

Mark Scheme (Results)

Summer 2013

GCE Geography (6GE03) Paper 01
Contested Planet

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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.

Question Number 1a	Using Figure 1, explain why, as countries develop economically, they move through the energy transition. (10)	
	Indicative content	
Figure 1 shows how energy sources change as countries develop, and the total amount of energy used per person also rises – so there are two changes to explain:		
	Total energy use	Mix of energy sources
Pre-industrial	<ul style="list-style-type: none"> • Many people suffer from energy poverty (very low overall energy use) • Lack of industrial development; electricity confined to urban areas • Most people are farmers and 'off-grid' 	<ul style="list-style-type: none"> • Majority of energy comes from biomass and waste (wood, dung) – cheap / free. • Natural resources are used directly (cooking fires) • Some fossil fuel use – oil for transport: coal for power stations – both are basic technologies and the fossil fuels are easy to transport
Industrialising / industrialised	<ul style="list-style-type: none"> • Rapid increase in energy use linked to industrialisation and urbanisation e.g. China, and as grids are developed • Population growth • Consumption increases as household wealth rises (domestic appliances) 	<ul style="list-style-type: none"> • Beginnings of mass transport / mass car ownership so oil rises • Shift towards gas as technology develops and eventually the development of nuclear power. • Green issues low on the agenda
Post-industrial	<ul style="list-style-type: none"> • High consumption, but then a decrease per person - could be the result of loss of heavy industry, growing environmental concerns, increased efficiency of appliances, lighting. 	<ul style="list-style-type: none"> • Nuclear & renewables - require sophisticated technology. • Clean energy sources rise due to environmental concerns; coal declines due to pollution concerns – possibly less cost-sensitive than earlier stages. • Growing sustainability agenda; Kyoto / EU ETS targets. • Oil remains high – important transport fuel
Level	Mark	Descriptor
Level 1	1-4	Descriptive answer which focuses on one or two changes with limited reasoning. 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 for the changes, but may be unbalanced on sources / total; likely to have some support. Structure is satisfactory. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors. Max 6 if only total or mix.

Level 3	8-10	Range of explanations covering total energy use and changing sources, with support / amplification. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare.
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Question number 1b	To what extent are domestic energy resources important in determining the energy security of countries? (15)
	Indicative content
<p>Expect a discussion of domestic resources, with reference to specific countries plus a discussion of other factors that might be important. Many candidates will discuss both renewable and non-renewable resources.</p> <p>Fossil fuel resources</p> <ul style="list-style-type: none"> • Large resources do lead to security e.g. Russian gas, Middle-eastern oil. Reliance on imports (UK / European countries in terms of gas) leads to potential insecurity. Rapid development of US shale gas / ANWR debate shows the value of domestic supply. Growth of biofuels (Brazil, USA) can be seen as an attempt to increase domestic security. • China and India both rely heavily on coal because they have their own large reserves. • On the other hand some countries choose not to exploit their domestic energy resources e.g. UK coal, because cheaper sources can be accessed via trade. <p>Renewable resources / potential</p> <ul style="list-style-type: none"> • The UK has large renewable potential, but it is costly to develop and not always reliable e.g. wind; there can be arguments about how appropriate it is to develop e.g. Severn Barrage, where cost and environmental reasons out-weigh security concerns. • Many countries are developing renewable for a combination of security and environmental reasons. <p>Trade and imports</p> <ul style="list-style-type: none"> • Generally trade in energy sources works, but it can be interrupted (e.g. 2006 & 2009 Russia / Ukraine gas disputes) and prices can be high (hence the need to develop domestic sources) – very heavy reliance on foreign imports does raise insecurity. OPEC could be mentioned. • Trade in uranium might be mentioned: France and Japan rely on nuclear energy and the trade in uranium. <p>Demand</p> <ul style="list-style-type: none"> • Supply is one side of the equation, but demand is the other – the BRICs with rapidly increasing demand risk rising insecurity unless they can secure foreign supplies (China in Africa) or develop their own domestic supply. <p>Politics / decisions</p> <ul style="list-style-type: none"> • Some might mention decisions, e.g. German phase out of nuclear power, as putting other concerns ahead of energy security. <p><u>To what extent:</u></p> <p>The answer could consider other factors beyond domestic energy resources, or the increasing importance of domestic sources in a world of rising demand. Do environmental concerns 'trump' energy security concerns? Does the global energy market mean the importance of domestic sources is changing or over-stated? Can renewable energy / new technologies reduce the importance of domestic fossil fuels?</p>	

