

Component 3: Contemporary Themes in Geography

Mark Scheme

Guidance for Examiners

Positive marking

Learners are writing under examination conditions and credit should be given for what the learner writes, as opposed to adopting an approach of penalising him / her for any omissions. It should be possible for a very good response to achieve full marks and a very poor one to achieve zero marks. Marks should not be deducted for a less than perfect answer if it satisfies the criteria of the mark scheme.

The mark scheme for this component uses banded mark schemes.

Banded mark schemes

The mark scheme is in two parts to reflect the sections (A and B in the examination paper). Section A is 38 marks and Section B is 45 marks.

The first part of the mark scheme in each section is an assessment grid advising on bands and the associated marks that should be given in responses that demonstrate the qualities needed in the three AOs; AO1, AO2 and AO3 relevant to this component. The targeted AO(s) are also indicated, for example AO2.1c.

The second part of the mark scheme is advice on the indicative content that suggests the range of likely themes and specialised concepts, processes, scales and environments that may be included in the learner's answers.

Banded mark schemes are divided so that each band has a relevant descriptor. The descriptor for the band provides a description of the performance level for that band. Each band contains marks. Examiners should first read and annotate a learner's answer to pick out the evidence that is being assessed in that question. Once the annotation is complete, the mark scheme can be applied. This is a two stage process.

Banded mark schemes Stage 1 – Deciding on the band

Beginning at the lowest band, examiners should look at the learner's answer and check whether it matches the descriptor for that band. Examiners should look at the descriptor for that band and see if it matches the qualities shown in the learner's answer. If the descriptor at the lowest band is satisfied, examiners should move up to the next band and repeat this process for each band until the descriptor matches the answer.

If an answer covers different aspects of different bands within the mark scheme, a 'best fit' approach should be adopted to decide on the band and then the learner's response should be used to decide on the mark within the band. For instance if a response is mainly in band 2 but with a limited amount of band 3 content, the answer would be placed in band 2, but the mark awarded would be close to the top of band 2 as a result of the band 3 content.

Examiners should not seek to mark candidates down as a result of small omissions in minor areas of an answer.

Banded mark schemes Stage 2 – Deciding on the mark

Once the band has been decided, examiners can then assign a mark. During standardising (marking conference), detailed advice from the Principal Examiner on the qualities of each mark band will be given. Examiners will then receive examples of answers in each mark band that have been awarded a mark by the Principal Examiner. Examiners should mark the examples and compare their marks with those of the Principal Examiner.

When marking, examiners can use these examples to decide whether a learner's response is of a superior, inferior or comparable standard to the example. Examiners are reminded of the need to revisit the answer as they apply the mark scheme in order to confirm that the band and the mark allocated is appropriate to the response provided.

Indicative content is not exhaustive, and any other valid points must be credited. In order to reach the highest bands of the mark scheme a learner need not cover all of the points mentioned in the indicative content but must meet the requirements of the highest mark band. Where a response is not creditworthy, that is contains nothing of any significance to the mark scheme, or where no response has been provided, no marks should be awarded.

Where the specialised concepts are integral to knowledge and understanding, they are underlined in the indicative content.

The mark scheme reflects the layout of the examination paper. Mark the chosen question in Section A and the two chosen questions from Section B. If the candidate has responded to both questions in Section A or more than two in Section B mark all the answers. Award the higher marks attained for the correct number of required questions; further, possible rubric infringement will be discussed at the marking conference.

Be prepared to reward answers that give **valid and creditworthy** responses, especially if these do not fully reflect the 'indicative content' of the mark scheme.

Section A: Tectonic Hazards - Generic Mark Bands (38 marks)

	AO1 [14 marks]	AO2 [20 marks]	AO3 [4 marks]
Band	<i>Demonstrate knowledge and understanding of places, environments, concepts, processes, interactions and change at a variety of scales</i>	<i>Apply knowledge and understanding in different contexts either to analyse or interpret or evaluate geographical issues and information</i>	<i>Use a variety of relevant quantitative and qualitative skills to construct arguments and draw conclusions</i>
4	<p>10-14 marks</p> <p>Demonstrates thorough and accurate knowledge; confident understanding of relevant concepts and principles throughout the response that is wholly relevant to the question</p> <p>Demonstrates knowledge and understanding through the use of appropriate, accurate and well-developed examples</p> <p>Wholly appropriate, accurate and relevant supporting geographical terminology is well used</p> <p>Well-directed and well-annotated sketch maps / diagrams are included and should be credited</p>	<p>16-20 marks</p> <p>Demonstrates sophisticated application of knowledge and understanding either to analyse or interpret or evaluate in order to produce a full and coherent response that is supported by wholly appropriate evidence</p> <p>Demonstrates application of knowledge and understanding through the synthesis of the connections between different elements of the question</p> <p>Demonstrates application of knowledge and understanding through the confident application of the specialised concepts throughout the response</p>	<p>4 marks</p> <p>The response uses wholly relevant qualitative skills to construct clear, coherent and appropriately structured arguments and conclusions</p>

