

Mark Scheme (Results)

Summer 2012

GCE Geography
Contested Planet
6GE03

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General Guidance on Marking

All candidates must receive the same treatment.

Examiners should look for qualities to reward rather than faults to penalise. This does NOT mean giving credit for incorrect or inadequate answers, but it does mean allowing candidates to be rewarded for answers showing correct application of principles and knowledge.

Examiners should therefore read carefully and consider every response: even if it is not what is expected it may be worthy of credit.

Candidates must make their meaning clear to the examiner to gain the mark. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct context.

Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the Team Leader must be consulted.

Using the mark scheme

The mark scheme gives:

- an idea of the types of response expected
- how individual marks are to be awarded
- the total mark for each question
- examples of responses that should NOT receive credit.

Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:

- show clarity of expression
- construct and present coherent arguments
- demonstrate an effective use of grammar, punctuation and spelling.

Full marks will be awarded if the candidate has demonstrated the above abilities.

Questions where QWC is likely to be particularly important are indicated "QWC" in the mark scheme BUT this does not preclude others.

SECTION A

Question Number	Question
1a	Explain the possible impacts on UK energy security of the trends shown. (10)
	Indicative content

The graph shows how **primary energy use** (all energy, not just electricity) has changed up to 2010, and projected to 2030. Answers should link the changes shown to the issue of **energy security** in the UK (decreasing / increasing / stable). The focus should be on Figure 1 but credit should be given for use of similar examples; candidates who drift into a non-UK case study will tend to self penalise. Weaker answers may focus on general impacts (soc / eco/ env) rather than impacts on energy security.

- Overall energy use is projected to rise by 2030, although only slightly, suggesting that the UK has a small ‘energy gap’ too plug.
- Coal + oil dominated in 1970, but by 2010 there is a greater energy mix which could be seen as positive for energy security (but perhaps too reliant on gas by 2030).
- Coal has declined from 100 MTOE in 1970 and is expected to decline ever further to 30 MTOE by 2030; might be seen as increasing insecurity as the UK has large domestic reserves it could use but does not: instead relies on imports. Closure on mines in 80s/90s.
- Oil remains relatively stable as an absolute amount but represents a declining proportion of primary energy; some might comment that by 2030 much of the 80 or so MTOE will be imported because of declining domestic production. OPEC issues.
- Natural gas is an ever increasing proportion; expect comments on rising imports from Russia, Qatar as LNG, and security declining; some might mention new and planned pipelines and terminals as helping secure supply.
- Nuclear is projected to fall by 2030, due to the decommissioning of older power stations, increasing reliance on other sources: some might comment that renewable growth (which is domestic) is filling the nuclear gap increasing security.
- Electricity imports are set to rise; increasing foreign dependency.

Better candidates might provide a summative overview of rising insecurity linked to increased dependency on foreign sources and intermittent renewables.

Do not expect explicit knowledge of the UK energy mix beyond that which can be taken from / inferred Figure 1.

NB: the question is about the impacts of the trends on energy security, *not* why the trends have occurred (likely to be L1).

Level	Mark	Descriptor
Level 1	1-4	Descriptive and partial response with a few basic comments on security likely to focus on a few changes for one or two sources e.g. gas. Structure is poor or absent. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors.
Level 2	5-7	Some range of explanations but unbalanced; many focus on more general impacts with only some linkage to energy security. Structure is satisfactory. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors.
Level 3	8-10	Range of explanations linked to the impact on energy security with some detail / examples used in support. Thorough use of Figure 1. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare

