale of York (1) Salisbury Plain (1) Do not accept 'Scotland', 'Wales', England', 'Northern Ireland' without some additional detail (e.g., use of compass point, named county etc.) Accept any other appropriate response	(1)

Question number	Answer	Mark
3(d) (i)	A The UK imports soya from Argentina E Large areas of flat land are needed for soya farming <u>Incorrect responses:</u> Options B, C and D are incorrect as these are untrue statements based upon Figure 3.	(2)

Question number	Answer	Mark
3(d) (ii)	Working to show: 3,000,000 / 100 x 70 (1) = 2,100,000 / 2.1 million (1) *OR* 70 / 100 x 3,000,000 (1) = 2,100,000 / 2.1 million (1) Maximum of 1 mark if the correct answer is given without any working shown.	(2)

Question number	Answer	Mark
3(d) (iii)	Award 1 mark for identifying one impact of soy farming from Figure 3, and 1 mark for further explanation, up to a maximum of 2 marks. Soil erosion (1) which reduces interception / increases run-off (1). Deforestation (1) which increases carbon emissions / increases the amount of greenhouse gases in the atmosphere (1). Deforestation (1) which means that the biodiversity of the area will decline (1). Removal of habitats (1) could lead to a reduction in biodiversity (1). Accept any other appropriate response.	(2)

Question 4 – Energy resource management

Question number	Answer	Mark
4(a)	The proportion/percentage/amounts of different energy sources used (in a country) (1). Accept any other appropriate response.	(1)

Question number	Answer	Mark
4(b) (i)	A natural gas <u>Incorrect responses:</u> Options B, C and D are incorrect as these energy resources did not have a consumption of 100 quadrillion Btu in 2005.	(1)

Question number	Answer	Mark
4(b) (ii)	B 70 <u>Incorrect responses:</u> Options A, C and D are incorrect as coal increased from 90 quadrillion Btu in 1990 to 160 quadrillion Btu in 2020.	(1)

Question number	Answer	Mark
4(b) (iii)	oil (1)	(1)

Question number	Answer	Mark
4(b) (iv)	Award 1 mark for any of the following reasons for the increase in consumption of renewables: Renewables naturally replenish themselves (1). Renewables (such as wind) have lower/falling fuel costs compared to non-renewable energy resources (1). Renewables do not produce carbon emissions / have a smaller negative impact on climate change (1). Development of new technologies will make the use of renewables more efficient in the future (1). Development of technology to provide new ways of storing energy from renewables (1). Renewables are a long-term solution to energy resource shortages (1) Some renewables (such as solar power) can provide electricity in remote locations where there is no main electricity (1). Growing population / demand for resources that use energy resources (1) Government policies that encourage the development of renewables (1). Accept any other appropriate response	(1)

Question number	Answer	Mark
4(c)	Award 1 mark for selecting an appropriate technique, and a further one mark for appropriate extension, up to a maximum of 3 marks. A questionnaire could be used (1) which includes a series of open questions (1) could be given to different stakeholders (1). An online poll could be used (1) which is emailed to residents and shopkeepers (1) which includes questions about how much they know about renewable energy resources (1). Interviews / surveys could be conducted (1) with a targeted group / stratified sample of individuals to ensure a cross-section of the community is sampled (1) and notes made from the interview could be posted on a website for other individuals to read and respond to (1). Do not credit explanation about why a method was chosen or details of how the results could be presented. Accept any other appropriate response	(3)

Question number	Answer	Mark
4(d)	Award 1 mark for a reason why global demand for energy resources has increased, and a further 1 mark for extension through further explanation, up to a maximum of 2 marks each. Increased wealth / rising incomes / better living standards (1) which means that people can afford more goods that rely of electricity / fuel to use them (1). Increased advertising / consumerism / demand for 'luxury items' (1) has stimulated a growth in manufacturing – and these factories require energy resources to run the machines (1). Global population has increased (1) which has led to a rising demand for electricity / manufactured products (1). Increase in car ownership / availability of cheap flights / development of new transport links (1) has stimulate population movement in vehicles that are powered by energy resources (1). Advances in technology / increased availability of hi-tech products (1) as people with larger disposable incomes desire more of these hi-tech consumer goods (1). Accept any other appropriate response	(4)