3	<p style="text-align: center;">7-9 marks</p> <p>Demonstrates secure factual knowledge and reasonable understanding of relevant concepts and principles for large portions of the response that is mostly relevant to the question</p> <p>Demonstrates knowledge and understanding through the use of appropriate, generally accurate and developed examples</p> <p>The use of appropriate and mostly relevant geographical terminology is evident</p> <p>Appropriate, basically accurate annotated sketch maps / diagrams are included and should be credited</p>	<p style="text-align: center;">11-15 marks</p> <p>Demonstrates accurate application of knowledge and understanding either to interpret or analyse or evaluate in order to produce a partial but coherent response that is supported by mostly appropriate evidence</p> <p>Demonstrates application of knowledge and understanding through the partial synthesis of the connections between different elements of the question</p> <p>Demonstrates application of knowledge and understanding through the mostly relevant application of the specialised concepts</p>	<p style="text-align: center;">3 marks</p> <p>The response uses mostly relevant qualitative skills to construct structured arguments and conclusions where coherence is variable</p>
2	<p style="text-align: center;">4-6 marks</p> <p>Demonstrates straightforward knowledge with some inaccuracies; some understanding of relevant concepts and principles that is linked to the question</p> <p>Demonstrates knowledge and understanding through the use of limited examples that may not always be appropriate or accurate</p> <p>The use of geographical terminology are limited</p> <p>Annotated sketch maps / diagrams are basic and should be credited</p>	<p style="text-align: center;">6-10 marks</p> <p>Demonstrates some application of knowledge and understanding either to interpret or analyse or evaluate in order to produce a response which is limited in coherence and is supported by limited appropriate evidence</p> <p>Demonstrates application of knowledge and understanding through the limited synthesis of the connections between different elements of the question</p> <p>Demonstrate application of knowledge and understanding through limited application of the specialised concepts</p>	<p style="text-align: center;">2 marks</p> <p>The response uses limited qualitative skills to construct argument(s) and conclusion(s) that are superficial in structure with minimal coherence</p>

1	<p style="text-align: center;">1-3 marks</p> <p>Demonstrates poor knowledge with errors and minimal understanding and linkage to the question</p> <p>Basic use of examples or if evident, lack relevance to the question asked</p> <p>Geographical terminology is rarely used within the response</p>	<p style="text-align: center;">1-5 marks</p> <p>Demonstrates application either to interpret or analyse or evaluate in order to produce a response which lacks coherence and is unsupported by appropriate evidence</p> <p>Demonstrates application of knowledge and understanding through the superficial synthesis of the connections between different elements of the question</p> <p>Demonstrate application of knowledge and understanding through superficial application of the specialised concepts</p>	<p style="text-align: center;">1 mark</p> <p>The response uses qualitative skills superficially to construct an argument / conclusion that is incomplete and lacks coherence</p>
	<p style="text-align: center;">0 marks</p> <p>Response not creditworthy or not attempted</p>	<p style="text-align: center;">0 marks</p> <p>Response not creditworthy or not attempted</p>	<p style="text-align: center;">0 marks</p> <p>Response not creditworthy or not attempted</p>

1. 'Volcanic activity results in only local hazards.' Discuss**[38 marks]****AO1 [14] AO2.1.c [20] AO3.3 [4]**

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1

Knowledge and understanding of the hazards that result from volcanic activity could include:

- The connections between the processes operating at tectonic plate boundaries and causes of volcanic hazards (causality)
- Primary hazards include lava flows, pyroclastic flows, ash and tephra falls and volcanic gases (risk)
- Secondary hazards include lahars, landslides and tsunamis (risk)
- The characteristics of volcanic activity: magnitude, predictability and frequency