Level	Mark	Descriptor
Level 1	1-4	One-or-two general comments on energy security, lacks a focus on domestic supply; may focus on one issue e.g. Russian gas. Structure is poor or absent. Explanations over simplified and lack clarity. Geographical terminology rarely used with accuracy. Frequent grammar, punctuation and spelling errors.
Level 2	5-8	Descriptive reference to examples of domestic supply and some of ideas on energy security. 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 comments on the importance of domestic supply and begins to link this to energy security with some implied 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 assessment of the role of domestic supply within a discussion of how far it influences energy security. Carefully structured. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare.

Question Number 2a	Using Figure 2 and your own knowledge, suggest the physical and human factors that might help explain the global pattern of water stress. (10)
	Indicative content

Figure 2 shows the pattern of water stress for 2011:

Extreme stress - the Middle East and North Africa (latitude 20-30°N)	High stress - southern Africa, Australia, India, Spain and others (close to the Tropics)
Medium stress – southern Europe, eastern Asia, USA / Mexico, western South America	Low stress – equatorial areas, plus mid- to high latitudes.

Answers may use the 'stress levels' as a structure. Answers will need to consider both human and physical factors.

Physical factors

- Latitude – areas of low stress are along the equator (Brazil, DRC, Indonesia) – influence of the ITCZ whereas extreme / high stress areas are in the seasonal tropics – influence of the high pressure belts.
- Transboundary sources – some high stress areas in Middle East share aquifers and rivers.
- Climate change – which may be making the water situation worse in some cases e.g. North Africa.
- Geology – whether a country has aquifers that water is stored in for later use
- Long term drought e.g. Australia; extreme seasonality of rainfall or river regimes i.e. monsoons

Human factors

- Pollution of water supplies in industrialising countries e.g. China, India, Mexico.
- Unsustainable use of water supplies, especially aquifers – salt water incursion at coasts due to over-abstraction. Middle East; possibly Spain i.e. excessive demand for tourism and urbanisation in the south.
- Population pressure leading to a mismatch of supply and demand e.g. in India and Bangladesh.
- Political risk and tensions where no agreement on water supply sharing has been reached e.g. Israel, Jordan, Palestine.
- Virtual water use.
- Wasteful practices e.g. excessive irrigation in Egypt.
- Deforestation interfering with the hydrological cycle.

NB: poverty/economic water scarcity is not a very good explanation for this map, as very poor areas in Africa appear in all 4 categories; many are 'low' as are many developed countries.

Level	Mark	Descriptor
Level 1	1-4	One or two reasons, unbalanced probably relating to one area e.g. climate. Structure is poor or absent. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors.
Level 2	5-7	Range of reasons, both human and physical but unbalanced / unclear; some support and some reference to places and differences in water stress levels. Structure is satisfactory. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors.
Level 3	8-10	Balanced range of physical and human factors and explanations for a range of stress levels, with good support. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare

Question Number
2b

Using named examples, assess the advantages and disadvantages of contrasting technologies to secure water supplies in developing countries. (15)

Indicative content

Answers **must** focus on the **developing world** and **water supply**. This includes NICs /MICs **but not** MEDC /OECD nations.

The focus is on contrasting types of **technology** e.g. hi-tech versus intermediate, small community schemes versus large scale dams or transfers, or top-down versus bottom up. There could be funding contrasts also e.g. NGO –v- government.

A wide range of examples might be used, which should focus on water **supply**, including:

	Advantages	Disadvantages
Wells / tubewells	Community scale and skills; NGO funded often; vary from basic to quite hi-tech	Depletion of groundwater supplies / saltwater incursion or unforeseen contamination e.g. arsenic in Bangladesh; limited population impact
Dams	Often multi-purpose so additional benefits; store water during dry periods	High cost, displacement of people; siltation over time; water may actually end up in cities / industry
Transfers	Balancing supply and demand; long term solution	Expensive and controversial; may deprive others of water they once had. Might lead to conflict.
Desalinisation	Immediate benefit in terms of supply; can be used in areas where there is essentially no supply	Expensive to build and run; coastal locations only; energy intensive and polluting – water cost may be high
Low / intermediate tech	E.g. Lifestraw, pumpkin tanks, treadle pumps. Relatively cheap.	Small scale; needs dramatic up-scaling to help significant numbers of people.