Question number	Indicative content
4 (e)	• AO2 (4 marks)/AO3 (4 marks) AO2 • As the global population continues to increase and existing fuel supplies begin to run out, countries will have to find ways to increase energy supplies. • The development of fracking could exploit non-renewable shale gas and oil, which would increase supplies of fossil fuels and increase the energy security of the UK. • Fracking has already been developed in some countries around the world, such as the USA, and many stakeholders believe that the UK should follow suit, and develop our reserves of shale oil and gas. • Stakeholders in favour of the development of fracking are able to cite a range of advantages: From an economic persepective, shale gas is a relatively cheap energy resource to develop (for example, in comparion with renewables or uranium) and produces fewer carbon emissions in comparision with coal based power stations. • Also, countries who develop fracking will consequntially reduce their reliance on importing overseas energy resources. • On the other hand, many stakeholders believe that fracking is not something that should be developed due to a number of disadvantages –

	and alternative energy resources should be developed instead, such as wind power, HEP and solar power. • Stakeholders who are against the development of fracking argue that the process pumps poisonous chemicals into the ground, which can potentially contaminate groundwater supplies and damage ecosystems. In addition to this the process does involving the burning of shale oil / gas, and the release of greenhouse gases such as methane into the atmosphere which can contribute to the problem of climate change. Other potential side-effects of fracking including mini-earthquakes, subsidence and additional noise and traffic congestion created by the lorries delivering water to the fracking site. AO3 • Viewpoints and attitudes with regards to the development of fracking are varied – and are dependent on specific stakeholders; moreover, an individual might not necessarily be wholly 'for' or 'against' fracking as the expoitation of shale oil and gas may bring both advantages and disadvantages to an individual, organisation or government. • In the UK, the government awarded numerous energy companies licenses to explore for oil and gas in the UK countryside. The locations included parts of Yorkshire, Lancashire, Lincolnshire, Leicestershire, Nottinghamshire and Derbyshire, which are believed to be some of the most productive areas for shale gas. Consideration is also being given to a number of other sites in southern England where shale oil might be accessed by fracking. However, some these locations are within the boundaries of National Parks or Environmentally Sensitive Areas, and the proposals have created some land use conflicts. • Another conflicting view that might be held by an individual could be the juxtaposition that an increase in use of fracking technology could create many job opportunities in an area – but could also lead to a reduction in house prices in the same area due to fears of earth tremors and subsidence. • It is also important to consider potential knock-on effects that the development of fracking may bring – as the solving of one problem may just lead to the creation or worsening of another. For example, the process of fracking requires the use of huge quantities of water – which will potentailly increase the vulnerability of drought in some areas as populations continue to rise and water supplies dwindle, and with cause conflict with those in agriculture and industry. • A large amount of energy is required to obtain the fuel during the fracking process, which means that the energy input to energy output ratio is a very low net gain. • Taking all of the advantages and disadvantages into account, some people believe that the development of fracking in the interim will provide us with additional time to research more efficient souces of technology for use in the longer-term. • An evaluation of the development of fracking (and/or the development of other new technologies) is likely to consider the social, economic, political and environmental sides to the argument when reaching a judgement; it is clear that fracking poses a large risk to the environment as it can damage houses, groundwater water supplies, wildlife habitats whilst still contributing to global warning with the harmful emissions of toxins and chemicals used; it is true that fracking produces less CO_2 then coal based power stations and could provide the country developing it with energy-security, at least in the short-term, but ultimately it still is not as

		environmentally beneficial as renewable energy sources such as solar and wind.
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)

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 5 – Water resource management

Question number	Answer	Mark
5(a)	A situation in where a place has more water than it needs / supply is greater than demand (1). 'excess of water', 'lots of water left over' etc. is not enough for a mark – there needs to be a clear idea of supply being greater than need/demand. Accept any other appropriate response.	(1)

Question number	Answer	Mark
5(b) (i)	C 2000 <u>Incorrect responses:</u> Options A, B and D are incorrect as these figures do not correspond to the top of the graph in the year 2010.	(1)

Question number	Answer	Mark
5(b) (ii)	A 200 <u>Incorrect responses:</u> Options B, C and D are incorrect as these do not provide an accurate figure of water resource consumption for agriculture in 1990.	(1)

Question number	Answer	Mark
5(b) (iii)	Agriculture (1)	(1)

Question number	Answer	Mark
5(b) (iv)	Award 1 mark for any of the following reasons for the increase in water resource consumption: Increased wealth / rising incomes / afford more goods that use water (1). Increased consumerism / demand for 'luxury items' that use water (1). Global population has increased (1). Technological advancement / development of new products that require water usage (1). Improved infrastructure to provide water supply to homes (1) Increased levels of personal hygiene / sanitation in homes (1) Poor water management in the home (idea of leaving the tap running / overfilling appliances) (1). Accept any other appropriate response	(1)

Question number	Answer	Mark
5(c)	Award 1 mark for selecting an appropriate technique, and a further one mark for appropriate extension, up to a maximum of 3 marks. A questionnaire could be used (1) which includes a series of open questions (1) could be given to different stakeholders (1). An online poll could be used (1) which is emailed to residents and shopkeepers (1) which includes questions about how much they know about water resources (1). Interviews / surveys could be conducted (1) with a targeted group / stratified sample of individuals to ensure a cross-section of the community is sampled (1) and notes made from the interview could be posted on a website for other individuals to read and respond to (1). Do not credit explanation about why a method was chosen or details of how the results could be presented. Accept any other appropriate response	(3)