Question Number	Question	
1b	Using named examples, evaluate the contribution radical energy technologies and policies might make to a more sustainable energy future. (15)	
	Indicative content	
<p>Some candidates might address the idea of a ‘sustainable energy future’ i.e. one which provides the energy people need at reasonable cost, but in a less environmentally damaging way.</p> <ul style="list-style-type: none"> • Technologies: radical can be taken to mean <i>not</i> business as usual/ <i>not</i> conventional fossil fuels and might encompass a wide range of renewable technologies some of which are well-known (solar, wind, tidal) and others are more cutting-edge (hydrogen, 2nd or 3rd generation biofuels). Clean coal and unconventional fossil fuels are acceptable. • Policies: might include renewable energy targets, recycling, carbon taxes, energy conservation and others. Policies can be at any scale of action e.g. national or international targets, city wide schemes, local energy consortiums. <p>Candidates are likely to evaluate by giving the pros and cons of policies and energy technologies:</p> <ul style="list-style-type: none"> • Many renewable technologies are limited by physical geography and may be expensive currently; there are space and NIMBY issues; on the plus side emissions are lower or zero. • Some technologies are not fully proven and require major investment to become viable e.g. hydrogen. • The public may be against some options, such as nuclear or large scale wind farms, or simply not overly concerned so there is no political capital to be gained by radical actions. • Policies might use the tax system which the public may not support; they may simply be too ambitious or under-funded to have the desired outcome. Grants for micro-generation in the UK have been criticised for being difficult to obtain and under-funded. • Carbon Capture and Storage is a radical way to use fossil fuels e.g. coal; it could allow coal to be used without releasing CO₂ into the atmosphere, but is largely unproved on a commercial scale and likely to be costly. <p>The question is about energy so answers should not focus wholly on actions to tackle global warming. Reference to Kyoto and similar policies / actions will need to be linked to energy e.g. conservation / efficiency / pollution reduction / extending the life of energy sources.</p> <p>Evaluation: May consider strengths and weaknesses of individual technologies and policies and / or provide an overall summary i.e. which options most / least likely to provide a more sustainable energy future. NB Expect radical technologies but many may not also include <i>radical</i> policies, just policies.</p>		
Level	Mark	Descriptor
Level 1	1-4	One or two general ideas on possible energy technologies or policies. Structure is poor or absent. Explanations are over simplified and lack clarity. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors.
Level 2	5-8	An explanation of several technologies or policies which may imply evaluation, but detail is thin and not linked to a sustainable energy future. Radical not addressed. Structure is satisfactory. Explanations are clear, but there are areas of less clarity. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors.
Level 3	9-12	Some evaluation that considers policies and energy technologies, but unbalanced; limited link to a sustainable energy future. Some radical content. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare.
Level 4	13-15	Genuine evaluation of a range of radical energy technologies and policies which uses examples and provides some detail; some link to the idea of a sustainable energy future. Carefully structured. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare.

Question Number	Question	
2a	Suggest reasons for the trends in the health of the four groups shown. (10)	
	Indicative content	
	<p>Figure 2 shows decline in 4 groups of species; they all have different starting points and the rate of decline in health varies from severe (coral) to marginal (birds). Good candidates should differentiate. Answers could be structured by reasons (i.e. threat type) or species group. Many of the reasons below could be true for several species groups.</p> <ul style="list-style-type: none"> • Birds show the smallest decline in health; this might be related to the ability to easily move to new locations if habitats are threatened by destruction or long-term change e.g. global warming. • Coral has exhibited a precipitous decline since 1995 which can be related to a range of global and local threats e.g. global warming (bleaching, sea level rise), El Nino events, over-fishing, development for tourism, coral mining etc. • Mammals show a small decline which might be related to hunting, alien species, disease; the small decline could be related to conservation efforts e.g. the red squirrel and the fact that some mammals have become icons of conservations e.g. pandas, tigers. • Amphibians show a long-term decline in health possibly related to drainage of wetlands and marshes, climate change, deforestation and pollution. <p>There are many other possible reasons that should be credited.</p> <p>Credit the use of other examples / species not shown on Figure 2. Max Level 2 = 7 for a candidate who only suggests reasons for one group e.g. coral.</p>	
Level	Mark	Descriptor
Level 1	1-4	Partial answer which focuses on a few general threats and / or one species only. Structure is poor or absent. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors.
Level 2	5-7	Some range of reasons provided with some details; likely to discuss more than one group. Structure is satisfactory. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors.
Level 3	8-10	Detailed range of reasons which recognises the different trends / rates of change and seeks to explain these. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare

Question Number	Question
2b	Using named examples, examine the relationship between levels of economic development and attitudes towards conservation of ecosystems. (15)
	Indicative content

This question focuses on the link between growing wealth and attitudes to ecosystem conservation (which might be seen by some as the link between human and ecosystem wellbeing).