Assessment:

In addition to advantages and disadvantages leading to judgments about individual technologies, there could be an overall judgment about which technologies are best for the developing world.

NB: do not credit developed world examples / discussion. Watch for developing world answer that drifts into a developed world focus.

Level	Mark	Descriptor
Level 1	1-4	Descriptive of one or two schemes with unbalanced positives and negatives. 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	Uses several examples but contrast may not be clear. Some advantages and disadvantages but unbalanced, may lack focus on water supply. 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 advantages and disadvantages, begins to assess and focuses on securing water supply, appropriate examples with some details and implied contrast. 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 assessment with a focus on securing water supplies, balance of advantages and disadvantages and contrasting range of technologies. Carefully structured. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare.

Question
Number
3a

Using Figure 3, explain how the three threats shown can affect physical processes within ecosystems. (10)

Indicative content

Responses should use Figure 3, but also bring in own knowledge in the form of examples e.g. the impacts of alien species in named locations or examples of resource exploitation such as deforestation in the Amazon. Figure 3 is terrestrial + aquatic but marine examples are just as acceptable.

Resource exploitation

- Nutrient cycling is directly affected by deforestation by removal of the biomass (main nutrient store in forests), which mean less litter and eventually lower soil nutrients (infertile soils) e.g. could be 'slash and burn' in tropical forests. (burning provides a temporary boost to soil nutrients)
- Further impacts due to exposed soil, leading to erosion and eventual loss of soil cover.
- In grasslands the litter and soil are larger stores; farming gradually depletes these.
- Removal of vegetation cover disrupts energy flow by removing primary producers, so depleting primary and secondary consumers – simplified food webs.
- In marine ecosystems secondary consumers (fish, shrimps etc) are generally exploited, which disrupts the food web.

Invasive alien species

- Generally has a greater impact on energy flow than nutrient cycles.
- Upsets the grazing chain if the invasive species out-competes native organisms, eventually changes food web and can cause extinction of some species.

Nutrient levels

- Main impact is eutrophication through excess of nitrates and phosphates from farm run-off and sewage.
- Excessive growth of primary producers in ponds, rivers and shallow seas leading to increased numbers of primary consumers, temporarily, followed by falling oxygen levels and eventual collapse of the food web.

Level	Mark	Descriptor
Level 1	1-4	Limited physical process understanding; descriptive of a few general threats. 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 physical process understanding and terminology with some explanations. Some balance between threats with some support. Structure is satisfactory. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors. Max 7 if 2 only
Level 3	8-10	Good physical process understanding and accurate use of terminology. Range of explanations for all three threats; uses own knowledge 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 3b	To what extent are local, small scale conservation schemes likely to protect biodiversity more successfully than global initiatives? (15)
	Indicative content
<p>The question is focussed on local versus global conservation. Better answer will have examples of schemes and both scales and weigh-up the success of both.</p> <p>Examples at a small / local scale are numerous and include:</p> <ul style="list-style-type: none"> • The St Lucia SMMA, Galapagos World Heritage Site, Australia’s Great Barrier Reef and Daintree, Komodo NP, Campfire, Korup / Kilim, Udzwunga NP – there are many others <p>Global initiatives could include:</p> <ul style="list-style-type: none"> • CITES, the IWC, the Millennium Ecosystem Assessment, Biodiversity Hotspots, frameworks such as World Heritage, Ramsar, Convention on Biological Diversity (CBD)– the question only say ‘initiatives’ so these could be awareness-raising as well as active / hands on conservation management. • Do not accept Kyoto or similar schemes where the primary focus is not conservation / biodiversity. <p>Small scale</p> <ul style="list-style-type: none"> • Generally hands-on with clear aims, may balance the needs of people with those of conservation e.g. SMMA, but possibly not meet the needs of all players; small enough to be managed / monitored. • May suffer from lack of funding for policing; tend to protect a small ‘pocket’ and may be vulnerable to wider changes such as global warming; often expensive if policies like invasive species eradication need to be carried out. <p>Global</p> <ul style="list-style-type: none"> • Bring the issues to a global audience; some are well-known and valued e.g. World Heritage • Often indirect and therefore easy to circumvent e.g. CITES, or not everyone agrees so hard to police e.g. the International Whaling Commission; may focus on cute and cuddly rather than keystones species or arguably greater importance e.g. the WWF Amur Leopard campaign. Rarely play a direct role in protection but rely on national and local government to actually conserve within a framework e.g. Ramsar or the CBD requiring national Biodiversity Action Plans. <p><u>To what extent:</u></p> <p>Better answers will make a judgement e.g. small scale is better and provide reasons, or argue that some global initiatives are necessary to tackle biodiversity loss or protect species from globalised trade.</p>	