AO2

Application of knowledge and understanding is deployed to evaluate whether volcanic activity results in only local hazards. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- Some volcanic activity may result in hazards that are only concentrated locally, for example Lake Nyos, Cameroon (1986)
- Some volcanic activity may result in hazards that are more important at a regional or global scale, for example the ash associated with the eruption of Eyjafjallajökull (2010) had profound impacts on aviation over European air space which in turn had global scale impacts on travel and the economy
- Relatively little volcanic activity results in hazards that are more important at the global scale in relation to impacts in terms of climate change (Mount Pinatubo 1991)
- The globalisation of the world economy means that medium magnitude volcanic events are more likely to have widespread or even global economic impacts than they did in the past
- The scale of the hazard may vary according to the nature of the hazard, volcanic gases often have a greater impact at the local scale (Lake Nyos, Cameroon 1986) compared to lahars at a regional scale (Nevada del Ruiz, Colombia 1985) and ash which can have an impact at a global scale (Eyjafjallajökull, Iceland 2010)
- The extent of magnitude of volcanic activity, with the understanding that the greater the magnitude the more widespread the hazards are likely to be
- Global impacts associated with volcanic hazards, such as those associated with VEI8 events are so rare on the geological timescale that they have little bearing on normal, everyday life
- Volcanic activity may result in hazards operating over different time scales, initially volcanic activity can have local impacts, but over time these may spread more widely and have a more global impact

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the hazards that result from volcanic activity
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions about whether volcanic activity results in only local hazards

Credit other valid approaches.

2. ‘The economic impacts of earthquake activity are always greater than the social impacts’. Discuss.

[38 marks]

AO1 [14] AO2.1c [20] AO3.3 [4]

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1

Knowledge and understanding of the economic and social impacts of earthquake activity could include:

- Economic impacts (disruption to production)
- Social impacts (e.g. homelessness, injury, bereavement)
- Primary and secondary effects
- Local, regional and global scale impacts (scale)

AO2

Application of knowledge and understanding is deployed to evaluate whether the economic impacts of earthquake activity are always greater than the social impacts. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- The relative severity of economic and social impacts varies according to the economic and social characteristics of the place. For example the Nepal earthquake (2015) had greater social impacts including homelessness and damage to important temples and monuments compared to Kobe (1995) where, due to the port’s importance in terms of global trade, economic impacts were more important
- The relative severity of economic and social impacts may be related to vulnerability which in turn is determined by inequalities of wealth and power in society
- The relative severity of economic and social impacts varies according to scale, for example at the local scale social impacts may be more important than at the regional or global scale
- The relative severity of economic and social impacts varies over time (time scales) as initially economic impacts may be more important, but areas with the capacity to recover from the economic impacts through insurance and good governance (Fukushima 2011), may experience greater social impacts (e.g. associated with the 100,000 evacuations) in the longer term
- The relative severity of economic and social impacts varies according to the perception of different groups of people, whether from the business sector or the local community
- The interdependence between economic and social impacts can make it difficult to isolate the economic impacts as the greater

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the economic and social impacts of earthquake activity
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions about whether the economic impacts of earthquake activity are always greater than the social impacts

Credit other valid approaches.

Section B: Contemporary Themes in Geography - Generic Mark Bands (45 marks)

	AO1 [20 marks]	AO2 [20 marks]	AO3 [5 marks]
Band	<i>Demonstrate knowledge and understanding of places, environments, concepts, processes, interactions and change at a variety of scales</i>	<i>Apply knowledge and understanding in different contexts either to analyse or interpret or evaluate geographical issues and information</i>	<i>Use a variety of relevant 'geographical skills' to construct arguments and draw conclusions</i>
5	<p>17-20 marks</p> <p>Demonstrates wide ranging, thorough and accurate knowledge with a high order of conceptual understanding throughout the response that is wholly relevant to the question</p> <p>Demonstrates knowledge and understanding through the use of wholly appropriate, accurate and well-developed examples</p> <p>Wholly appropriate, accurate and relevant supporting geographical terminology is well used</p> <p>Well-directed and well-annotated sketch maps / diagrams are integrated and should be credited</p>	<p>17-20 marks</p> <p>Demonstrates sophisticated application of knowledge and understanding either to analyse or interpret or evaluate in order to produce a full, comprehensive and coherent response that is supported by wholly appropriate, wide ranging and relevant evidence</p> <p>Demonstrates application of knowledge and understanding through the sophisticated synthesis of the connections between different elements of the question</p> <p>Demonstrates application of knowledge and understanding through the confident application of the specialised concepts throughout the response</p>	<p>5 marks</p> <p>The response uses wholly relevant qualitative skills to produce well-constructed, coherent, sophisticated and logical arguments and conclusions</p>