Candidates are likely to examine countries / regions at different levels of development in order to make comparisons:

- **Less developing countries** regions (LEDCs, LDCs) could be seen as protecting ecosystems almost by default, as they do not exploit them and / or using them in a way that limits destruction to small areas e.g. farming; some might argue for less developed regions rely heavily on conservation areas for tourism income e.g. safari parks and because of this actively manage e.g. Campfire Project
- **NICs and RICs (+BRICs)** might be seen as having the least interest in conservation and ecosystems because they are at the stage of using natural resources for economic gain e.g. deforestation in Brazil, loss of mangroves for fish farms in Asia etc.
- **Developed countries** may be seen as having moved towards conservation of large areas and regulation of damaging activities such as pollution e.g. national parks, FSC regulations; there may be arguments against this such as continued over-fishing.

Some may choose to examine the relationship over time i.e. as countries become more developed.

An alternative approach could be to use case studies / examples to show how economic development can lead to destruction, or protection / conservation.

Examination of the relationship:

Some candidates will take a straightforward view i.e. more development = less concern

Others might argue that high levels of development mean greater concern; others may argue more complex relationships or that it depends more on individual attitudes.

This could include the view that there are exceptions to overall relationship i.e. wealthy countries that 'don't care' or developing ones with good conservation management.

Credit that which is justified / supported, there are lots of different approaches that could be used.

Level	Mark	Descriptor
Level 1	1-4	A few general comments on ecosystem destruction or similar; description of a conservation area not linked to the question. Structure is poor or absent. Explanations are over simplified and lack clarity. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors.
Level 2	5-8	Some attempt to address the relationship but partial and unbalanced; may use examples but these do not support the discussion fully. Structure is satisfactory. Explanations are clear, but there are areas of less clarity. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors.
Level 3	9-12	Response which focuses on the relationship, in clear but possibly one-sided terms; examples are present and there are some details to support the argument. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare.
Level 4	13-15	Detailed examination of the relationship which uses examples in support; likely to see exceptions to any general rule. Carefully structured. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare.

Question Number	Question	
3a	Using Figure 3 and your own knowledge, explain why the pattern of economic power has changed over time (10)	
	Indicative content	
	<p>Expect some description of the changes shown, and possibly the use of uni/bi/multi-polar from better candidates. Do not expect equal coverage for all 4 periods; candidates are likely to focus more on 1998 and 2025. The USA and Germany are the only countries in the top 5 present at all 4 times, although some candidates might comment that the lists do not change much over 100+ years (and perhaps suggest reasons for this)</p> <ul style="list-style-type: none"> • The 1913 world is arguably the most uni-polar of the 4 dates; some might see the First World War and WWII as a reason for the decline of the UK by 1950 (debt after WWII / cost of empire) • The 1950 world is the start of the Cold War era with the USA as the dominant world power with 27% of global GDP; some might comment on the WWII victors as holding the top three positions; the 1950s might also be seen as the beginning of USA TNC/ media domination; countries aligning themselves into opposing economic power / blocs. • 1998 represents to post-cold war world following the collapse of communism (hence no Russia in the GDP top 5); some might comment on the dominance of western capitalist countries in the top 5 perhaps linked to the industrialisation of Japan since 1950 and the role of some countries in IGOs such as the UN, WB, WTO etc. The importance of the EU is also obvious. • In 2025 the rise of India and China (reasons for BRIC growth; industrialisation; growing military and technical prowess) is clear and the world might be seen as bi-polar (or increasingly multi-polar); developed countries have slipped perhaps reflecting ageing populations and other reasons. • Accept arguments that GDP is only one measure of superpower status so Figure 4 is not a complete picture; credit additional status factors as own knowledge. <p>Look for a range of reasons and a relatively coherent discussion. Max 7 if only 2 time periods are mentioned.</p>	
Level	Mark	Descriptor
Level 1	1-4	Descriptive response which repeats Figure 4 and provides a few general reasons why some countries are more important than others. Structure is poor or absent. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors.
Level 2	5-7	Some range of explanations for some changes shown on Figure 4; may be unbalanced and lacking depth. Structure is satisfactory. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors.
Level 3	8-10	Detailed explanations of changes and use of own knowledge; likely to use the terminology of superpowers. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare

Question Number	Question
3b	Using named examples, assess the relative importance of economic, military and cultural factors in influencing superpower status. (15)
	Indicative content

Candidates should focus on **economic, military and cultural** factors but some may choose to bring in other factors e.g. IGO membership or demographic status which should be credited in the context of 'relative importance'.