Level	Mark	Descriptor
Level 1	1-4	One or two ideas, perhaps on named schemes, but scale not clear. Limited link to biodiversity. 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 examples and some details but descriptive rather than assessing. 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 examples with some details, including some advantages and disadvantages; begins to assess local versus global. 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 assessment; uses detailed example (s) of global and local and weighs up their advantages and disadvantages; likely to include a judgment. Carefully structured. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare.

Question Number
4a

Using Figure 4 and your own knowledge, explain how trade patterns influence the global development gap. (10)

Indicative content

Figure 4 focuses on trade in one commodity, cocoa, which is grown in narrow belt in the equatorial region by a small number of countries – Ghana, Ivory Coast and Indonesia account for 70% of world cocoa production.

Producers and consumers map

- Might be seen as illustrative of the north-south divide i.e. developed world consumers versus developing world producers – trade flows of raw materials / commodities from south to north.
- The top 15 chocolate consuming countries are MEDCs, many of them the richest in the world (G8, EU) whereas the cocoa producers are LEDCs, some among the poorest in the world.
- Chocolate forms part of the diet in consumer countries but not producer countries.
- Ideas of commodity dependency (perhaps from colonial times) and explanations of poor terms of trade (low value exports versus high value imports)
- Fairtrade might be viewed by some as helping over common the ‘unfairness’

Confectionery TNCs

- These are all based in MEDCs – the USA, Italy and Switzerland; they turn a relatively low value commodity into a high value (some might say luxury) product.
- Profits from sales stay in the MEDC countries where chocolate is made.
- Cocoa producer farmers likely to get paid low wages whereas those who work for TNCs will be better off.

Cocoa prices

- The graph shows that prices have varied considerably since 1995, from below \$1 per kg to touching \$3; prices have been high recently but have also had long periods at low levels for instance 1999-2001.
- Variable prices, spikes and price crashes mean earnings from cocoa rise and fall, resulting in uncertain incomes; difficult for producers to plan ahead /know what they might earn.

Overall, some might comment on the unfairness evident in the data; credit the idea that the data is narrow i.e. one commodity / only some countries and that there are other aspects to the cocoa trade e.g. Fair Trade, that might paint a different picture.

Level	Mark	Descriptor
Level 1	1-4	Descriptive answer which comments on a few aspects of Fig 4 in general terms such as 'unfairness'. 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 using Figure 4, with some linkage to the global development gap. May lack balance. 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, making use of Figure 4 and own knowledge; links to the global development gap. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare

Question Number 4b	Using named examples, evaluate the view that migration to megacities is the best solution to rural poverty in the developing world. (15)
	Indicative content

This question focuses on the idea that migration to urban areas reduces poverty better than other ways; some might read into the question that it is the best option for people in rural areas and should discuss whether this is actually the case.

Benefits of migration to megacities	Problems of migration to megacities
<ul style="list-style-type: none"> • Better jobs prospects e.g. in coastal Chinese cities / Pearl River Delta, or inland in cities such as Chongqing. • Many of the jobs are in manufacturing and reasonably well paid, but conditions are poor. • Opportunities in the informal sector • Better services such as education and healthcare in urban areas. • Can send remittances home i.e. to rural area • Some rural areas have severe problems and low potential - poverty, drought, deforestation, desertification, conflict – all could be stated as strong reasons to move. 	<ul style="list-style-type: none"> • Slum housing, which is widespread, unhealthy, expensive – Dharavi and Kibera might feature as examples. • Informal employment, low incomes and under-employment are major issues; the cost of food and water in urban areas is very high. • Some might recognise that opportunities and conditions in Bangalore or Shanghai are likely to be very different to those in Lagos or Nairobi. • Wider environmental and social issues of urban poverty and whether it really is 'development' • Sharply rising inequality • Leaves behind an even more vulnerable, impoverished rural population (old, young, infirm)

Rural development to overcome poverty can also be considered :

- People may be better of staying put – help from NGOs, ability to produce their own food.
- Some forms of development such as ecotourism, farming are possible in rural areas.