Question number	Answer	Mark

5(d)	Award 1 mark for a reason for a water shortage and a further 1 mark for further extension, up to a maximum of 2 marks each. The population in some parts of the world is growing rapidly (1) which means demand for water is higher than supply (1). Some parts of the world have low rainfall/arid climates/seasonal imbalance of rainfall/affected by climate change (1) which means that the supply of water is lower than demand (1). Developing / poorer countries (1) cannot afford the technology / infrastructure to transfer water (1). Water has been used in an unsustainable way in industry (1) polluting water supplies / leading to over-extraction of groundwater stores (1). Some parts of the world have a water shortage due to a negative geopolitical relationship with a neighbouring country (1) which means that the flow of a river might be controlled up stream, restricting water supply further downstream (1). **Question is about 'supply', therefore do not credit reasons for** poor water quality. Accept any other appropriate response	(4)

Question number	Indicative content
5 (e)	• AO2 (4 marks)/AO3 (4 marks) AO2 • As the global population continues to increase, countries are finding ways to secure water supplies − and this is involving technology and interventions by different interest groups. • It is not possible to drink seawater as it contains salt. Desalination plants remove the salt from seawater to make it safe to drink. When it goes through the filtration steps necessary to remove the extra sodium from the liquid, the water becomes usable for agriculture, industrial needs, and for drinking purposes. • The United States uses desalination plants to supplement the water supply, like in San Diego, CA, where 10% of the usable water goes through this process. In the Middle East where freshwater supplies are scarce, up to 48% of the drinking water availability in some countries is because of the work of desalination. • Stakeholders in favour of the development of desalination plants believe that this process of removing salt from seawater could solve many of the world's water insecurity issues. One example of the desalination is in the

UK, where a desalination facility has been built on the the River Thames. The plant removes the salt from tidal water from the River Thames to help the UK during times of prolonged low rainfall and drought.

- In addition to providing water security for vulnerable areas and therefore supports development by tackling issues caused by drought and famine, desalination plants also have the potential to generate HEP and also to take the pressure of other fresh water supplies hat are at risk of over-abstraction which can have a negative impact on ecosystems.
- However, some would argue that desalination is not a very efficient process as only a small proportion of useable water is created which means that this is unlikely to be a large-scale solution. Also, large quantities of salt water (brine) are created as a waste product which may disrupt the balance of marine ecosystems when disposed of into the sea.
- Other disadvantages of developing desalination plants is that they require frequent maintenance to prevent a build-up of bacteria which is expensive and time-consuming.

AO3

- Viewpoints and attitudes with regards to the development of desalination are varied – and are dependent on specific stakeholders; moreover, an individual might not necessarily be wholly 'for' or 'against' deslination as the expoitation of shale oil and gas may bring both advantages and disadvantages to an individual, organisation or government.
- There are places in the world, especially in the arid Middle East, where desalination makes it possible to have enough usable water for everyone. Existing water resource management schemes such as building dams and reservoirs are also very costly, and often are faced with additional challenges, for example in terms of controversy and conflict when water courses are diverted.
- Although the cost of desalination can be an obstacle for implementation, finiancial support / subsidies are often available – and the longer term social and economic benefits of a reliable water supply may be seen to outweigh the costs of setting up and operating desalination plants.
- A large of quantity of energy resources is needed to power desalination plants which may result in carbon emissions/greenhouse effect – which might be an issue a government might be particularly concerned about. For example, Israel, a country that has invested in desalination, have set a target of cutting carbon emissions by 85% from 2015 levels by the middle of this century.
- Another conflicting view about the development of desalination is that, aswell as the negative environmental effects that they could causes, the huge set-up and running costs means that they they are not viable in every country that would benefit from them – and are simply not an option possibly due to the low level of economic development of a country; however, if they were to invest in desalination, it could actually stimulate future economic development as the water could be used domestically, in agriculture and in industry, boosting the economy of the country.
- Taking all of the advantages and disadvantages into account, some people believe that the development of deslaination in the shorter term will provide us with additional time to research more efficient souces of technology and methods of water management for use in the longer-term.
- An evaluation of the development of desalination (and/or the development of other new technologies) is likely to acknowledge that it

		has the potential to help people meet their basic needs, grow food, and support their livelihood in areas of water stress and water scarcity. However, the other side of the argument, from an environmental perspective, will recognise the devastating brine that contains significant salt levels and other chemicals. Ultimately, there are some significant trade-offs to consider when using this technology.
Level	Mark	Descriptor
	0	No acceptable response.
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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)

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		• 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.