Examples used could be historical or contemporary; credit answers which discuss the importance of factors both maintaining the power of the USA and EU, and growing power in the BRICs. There is no clear 'right' answer but good candidates should move towards making a judgement. Hard and Soft power could be discussed and used as a structure rather than eco/ mil / cult. Expect some discussion of:

Economic:

- Importance of GDP and wealth as the basis for other forms of power
- Role of trade and finance in creating wealth and the opportunities resulting from globalisation
- Wealth of the USA and the growing wealth of China as the 'workshop to the world'; there is likely to be a discussion of the BRICS in this context
- Economic development in other regions e.g. China in Africa
- Resources as a source of wealth / power e.g. oil, rare earths

Military:

- Military power as a threat, and tool of diplomacy, especially the *global* military machine of the USA.
- Role of nuclear weapons within G8 / UN security council members as the ultimate threat / deterrent
- Rising role of China's military i.e. very large standing army and increasing sea and ballistic power; ongoing strength if Russia in terms of nuclear power.

Cultural

- Cultural power and influence might be seen as the least important, but others might argue it is the most pervasive due to the more subtle work of brands, TNCs, international news media, film and TV; the role of language might feature.

Assessment:

The relative importance of the 3 factors should be considered against each other; there is no one correct answer, credit justified statements. Other factors e.g. IGO membership can be credited and may form part of the assessment.

Max 12 if only 1 country is mentioned.

Level	Mark	Descriptor
Level 1	1-4	A few general comments on power and wealth, possibly related to the USA. Structure is poor or absent. Explanations are over simplified and lack clarity. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors.
Level 2	5-8	Some attempt to discuss the factors but at a superficial level; might set out the various forms of power the USA has with few details and no judgement. Unbalanced. Structure is satisfactory. Explanations are clear, but there are areas of less clarity. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors.
Level 3	9-12	More detailed response which uses some examples and has some balance across the factors; may move towards a judgement on relative importance. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare.
Level 4	13-15	A genuine, supported assessment of factors with examples and detail which judges the relative importance as part of a clear argument. Carefully structured. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare.

Question Number	Question	
4a	Suggest reasons for the variable progress towards achieving the Millennium Development Goal targets. (10)	
	Indicative content	
	<p>Progress is variable. In terms of regions SSA has made little progress on any of the targets, whereas two targets have been met in E Asia with reducing hunger on track, but less good progress in 2 areas. Elsewhere progress is more variable, although generally not on target.</p> <p>Expect some discussion of regions (column) and targets (rows); candidates who focus on one column / row will self-penalise with a narrow response. Structure could be by row or column. Credit those who argue that in some cases the actual situation could be reasonable and the target small, but just not close to being achieved e.g. target 3 for E Asia.</p> <p>Sub-Saharan Africa:</p> <ul style="list-style-type: none"> • Persistent poverty fuelled by limited progress in economic development • Lack of trade and participation in globalisation • Particular problems such as lack of adequate nutrition worsened by war/ conflict, drought, desertification and population growth • Low levels of medical infrastructure and personnel for lack of progress in targets 4 and 5. <p>East Asia:</p> <ul style="list-style-type: none"> • Benefits from growing wealth and jobs in China, which makes up a very large % of the whole region. • Industrialisation and urbanisation explain falling poverty and hunger • Investment in doctors and hospitals, plus more urban births, explain reduction in maternal mortality; children still need attention (targets 3 and 4) <p>South Asia</p> <ul style="list-style-type: none"> • Starting from a lower base than E Asia and contains Pakistan and Afghanistan - war / conflict limit or reverse progress • India has a large rural population which still lives in poverty; some might mention the 2007-2010 food crisis • Aid and investment may explain good education progress. <p>Latin America & Caribbean</p> <ul style="list-style-type: none"> • Surprisingly poor progress expect for child mortality; some might argue that the problem is smaller here but also expect explanations based on urban slum poverty and hunger; low wages. • Possibly lack of political will to sort out the remainder of the problem. <p>Level 3 marks are possible for candidates who compare and explain the progress made by two regions e.g. Sub-Saharan Africa versus East Asia.</p>	
Level	Mark	Descriptor
Level 1	1-4	Unbalanced; one or two ideas focussed on a few areas of Figure 4 only; partial. Structure is poor or absent. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors.
Level 2	5-7	Some range of explanations for several targets and regions, but these will tend to be rather generalised. Structure is satisfactory. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors.
Level 3	8-10	Range of explanations linked to the rows and columns; balanced with some specific examples to support explanations. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare

Question Number	Question
4b	Using named examples, assess the advantages and disadvantages of contrasting ways of measuring development. (15)
	Indicative content

The development gap can be measured in a variety of ways; expect a definition of the gap followed by a discussion of a variety of different measures and indicators. These should not be a repeat of ways that can be inferred from Figure 4, although some discussion of the MDG as a framework is acceptable. Common ways (measures / indicators) that might be mentioned include:

- **Single economic measures** of GDP / GNI per capita; perhaps the most commonly used measure; issues related to nominal or PPP versions and overall conversion / exchange rate calculations; lack of regional picture and urban and rural contrasts but it does make for an easy comparison between nations; very widely understood; very narrow view of what development is i.e. related to money / wealth.
- **Single social measures** such as literacy, infant mortality, life expectancy; perhaps reflect the importance of human development and therefore see development in a broader context; difficulties of getting data in some places (Sudan, Somalia, North Korea) and exceptions / anomalies such as Cuba.
- **More ‘modern’ indicators** such as mobiles, internet, landlines - leapfrogging might make these fairly meaningless or difficult to interpret
- **Composite indices** such as HDI, Gender Development Index, PQLI - often seen as more accurate as they iron out extremes by including 3+ measures; perhaps give a more ‘rounded’ view but data may be incomplete - might be related to a model such as the development cable.
- **Environmental measures** such as carbon footprints, ESI/EPI; possibly show the link between human and ecosystem wellbeing as an indicator of development.

In L3 and L4 some of the ways mentioned should be contrasting i.e. single measures versus indices, or economic versus social measures. A very wide range of measures and ways could be used.

Models (Rostow etc) are unlikely to be useful / valid as they do not measure development, just describe development position.

Assessment:

Expect consideration of the + / - for individual measures as well as some overall judgment of which ways of measuring development are best e.g. indices versus individual indicators.

Level	Mark	Descriptor
Level 1	1-4	Generalised statements about one / a few measures e.g. GDP; likely to lift off from Fig 4 or elsewhere. Structure is poor or absent. Explanations are over simplified and lack clarity. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors.
Level 2	5-8	Some range of measures but may not contrast, unbalanced adv / disadv; some statements likely to be errors; descriptive and lacking examples. Structure is satisfactory. Explanations are clear, but there are areas of less clarity. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors.
Level 3	9-12	Range of measures with some contrast, some details and accuracy; advantages and disadvantages are fairly well balanced with some assessment. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare.
Level 4	13-15	Detailed, exemplified assessment using a range of contrasting measures and examples; likely to provide an overview i.e. which is best and why. Carefully structured. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare.

Question Number	Question	
5a	Suggest reasons for trends in the use of technology in the developing world, such as those shown. (10)	
	Indicative content	
<p>Expect some description as the trends are explained, but the answer should focus on giving reasons for the technology trends. The data is only for the developing world.</p> <p>Landlines:</p> <ul style="list-style-type: none"> Was the highest in 1990, but at a low level due to the cost of provision (cabling, connection charges, line rental) Trend is upward but slow (linked to economic development) but then peaks in 2006 and has since declined slightly - the technology has been leapfrogged by mobile phones which are cheaper to use. <p>Mobiles:</p> <ul style="list-style-type: none"> Not really present until 1998-99, then exponential growth to over 60/1000 by 2009; advent of cheap handsets and falling call / text costs (initially high costs in relation to incomes). Many developed world TNCs have moved into the developing world and there are also developing world companies growing rapidly Installation costs are low as base stations can be placed almost anywhere Cheap, used handsets imported from the developed world and locally made spares and batteries; innovate ways of charging mobiles using car batteries in rural areas. Increasing importance of mobiles as a business opportunity <p>Internet:</p> <ul style="list-style-type: none"> Slower growth than mobiles, rising from almost nothing in 1998 to 20 /1000 in 2009 More costly, requires literacy and more infrastructure (especially if not mobile) e.g. ISPs, cabling, hardware and software. Innovations such as OLPC and WiFi may have increased growth rate since 2005 Some areas likely to be very poorly connected e.g. SSA whereas other are much better e.g. China due to very different levels of development in the developing world. Possible role of aid. Development of undersea fibre-optic connections recently e.g. EASSy in East Africa. <p>Credit reference to physical barriers to developing the infrastructure. Credit use of examples of other technologies that have grown (or slowed / declined) in the developing world. Max marks could be gained by focussing partly on Figure 5 and on other examples.</p> <p>Candidates might achieve L3 by suggesting reasons for 2 trends, but not for 1 only.</p>		
Level	Mark	Descriptor
Level 1	1-4	Description of the trends with a few generalised reasons which are likely to be partial. Structure is poor or absent. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors.
Level 2	5-7	Some range of reasons linked to trends but may be unbalanced. Structure is satisfactory. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors.
Level 3	8-10	Range of reasons for trends, recognises different rates of change; balanced and reasons are specific. May use examples to support. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare

Question Number	Question
5b	Using named examples, evaluate the environmental and social costs of adopting new technologies. (15)
	Indicative content

Answers should focus on **costs** and good answers will be balanced between environmental and social. Social costs could relate to human wellbeing in terms of health, wealth, lifestyle etc.

The new technology could be contemporary or new at the time of introduction to an area. There are a very wide range of possible examples that could be used including:

- GM crops: environmental costs relating to the expansion of farmed area, deforestation and pesticide / herbicide resistance; the fear of genetic material ‘escaping’ into other organisms; social costs include social-polarisation in areas such as Latin America; widespread fears about the ethics of GM in some areas.
- Green Revolution crops: social polarisation, plus widespread environmental issues associated with intensive farming e.g. water and energy use, pollution and eutrophication.
- Nuclear power: environmental concerns about waste disposal and storage, leaks (Irish Sea, Chernobyl) plus social issues relating to fear of this.
- Wind power and other renewables in terms of NIMBY issues and a range of environmental concerns; the costs of biofuels in terms of impacts of food prices could be raised as a social concern.
- Pollution from transport / internal combustion engine could be seen as a key cost relating to cars (which are new technology to some people) or road, rail and shipping freight -possible link to the issue of global warming or urban air pollution and health issues.
- Some candidates may discuss the potential costs of large scale geoengineering to tackle global warming such as fears of acid precipitation if sulphate aerosol technology is used.
- Water technology could be discussed in terms of the South-North transfer and Three Gorges in China, as well as many other examples.

Be flexible about ‘new technology’ as a huge range of possibilities exist, including intermediate technology, energy, medical, transport, chemicals, geo-engineering, farming etc.

Credit those who argue that the costs can be overcome in many cases, but the focus should **not** be on benefits.

Assessment

Better answers should move towards a conclusion, possibly in terms of which is the greater cost (social or environmental) and / or which types of technology have the greatest costs (energy technologies, or military ones, chemicals such as DDT). There might be judgments that the costs are greater in some areas compared to others e.g. the developing world.

Level	Mark	Descriptor
Level 1	1-4	A few general statements on costs of generic technologies; likely to be sensationalist and lacking details. Structure is poor or absent. Explanations are over simplified and lack clarity. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors.
Level 2	5-8	Limited range of costs for some technologies but lacking detail and may be unbalanced i.e. one technology or only social or environmental. Structure is satisfactory. Explanations are clear, but there are areas of less clarity. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors.
Level 3	9-12	Some range of social and environmental costs and broadly balanced; uses examples and has some details; implied evaluation. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare.
Level 4	13-15	Genuine evaluation of a range of social and environmental costs in a balanced account which uses examples and has detail in support. Carefully structured. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare.