4	<p style="text-align: center;">13-16 marks</p> <p>Demonstrates accurate factual knowledge and confident understanding of relevant concepts and principles throughout the response that is relevant to the question</p> <p>Demonstrates knowledge and understanding through the use of appropriate, accurate and developed examples</p> <p>Appropriate, accurate and relevant geographical terminology is evident</p> <p>Appropriate, mostly accurate and relevant annotated sketch maps / diagrams are included and should be credited</p>	<p style="text-align: center;">13-16 marks</p> <p>Demonstrates accurate application of knowledge and understanding either to interpret or analyse or evaluate in order to produce a coherent response that is supported by appropriate evidence</p> <p>Demonstrates application of knowledge and understanding through the synthesis of the connections between different elements of the question</p> <p>Demonstrates application of knowledge and understanding through the relevant application of the specialised concepts</p>	<p style="text-align: center;">4 marks</p> <p>The response uses relevant qualitative skills to produce clear, coherent and appropriately structured arguments and conclusions</p>
3	<p style="text-align: center;">9-12 marks</p> <p>Demonstrates secure, straightforward knowledge and reasonable understanding of relevant concepts and principles throughout most of the response that is mostly relevant to the question</p> <p>Demonstrates knowledge and understanding through the use of mostly appropriate, mostly accurate and developed examples</p> <p>Mostly appropriate, accurate and mostly relevant geographical terminology is evident but is variable in its use</p> <p>Appropriate, basically accurate and partial use of annotated sketch maps / diagrams are included and should be credited</p>	<p style="text-align: center;">9-12 marks</p> <p>Demonstrates partial application either to analyse or interpret or evaluate in order to produce a partial but coherent response that is supported by mostly appropriate evidence</p> <p>Demonstrates application of knowledge through the partial synthesis between different elements of the question</p> <p>Demonstrates application of knowledge and understanding through the partial application of some specialised concepts</p>	<p style="text-align: center;">3 marks</p> <p>The response uses mostly relevant qualitative skills to produce a structured response but where coherence is variable</p>

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2	<p style="text-align: center;">5-8 marks</p> <p>Demonstrates some knowledge, but limited in scope with some inaccuracies; some understanding of relevant concepts and principles</p> <p>Demonstrates knowledge and understanding through the use of limited examples, which are mostly accurate but un-developed</p> <p>Limited geographical terminology is evident, not all of which is appropriate or accurate</p> <p>Basic sketch maps / diagrams are used but contain inaccuracies. Credit should be given when used appropriately</p>	<p style="text-align: center;">5-8 marks</p> <p>Demonstrates limited application either to analyse or interpret or evaluate in order to produce a limited response where most points are generalised or of limited relevance to the question.</p> <p>Limited synthesis between different elements of the question</p> <p>Demonstrates application of knowledge and understanding through the limited application of some specialised concepts</p>	<p style="text-align: center;">2 marks</p> <p>The response uses some qualitative skills to produce a response with superficial structure, with minimal coherence</p>
1	<p style="text-align: center;">1-4 marks</p> <p>Demonstrates poor knowledge with errors and minimal understanding and linkage to the question</p> <p>No use of examples or, if evident, lack relevance to the question asked</p> <p>Geographical terminology is rarely used within the response</p>	<p style="text-align: center;">1-4 marks</p> <p>Demonstration of application either to analyse or interpret or evaluate is poor, producing a response which lacks coherence and is unsupported by appropriate evidence</p> <p>Synthesis between different elements of the question is poor</p> <p>Demonstrates application of knowledge and understanding through the superficial application of basic specialised concepts</p>	<p style="text-align: center;">1 mark</p> <p>The communication in the response is incomplete</p>
	<p style="text-align: center;">0 marks</p> <p>Response not creditworthy or not attempted</p>	<p style="text-align: center;">0 marks</p> <p>Response not creditworthy or not attempted</p>	<p style="text-align: center;">0 marks</p> <p>Response not creditworthy or not attempted</p>

Section B: Contemporary Themes in Geography

3. Assess the significance of climate in influencing the nutrient cycle. Use two biomes to support your answer. [45 marks]
AO1 [20] AO2.1.c [20] AO3.3 [5]

Focus 3.2.2

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1

Knowledge and understanding of factors influencing the nutrient cycle could include:

- A generalised Gersmehl nutrient cycle model of a system with inputs of weathering and nutrients dissolved in rainfall, stores of biomass, litter and soil, flows of uptake by plants, fall-out as tissues die and release as litter decomposes and outputs through leaching and runoff
- Relative size of nutrient stores in two biomes
- Relative thickness of nutrient flows in two biomes
- The influence of temperature on the size of inputs, stores, flows and outputs (causality)
- The influence of precipitation on the size of inputs, stores, flows and outputs (causality)
- Seasonal variations in temperature and precipitation influence the growth of biomass, fallout and decomposition (causality)
- The different sizes of the component stores, for example between the equatorial biome with its large above-ground biomass store which is in contrast to the smaller biomass store of the taiga forest biome where growth and biodiversity are lower due to the cold conditions. The litter store for the tropical rainforest biome is small due to the rapid decomposition in the hot, wet conditions compared to the large litter store in the taiga forest biome where the cold conditions inhibit the breakdown and decay of litter. The small nutrient soil store in the tropical rainforest biome results from rapid leaching due to high precipitation whereas the soil store in the taiga forest biome is very small due to the cold conditions which inhibit weathering
- The influence of factors other than climate on nutrient cycling including abiotic factors of geology and pH and biotic factors of human activity, species migration and seed dispersal on the size of inputs, stores, flows and outputs (causality)

AO2

Application of knowledge and understanding is deployed to assess the significance of climate in influencing the nutrient cycle. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- It may be argued that the role of climate in influencing nutrient cycling varies over time (time scales). Human activity may be seen to be increasingly influencing nutrient cycling through deforestation, harvesting, the application of fertilisers and livestock rearing

- Human influences may be seen as significant at present, but, over geological time, climate may be seen as having greater influence
- The significance of climate in influencing nutrient cycling varies according to location (place). In more remote, less accessible areas the role of climate in influencing nutrient cycling may be greater
- Anthropogenic climate change may be linked to changes in rates of nutrient cycling. For example, climate change in the Arctic accelerates decomposition and release of methane from soils stores. In this way, it may be argued that complex interconnections between people and climate make it difficult to isolate the significance of climate alone
- The significance of climate in influencing nutrient cycling varies according to scale. On a small-scale other factors such as geology (in its influence on pH, leaching and runoff) can exert a greater influence
- The complexity of interconnections between climate and geology, making it difficult to isolate and evaluate the significance of climate alone

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the influence of climate on the nutrient cycle
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions about the role played by climate in the nutrient cycle

Credit other valid approaches.

4. To what extent is the conservation of biodiversity achievable? [45 marks]
AO1 [20] AO2.1.c [20] AO3.3 [5]

Focus: 3.2.4

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1

Knowledge and understanding of the conservation of biodiversity could include:

- There are a variety of threats to biodiversity, with a decline in the quality and geographical extent of ecosystems leading to the risk of high rates of biodiversity loss
- A range of conservation schemes have been implemented to address these threats to biodiversity (sustainability)
- Different methods of conservation (in situ or ex situ)
- The choice of what to conserve (whole ecosystems or hot spots)
- The decision as to how to conserve (maximum diversity or rare / endemic species)
- Different scales of conservation from single large to several small reserves (SLOSS) and international sites (RAMSAR convention for conservation and sustainable use of wet lands) to local strategies (scale)

AO2

Application of knowledge and understanding is deployed to evaluate the extent to which the conservation of biodiversity is achievable. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- The extent to which the cost, legislation and financing of conservation strategies influences the achievability of the conservation of biodiversity
- The extent to which conflicts arising because of the interdependence between economic development and some conservation strategies. Fewer conflicts may make strategies more achievable
- Economic globalisation has inevitably led to increased demand for resources, making conservation of habitats and biodiversity increasingly difficult
- Consumerism and conservation may be seen to be mutually exclusive
- Economic and social sustainability may be seen to be more important than environmental sustainability by the political elite in countries that have valuable natural resources
- Failure to tackle poverty in biodiversity hotspots and increased demand for wildlife and animal products mean that conservation of biodiversity in some regions may not be possible
- The scale of conservation strategies, as the narrow focus of some policies make them more achievable
- Assessment of geographical considerations, as many conservation schemes are based on the boundaries of countries, whereas ecosystems are not restricted within political borders (place) therefore influencing the extent to which the conservation of biodiversity is achievable

- The relative reliance on the co-ordination of agencies for the success of some conservation strategies, which sometimes fail to act together (interdependence) therefore influencing the extent to which the conservation of biodiversity is achievable
- Whether some conservation strategies are more achievable because they are sustainable and holistic, with strategies involving local economic development as a conservation tool (sustainability)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the conservation of biodiversity
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions about the extent to which the conservation of biodiversity is achievable

Credit other valid approaches.

5. 'India's natural resource base provides more opportunities than constraints for economic development'. Discuss.