Expect some use of examples of megacities (Nairobi, Bangkok are named in the specification but any developing world megacity / large urban area is acceptable)

Evaluate:
As the question says 'best' other development options such as Fair Trade (which is often rural), aid and debt reduction could legitimately be discussed as part of an answer. Better answers will come to a clear judgment.

Level	Mark	Descriptor
Level 1	1-4	Descriptive of the rural-urban migration process; lacks focus on development. 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	One-sided answer; may focus on megacity benefits or costs; generalised with less support. 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 ideas with some support on the benefits and problems of megacities for development; begins to evaluate megacity migration / rural development. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare.
Level 4	13-15	Balanced evaluation including the costs and benefits of migration as well as comments on rural development. Carefully structured. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare.

Question Number
5a

Using Figure 5, explain the advantages and disadvantages to people and the environment of the different types of cooking technology shown. (10)

Indicative content

Answers should be written in the context of the 'problem' shown on Figure 5 i.e. unreliable biomass supplies and health problems from indoor smoke. The focus should be on the developing world.

Advantages and disadvantages should be in terms of people (social, including health, incomes etc) or environmental; they should be focussed on the 'problem' but some wider issues may be relevant also e.g. all 3 technologies reduce the need for fuel-wood so might help reduce deforestation.

	Advantages	Disadvantages
Upesi stoves	<ul style="list-style-type: none"> Jobs for local people making the stoves. Local resources used, no imports, cheap to make and buy (accessible to many) Reduces fuel use, so cost saving and time saving (fuel collection) Some health improvements 	<ul style="list-style-type: none"> Still fairly basic technology which does not eliminate health risks or use a 'better' fuel.
Gas stoves	<ul style="list-style-type: none"> No need to collect fuel – saving time. Harmful emissions eliminated – health benefit. Can be used anywhere; portable 	<ul style="list-style-type: none"> Cost to buy stove probably high, plus need to buy gas (regularly) – too high for many. Might be seen as developed world techno fix, not appropriate.
Solar stoves	<ul style="list-style-type: none"> Uses 'free' energy Simple technology; nothing to break. No emissions and no need to collect fuel. Does not need to be watched, so time saving. 	<ul style="list-style-type: none"> Cost to buy could be high (could be built locally) Potentially unreliable – cloudy day? Cannot be used everywhere – climate dependent. Questions over thoroughness of food cooking i.e. health risks?

Level	Mark	Descriptor
Level 1	1-4	One or two ideas, states some advantages and disadvantages in a generalised account; relies on lift-offs. 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 advantages and disadvantages, and some reference to people and environment. Explanations link to the problem shown. Structure is satisfactory. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors. Max 7 for 2 only
Level 3	8-10	Range of advantages and disadvantages explained for both people and environment, linked to the problem shown; wider issues developed from the Figure; balanced across Figure 5. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare

Question
Number
5b

Using named examples, assess the extent to which technological innovation may have unforeseen social, environmental and economic costs. (15)

Indicative content

A very wide range of technologies and innovations could be used to support and answer, and these can come from areas such as water, energy, farming. Better answers will need to be clear about social, economic and environmental costs specifically.

Some likely examples are:

- **GR / GM crop technology** – often cited as have environmental drawbacks in terms of farm chemicals, ecosystem degradation – as well as social costs such as polarisation; some might argue the benefits of increased food production / food security are worth it.
- **Renewable energy** – might be argued as being, in some cases, relatively cost free i.e. solution to global warming, lowish cost, keeps the lights on – often raises NIMBY issues e.g. wind but these are fairly minor.
- **Medicines** – often have a high economic cost e.g. ARVs, some vaccinations, but really only social benefits and no discernable impact on the environment.
- **Transport** – may be seen as environmentally negative i.e. global warming from cars, trucks, air travel; social benefits in the main but are these large enough to outweigh the heavy environmental price?
- **Water technology** – lots of examples where there is social good due to clean water supply but environmental downsides, and possibly 'losers' in terms of water supply.
- **Robotisation** – jobs losses as machines replace people.
- **Chemicals** – well know examples of DDT and CFCs with environmental impacts on food chains and the atmosphere respectively.
- **Mobiles phones / internet** – leapfrogging; use of resources and disposal, social / privacy issues.

Do not credit benefits on their own.

Assessment might raise points such as:

- Most technologies have some environmental costs related to resource use, although some are designed specifically to solve environmental problems.
- Technologies have unforeseen social costs and benefits e.g. mobile phone texting (originally designed for the deaf)
- In some cases the benefits may heavily outweigh the costs, so are acceptable e.g. the benefits of mobile phones in the developing world.