SECTION B

Question Number	Question	
6a	Explain how the physical and political geography of the region is putting water supply at risk. (10)	
	Indicative content	
<p>NB: This question focuses on risks to water supply in the present. Transboundary water resources are those which have to be shared across borders. The basic problem is that the river source regions are largely in China, Nepal and other Himalayan countries but users are in those countries as well as others.</p> <p><u>Physical geography</u></p> <ul style="list-style-type: none"> • Source region is in the Himalayan Mountains and plateau region; ice and snow stores water which is released in the spring and summer into rivers and also sometimes unreliable. • Water supply relies on the monsoon / ITCZ shifts, which can be unreliable (i.e. drought or severe flooding). Fig 4 shows some locations have a very brief, intense monsoon e.g. Delhi and Karachi. Seasonality of physical supply is an issue in some locations. • Some countries (Fig 5) rely on sources originating outside their country for over 50% of their supply (Fig 6), and could be said to at risk if sources were cut off or reduced. • Climate change may be mentioned, but only as one factor (see Q6b), and it is a future risk largely. • The finite nature of physical water supply (surface rivers and lakes + groundwater aquifers) <p>Do not credit reference to human factors that are increasing demand, unless they are in the context of physical supply. Answers which focus heavily on the future threat of global warming will be unbalanced and self-penalising.</p> <p><u>Political</u></p> <ul style="list-style-type: none"> • The region is not stable and there are a number of long running disputes which could escalate and water could become a weapon within a conflict (Fig 3). Expect some brief details of some conflicts from Fig 3 and / or research e.g. Between India and Pakistan or India and Bangladesh (which has a religious dimension). • View 2 alludes to the possible risk China's actions might pose to the Mekong. • Already numerous dams and diversions have been built, and more or planned; these are a source of tension and risk • Good answers may point out that there are agreements in place in some cases. <p><u>Synoptic linkages</u></p> <ul style="list-style-type: none"> • Possible links to transboundary aquifers, which may have been researched. • Parallel examples of other regions e.g. SW USA or the Nile might be used to illustrate problems • Links to Unit 3 superpowers in terms of political disputes and instability; note some disputes e.g. Tibet, are not mentioned in the resources. 		
Level	Mark	Descriptor
Level 1	1-4	Unbalanced response which focuses on political or physical (or does not differentiate); limited use of resources and generalised comments. Structure is poor or absent. Explanations are over simplified and lack clarity. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors.
Level 2	5-7	Some political and physical factors are identified; may be unbalanced but there are some details from the resources. Structure is satisfactory. Some reference to wider links. Explanations are clear, but there are areas of less clarity. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors.
Level 3	8-10	Detailed explanations of a range of physical and political factors exemplified from the resources and may use own knowledge. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare.

Question Number	Question	
6b	Assess the relative importance of the threats to future water supply within the region (15)	
	Indicative content	
	<p>NB This question focuses on the threat to <u>future</u> water supply in the region.</p> <p>There are a number of threats to the regions future water supply; answers should not revisit the territory of Q6a in detail. Figure 6 shows that renewable water supply in the region fell on a per capita basis in very country between 1988-92 and 2003-07. Threats to future water supply include:</p> <ul style="list-style-type: none"> • Rapid population growth (Fig 7) which is projected to increase sharply to 2025 will but increasing strain on resources. Some might see this as the fundamental problem i.e. too many people and a finite (or diminishing) supply. Some countries (Fig 5) are already using most of their available water now e.g. Pakistan. See View 1. • Urbanisation (e.g. Delhi) is progressing rapidly but water supply is not matching demand - some might see this as a crisis today, rather than one for the future. • This can be linked to rising per capita demand as the economies of the region move from an LEDC / RIC model towards an NIC/MEDC one; Figure 8 shows how water use changes as a result of development - this might be linked to China and India's growth. • Agricultural water demand is also rising and there is pressure to match food supply with population (Fig 9); in some countries e.g. China the 2025 projections of water demand for irrigation are nothing short of scary. These demands might be seen as unsustainable as the water simply is not available? • A context threat is that of climate change. Good candidates might recognise that this is an unknown and that it is controversial as melt rates of glaciers were subject to media controversy in 2009. The consensus seems to be that shrinking glaciers will begin to reduce water supply and that this could be compounded by changing rainfall patterns to the risk of too little and too much increases. There is an opposing view in View 2 which should be referred to. • Views 1 and 2 give views on the relative importance of different threats, which good students might be expected to refer to. <p>Assessment:</p> <p>Better answers will make a judgment about which threats are the most important / serious; this could include an assessment that some are uncertain e.g. global warming's impact, future industrial water demand or that some are easier to manage than others e.g. water pollution compared to population growth.</p> <p>Synoptic linkages</p> <ul style="list-style-type: none"> • Unit 1 Climate Change • Unit 3 bridging the development gap and Unit 1 globalisation / migration in terms of urban and economic growth • Numerous parallel examples of areas under water stress might be used. • Economic models such as Rostow might be used. • Credit use of research material not in the resources. 	
Level	Mark	Descriptor
Level 1	1-4	A few general ideas on threats; may see global warming as the one and only threat. Structure is poor or absent. Explanations are over simplified and lack clarity. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors.
Level 2	5-8	Outlines some range of threats, but relies on the resources and may be unbalanced; provides some explanations but not relative importance. Structure is satisfactory. Explanations are clear, but there are areas of less clarity. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors.
Level 3	9-12	Explains a range of threats with some details, and some evidence of synopticity; implied or partial assessment. Structure is good. Includes reference to wider / synoptic links at top end. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare.
Level 4	13-15	Detailed, balanced assessment of relative importance of a full range of threats. Carefully structured. Strong synoptic links. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare.