[45 marks]

AO1 [20] AO2.1.c [20] AO3.3 [5]

Focus: 3.3.3

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1

Knowledge and understanding of India's natural resource base could include:

- India has a large mineral and energy resource base
- The geological and metallurgical background in India is similar to mineral-rich Australia, South Africa and South America, all of which formed a continuous landmass before the break up of Gondwanaland
- India's resource base includes abundant reserves of coal (fourth-largest reserves in world), iron ore, bauxite and zinc
- India is well endowed with oil and gas reserves
- Other resources include manganese, mica, titanium ore, chromite and diamonds
- Physical resources include land and water as well as minerals and energy

AO2

Application of knowledge and understanding is deployed to discuss whether India's natural resource base provides more opportunities than constraints. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- The relative impact of the types and amounts of resources available; opportunities exist where there is an abundance of resources, particularly those that have the potential to supply the key products for the production of steel and aluminium (coal, iron ore, bauxite), create many opportunities for economic development (causality)
- India's varied landscape and climate may present both opportunities and constraints in the same place. For example, the deserts of Rajasthan may present many opportunities for the development of tourism (causality) but water insecurity in this region constrains economic development
- The relative availability of resources in relation to the demand for them. Despite being well endowed with oil and gas reserves, consumption exceeds production meaning that India is heavily dependent on crude oil imports, with net oil import dependency rising from 43% in 1990 to an estimated 71% in 2012. India imports three-quarters of its crude oil needs from countries such as Saudi Arabia, Iran, Iraq, Nigeria and the United Arab Emirates (interdependence)
- The extent to which accessibility has an impact on the opportunities provided by natural resources. Multiple structural and regulatory challenges results in India's resource abundance remaining largely unexplored (India's exploration spend as a proportion of global non-ferrous exploration spend is low at 0.2%) presenting constraints for economic development.

- Discussion of whether the increase in international concerns and controls surrounding greenhouse gas emissions (globalisation), pollution and environmental damage (risk) associated with the combustion of coal (in particular) will lead to increases in the cost of environmental amenity and repair, placing constraints on India's economy (sustainability)
- The significance of the control of supplies of natural resources. The agencies controlling the supply of physical resources are largely MNCs. Where these are indigenous (for example, Tata) their growth creates opportunities. However, where the MNCs are foreign owned the economic benefits of mineral extraction accruing to India are constrained (globalisation)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the opportunities and constraints of India's natural resource base for economic development
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions about whether India's natural resource base provides more opportunities than constraints

Credit other valid approaches.

6. Assess the importance of India's political and economic influence in the wider world.

[45 marks]

AO1 [20] AO2.1.c [20] AO3.3 [5]

Focus: 3.3.5

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1

Knowledge and understanding of India's political and economic influence in the wider world could include:

Political influence

- Recent visits from leaders and officials from the United States, France, Germany and Russia have spotlighted India's rise
- India's active participation in global organisations, such as the WTO (globalisation)
- India's active participation in global organisations, governance, conventions and treaties, such as the UN and IPCC (Intergovernmental Panel on Climate Change)

Economic influence

- Economic growth, following the launch of economic reforms in 1991, is driving India's emergence as a regional and global power
- India's economy has grown an average of around 6% annually over the past decade and 8% over the past three years
- India has made great strides in fields such as information technology. Its large, skilled workforce makes it a popular choice for international companies seeking to outsource work (globalisation)
- India launches its own satellites and in 2008 sent its first spacecraft to the moon. It also boasts a massive cinema industry, the products of which are among the most widely-watched films in the world (globalisation)
- India is home to 54 of the world's top 5000 global companies (globalisation)

AO2

Application of knowledge and understanding is deployed to assess the importance of India's political and economic influence in the wider world. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- Changes over time (time scales) leading to assessment of the extent to which India's political and economic influence in the wider world has grown significantly since the economic reforms of 1991. Wealthier nations now see India as a trading partner with enormous potential. India is Asia's third-largest economy and new growth estimates make India the world's fastest-growing economy, surpassing China's
- Assessment of the variation in factors limiting India's political and economic influence. Given the size of India's poor and unskilled population and the massive challenge of domestic poverty and underdevelopment (inequalities), it is a challenge for the Indian state to allocate scarce resources into making it an economically powerful nation. However with its enormous coastline and respected navy India is well-placed to provide security in a critical part of the global commons.