Level	Mark	Descriptor
Level 1	1-4	Some examples of technology, and some general costs / problems but brief and inaccurate. 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 examples and some variable detail. States a number costs but likely to be generalised or focus on one aspect. 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 examples with some detail; outlines a range of costs (social, economic, environmental) with some balance and begins to recognise that some technologies may have unforeseen costs. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare.
Level 4	13-15	Range of detailed examples, and accurate economic, social and environmental costs; genuine assessment which weighs up whether costs are unforeseen in nature. Carefully structured. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare.

Question Number	Question
6a	Explain why there are, and have been, tensions between superpowers and other countries in East Asia. (14)
	Indicative content
<p>Answers need to cover both past tensions and current ones, although there is likely to be more to say about current ones. There should also some focus on superpowers i.e. the USA today and the USSR in the past could be mentioned – China and Russia are both BRICS in the emerging power category. Note that some tensions are both past and current.</p> <p>Past:</p> <ul style="list-style-type: none"> • Japan’s invasion of Manchuria in 1931 and subsequent occupation soured Sino-Japanese relations • The region was a key theatre of operations during WWII, fought over by the Great Powers of the time (USSR, UK, USA and Japan) – this has left resentment and simmering disputes over whose version of history is right. • The Korean War (Russia / Chin / NK –v- SK / USA / UN) ended in stalemate – no peace treaty was ever signed; Taiwan is an ongoing source of tension between the USA (supporting nationalist China) and the mainland People’s Republic of China. • The area was pivotal during the Cold War - the USA, Taiwan, Japan, South Korea as the capitalist bloc versus USSR, China and North Korea in the communist side – this continues to this day, albeit in a revised form. <p>Current (NB accept the Heads of State in Fig 2, or more recent ones)</p> <ul style="list-style-type: none"> • Countries in the region follow different ideologies – Chinese communism on the one hand, versus capitalism (led by the USA) on the other. • The USA sees the region as within its sphere of influence, and maintains a large military presence – this conflicts with China’s expansionist plans (Figure 4) and blue water navy development. View 3. • In general the region is heavily militarised and China, North Korea, Russia and the USA (submarines) have nuclear weapons in the region. North Korea’s nuclear ambitions are an on-going source of tension. • There are numerous disputed territories in the area (View 4) including the border zone in North Korea – and occasional skirmishes and sabre-rattling via military exercises around Korea and Taiwan in particular. Expect some of these to have been researched (Figure 3) and others may be mentioned e.g. the Spratly islands which are thought to have oil /gas. • Credit reference to relationships between East Asian countries and superpowers e.g. EU / China trade disputes; arguments of international agreement and trade. <p>Synoptic linkages</p> <ul style="list-style-type: none"> • Research on territorial disputes. Further details on recent events and conflicts; especially instability in 2012 / 13 caused by new leadership in all 4 countries and older issues. Unit 3 energy security e.g. oil and gas reserves in disputed waters. 	

Level	Mark	Descriptor
Level 1	1-4	One or two generalised comments on tensions, lacking accuracy. Structure is poor or absent. Mostly lift-offs. 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 tensions using the RB but narrow range; unclear on past and current; limited detail. 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	8-11	Some range of tensions using the RB effectively and some clarity on past and current; explanations with some detail / accuracy. 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 4	12-14	Range of current and past tensions explained in detail, might recognise some are more significant than others. Accurate detail linked to superpowers and other countries. Structure is good. Explanations are always clear. Synoptic. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare.

Question Number	Question
6b	Assess the extent to which each of the four East Asian countries named in Figure 2 have the characteristics of superpowers. (14)
	Indicative content

Expect all 4 countries to be discussed, but there is likely to be more detail on some (China) and less on others (North Korea). Some might use a structure such as soc/eco/pol or the 'pillars' of superpower status, or hard versus soft power.