Question Number	Question
6c	Evaluate the contribution water management schemes, such as those shown in Figure 11, might make towards a sustainable water future for the region (15)
	Indicative content

The 3 schemes in Figure 11 are very different; candidates might see intermediate technology as bottom up and local, whereas the large dam is a classic top-down megaproject with very high initial costs. The international agreement might be seen by some as an attitudinal fix as opposed to a technological one.

Expect good candidates to set out their understanding of ‘sustainable water future’ and perhaps use this as a structure.

In terms of evaluating each scheme:

- **Intermediate technology:** has the benefits of being low cost, can be built and maintained by the users and dramatically improves water supply, probably without a major impact on those downstream; has limited env impacts on the river. The project does imply a mountain location and relies on a secure supply in the first place; may be difficult to upscale and not suitable for urban areas and industry.
- **MRC:** in some ways a model agreement between countries which have had historic tensions; it recognises the critical importance of the Mekong and provides a framework agreement to manage this transboundary resource. The actual agreement is a little short in detail. Critically the main source country (China) and a troublesome user (Myanmar) are not formal members; View 4 suggests China could seriously affect the Mekong. Candidates may compare this agreement to others and conclude that such agreements are difficult to manage; an agreement can only (realistically) maintain the status quo and it may not be enough to ensure a water future given the other threats to water supply combined with rising demand.
- **Large Dams:** the Diemer-Bhasha is not a transboundary issue, but it is a classic multi-purpose scheme linked to wider development aspirations. Its storage capacity may increase water security for some but it has a range of downsides (although these are not directly related to water security); candidates might see it as an unacceptable set of costs. The financial cost is huge for Pakistan and there are question marks over its overall suitability.

Evaluation

Stronger answers should evaluate the +/- of the 3 projects, but may also come to an overall judgment about which is likely to make the greatest contribution. Credit the idea that different solutions are needed in different countries / regions and that some may be more suitable in some areas than others; alternative ways might be suggested e.g. water conservation.

Synoptic linkages

- Unit 3 Techno Fix in terms of contrasting technological approaches
- Unit 3 Bridging the Dev Gap in terms of different approaches to development
- The MRC might be compared to other agreements e.g. on the Nile or Colorado.
- Models of sustainability (stool, quadrant)
- Three Gorges or other similar dams, plus other methods that are low tech e.g. Sri Lankan pumpkin tank.
- Other ways of securing water supplies e.g. conservation.

Level	Mark	Descriptor
Level 1	1-4	Limited response, may be very partial and weakly linked to idea of a sustainable water future. Structure is poor or absent. Explanations are over simplified and lack clarity. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors.
Level 2	5-8	Response which examines the general costs and benefits of the schemes without detail and linkage to sustainable water future. Structure is satisfactory. Explanations are clear, but there are areas of less clarity. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors.
Level 3	9-12	Some linkage to sustainable water future in a response which evaluates the schemes in general terms; some details. Structure is good. Includes reference to wider / synoptic links at top end. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare.
Level 4	13-15	Genuine evaluation of the three schemes in terms of sustainable water future; may suggest alternatives. Carefully structured. Strong synoptic links. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare.

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