- Assessment of the varied contexts in relation to India's formal political status and its softer political influence. The five permanent members of the United Nations Security Council support India's claim to join them, earned by India being one of the most consistent contributors to UN peacekeeping operations (interdependence). In terms of soft power, it may be argued that India has huge potential as it is committed to democratic institutions, the rule of law and human rights, has a huge and talented diaspora, shares many Western values and is culturally rich
- The extent to which Indian MNCs have a global economic and political influence. For example, the relative influence within the global economy of Indian MNCs such as Tata Steel and JSW
- Assessment of the balance between India's political and economic influence in the wider world. India's economic power may be regarded as of greater significance than its political power, but it may be argued that economic power is a fundamental precondition for, and prelude to, India's emergence as a global hegemon

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about India's political and economic influence in the wider world
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions to assess the importance of India's political and economic influence in the wider world

Credit other valid approaches.

7. 'China's natural resource base provides more opportunities than constraints for economic development'. Discuss.

[45 marks]

AO1 [20] AO2.1.c [20] AO3.3 [5]

Focus: 3.3.3

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1

Knowledge and understanding of China's natural resource base could include:

- China has a large mineral and energy resource base
- China is well endowed with coal reserves
- Petroleum and natural gas resources are also available, but in smaller proportions
- China's has large reserves of metallic minerals such as tungsten, tin, molybdenum, antimony and rare earth
- Other metallic minerals include iron, manganese, aluminium and copper
- China has the world's largest hydropower potential
- Physical resources include land and water as well as minerals and energy

AO2

Application of knowledge and understanding is deployed to discuss whether China's natural resource base provides more opportunities than constraints. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- The relative impact of the types and amounts of resources available; the opportunities for economic development presented by the abundance of China's resources (causality). The ability of China to meet its energy demand from domestic sources due to China's relatively rich endowment in coal. China's varied landscape including the picturesque karst landscapes in Guilin and Yanshuo, lakes in Jiuzhaigou and the Rainbow Mountains in Zhangye present many opportunities for the development of tourism (causality)
- China's varied landscape and climate may present both opportunities and constraints in the same place. For example, the cultural and environmental attractions of Tibet may present opportunities for the development of tourism (causality) but physical and political isolation in this region constrains economic development
- The relative availability of resources in relation to the demand for them. China's resource base is insufficient to meet the increased use of energy and minerals as China's economy becomes more urban and export oriented (estimates are that in twenty years' time, assuming there is no dislocation to its growth process, China is likely to consume more energy and metals than all of the industrialised economies today) therefore constraining its economic development
- The extent to which quality has an impact on the opportunities provided by natural resources. Many important metallic minerals such as iron, manganese, aluminium and copper are of poor quality and difficult to smelt, constraining China's economic development

- The extent to which accessibility has an impact on the opportunities provided by natural resources. The uneven distribution of China's coal reserves and limited reserves of high-quality coking coal and anthracite coal constrain its economic development
- Discussion of whether the increase in international concerns (globalisation) and controls surrounding greenhouse gas emissions, pollution and environmental damage (risk) associated with the combustion of China's low grade coal, which will lead to increases in the cost of environmental amenity and repair, placing a strain on China's economy (sustainability)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about China's natural resource base
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions about whether China's natural resource base provides more opportunities than constraints

Credit other valid approaches.

8. Assess the importance of China's political and economic influence in the wider world.

[45 marks]

AO1 [20] AO2.1.c [20] AO3.3 [5]

Focus: 3.3.5

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1

Knowledge and understanding of China's political and economic influence in the wider world could include:

Political influence

- China's active participation in global organisations such as the WTO (globalisation and interdependence)
- China's active participation in global organisations, governance, conventions and treaties such as the UN and IPCC (Intergovernmental Panel on Climate Change)

Economic influence

- China's importance as is a major economic power: it has been projected that by 2030 China's economy could be twice the size of the USA's
- In 2014 Chinese overseas investment surpassed foreign direct investment into China
- Chinese overseas investment is important in both developed and developing countries, especially in the continent of Africa
- In 2014, the list of the world's largest 500 corporations included 95 Chinese companies

AO2

Application of knowledge and understanding is deployed to assess the importance of China's political and economic influence in the wider world. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- Changes over time (time scales) leading to assessment of the extent to which China's political and economic influence in the wider world has grown significantly over the past 35 years since the introduction of Deng Xioping's 'Open Door' policy
- The extent to which China's political and economic influence varies according to location (place) and here it is important to distinguish between the developing and the developed world: China enjoys less influence in the latter, but its extraordinary success as a developing country is seen by many in the developing world as a model from which they can learn and which they seek to emulate. Africa is the clearest case in point. China's transformation is most strongly felt in East Asia, which has become increasingly China-centric
- The relative variation in factors affecting China's political and economic influence. China remains a poor country (recent figures show that the US expends five times more on national security than China), with a standard of living only one-fifth of USA's and China's relative poverty (inequalities) may act as a major constraint on China's capacity for its political (soft) power to appeal for several decades