<p>North Korea – very large military relative to population, but technically not advanced; low development levels (but also data hard to get); lacks any global influence in terms of TNCs, Universities, patents (Fig 9), IGOs (Fig 10) and is one of the least globalised countries in the world (Fig 8); difficult country to classify in many ways. View 1.</p>	<p>South Korea – wealth levels equal to an MEDC, a highly developed, urban, educated country. Has some world-beating TNCs and global brands and is nearly as globalised as Japan; some might argue that it has relied heavily on USA support and lacks global influence, although this has grown with G20 membership. An NIC not yet in the OECD club.</p>
<p>Japan – highly developed nation (most developed in the region) with high levels of human and economic development; globalised (but still only 44th in the world) with a large number of global brands, TNCs, quality universities and a huge patent output. Could be viewed as an economic superpower but not true superpower in terms of political, cultural and military influence; its economy has also been stalled for the last 2 decades.</p>	<p>China –Country of two halves. View 2 contrasts with Figure 16 showing a global hub (rural –v- urban) and Figure 6 suggests average levels of development (HDI, urban population, importance of agriculture). Militarily the country is moving towards having global reach, and its importance internationally is growing (Fig 10) i.e. membership of global IGOs and the G2. It has a way to go to compete with the best in terms of education (Fig 8), patents (Fig 9) and globalisation; Chinese TNCs have fewer global brands.</p>

Assessment:

In terms of overall assessment, some might argue North Korea is a rogue or failed state which may have nuclear weapons but has few other strengths. South Korea is economically strong but lacks global influence. Japan might be viewed as the 'almost' superpower that failed to make it. China has many strengths and might be seen as virtually a superpower economically but with some way to go militarily / culturally.

Synoptic linkages

Unit 1 Globalisation, TNCs, country classifications; Unit 3 Development indicators.

Level	Mark	Descriptor
Level 1	1-4	Very partial coverage; one or two ideas on a narrow theme; descriptive. 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	Considers some countries using data from the RB with some details; lacks structure; limited link to superpower status. 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	8-11	Uses a range of data to consider countries in detail; begins to assess in relation to superpower status. Structure is good. Some reference to wider links. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare.
Level 4	12-14	Detailed assessment which judges the superpower status of all 4 countries. 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	To what extent are trends in population and resource consumption in China and Japan sustainable? (12)
	Indicative content
<p>The question has two sides to it, population and resource consumption. There should be some balance between the two. Candidates may define sustainability e.g. the Brundtland definition and / or use the sustainability stool or quadrant as a structure for their answer.</p> <p>Population</p> <ul style="list-style-type: none">• China's population bulges in the 15-50 age range, meaning a large workforce now but the number of young people is low – meaning an ageing population in the future – health care costs, pensions. Population growing slowly (Fig 13); the slacking of the one-child policy may counter-act this a little.• Japan's faces a negative population dividend as its population is old, ageing fast and there are issues of economic sustainability; Japan's lack of economic progress since 1990 (Fig 11) may mean it faces a future of declining incomes and spiralling social care costs. Japan's lack of immigration means a 'quick fix' to improve workforce sustainability is unlikely.	

Resource consumption

- China, as View 5 suggests, is on a trajectory to increase resource consumption considerably with global implications – largely due to increasing wealth rather than rising population; Fig 12 shows that renewable water levels are projected to fall while calorie and protein intake have been rising (nutrition transition); China’s oil imports are large and its eco-footprint is rising – some might discuss the wider environmental consequences of these trends.
- Japan is relatively sustainable in terms of resources. It has ample water supply (Fig 13) now and even more in the future, and food consumption falling due to ageing – but 60% of food is imported. Overall eco-footprints are falling (partly due to less heavy industry) in Japan and are not high for an MEDC. Some might argue that although this is environmentally positive it points to long-term social and economic sustainability issues. Japan is highly energy insecure and relies on imports – made worse by the post-tsunami shut down of its nuclear plants.

Assessment

Japan faces a major social challenge with ageing, and this undermines its long term economic prosperity when combined with its reliance on energy and food imports; environmentally the country is more sustainable than most MEDCs. China has population issues too, but they are further off; its current trajectory in terms of resources consumption and environmental consequences does not look sustainable, although poverty levels will reduce further.

Synoptic linkages

- Sustainability – synoptic theme in Unit 3, Unit 1 population, Unit 3 Energy, Water.

Level	Mark	Descriptor
Level 1	1-4	One or two general ideas about either resources or population, inaccurate and partial. Lacks sustainability. 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	Uses the RB data with some details; unbalanced on population / resources but with some links to sustainability and begins to assess. 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. Max 7 if population / resources only or China /Japan only.
Level 3	9-12	Detailed balanced assessment of population and resource trends linked to sustainability for both countries; likely to make a judgment. Structure is good. Explanations are always clear. Synoptic. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare.

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