- China's economic influence in the global market is emerging rapidly and presents other superpowers with a dilemma. For example, the large emerging Chinese middle class represents an export opportunity for European countries. Placing higher import duties on cheap Chinese steel is therefore contested by politicians but requested by European steel makers
- Given the world's unfamiliarity with China, it is possible to argue that the West has consistently underestimated the speed of China's rise, with the consequence that it underestimates the extent of China's political and economic influence
- Assessment of the balance between China's political and economic influence in the wider world. China's economic power may be regarded as of greater significance than its political power, but it may be argued that economic power is a fundamental pre-condition for, and prelude to, China's emergence as a global hegemon

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about China's political and economic influence in the wider world
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions to assess the importance of China's political and economic influence in the wider world

Credit other valid approaches.

9. 'Political factors hinder rather than promote development'. With reference to two or more Sub-Saharan African countries to what extent do you agree?

[45 marks]

AO1 [20] AO2.1.c [20] AO3.3 [5]

Focus: 3.6.4

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1

Knowledge and understanding of political factors influencing development could include:

- The political instability, armed rebellions, coups and austere military rule that characterises countries such as Niger and Mali (a military coup in Mali in 2012 brought to a halt 20 years of stable democracy)
- The growth in terrorism in these countries (risk)
- The porous nature of the borders of most countries results in a political crisis in one country becoming a serious threat to neighbouring countries
- The prevalence of modern slavery in many of these countries, including forced labour, child labour and human trafficking, with Mauritania having proportionally the highest prevalence of slaves in the world
- International intervention by former colonial powers (France in Mali) (interdependence)
- International intervention and neo-colonial influences (Chinese investment) (globalisation)
- International intervention by global organisations such as the UN (interdependence)
- A major failing common to many Sub-Saharan African countries has been the quality of their government and leadership which has had a negative impact on development (causality). Development measures, such as the human development index (HDI), indicate that levels of development in many of these countries are amongst the lowest in the world
- Political problems and associated instability affect development directly by disrupting economic activity, mainly agriculture
- Political problems and associated instability affect development indirectly through their impact on educational achievement, infrastructure, population change and displacement with conflicts compounding security and humanitarian crises disrupting supply routes and causing food shortage

AO2

Application of knowledge and understanding is deployed to evaluate whether political factors hinder rather than promote development in Sub-Saharan countries. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- Arguments that evaluate the scale of political influence on development (local, regional, national or international). Neo-colonial influences on an international scale can lead to further political instability, with China challenging US economic hegemony in these countries, such as Sudan and South Sudan, and compromising development

- The extent of change in political factors over time (time scales). Political factors may shift to a position where they promote rather than hinder development. Some countries are becoming gradually more democratic (in 2009 a civilian leader was elected in Mauritania leading to improvements in freedom, human rights and accountability)
- The extent that place and location hinder rather than promote development (place). Examples of countries such as Zimbabwe are affected by the structure of the current political system, including misuse and misappropriation of aid and income
- The extent of variation of the type of political influence. Supranational organisations (interdependence) such as the UN and former colonial powers are attempting to reverse negative trends and promote development but their success in setting and monitoring development targets may be hindered by local political instability or corruption
- The relative impact of the rise of terrorist groups which have a variety of effects with regard to development including impact on local populations (Boko Haram) and on international reputation and investment

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about political factors influencing development
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions about whether political factors hinder rather than promote development

Credit other valid approaches.

10. Evaluate the success of strategies used to promote development in selected Sub-Saharan African countries. [45 marks]

AO1 [20] AO2.1.c [20] AO3.3 [5]

Focus: 3.6.7

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1

Knowledge and understanding of the strategies used to promote development could include:

- Aid provided by international aid agencies and NGOs: a distinction may be made between 'top down' and 'bottom up' strategies (interdependence)
- Strategies implemented by the World Bank, IMF and SAPs (structural adjustment programmes) / PRSPS (poverty reduction strategy papers), HIPC (heavily indebted poor countries) (interdependence)
- Micro-finance schemes (interdependence)
- Free trade (globalisation)
- Fair trade (globalisation)
- Foreign direct investment and the role of MNCs (globalisation)

AO2

Application of knowledge and understanding is deployed to evaluate the success of strategies used to promote development in selected Sub-Saharan African countries. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. To evaluate the extent of success of strategies, this evidence could include:

- The validity and reliability of various indicators may be contested: the indicators covered will be mainly economic, but may include social, environmental and demographic measures of improvement indicative of progress made
- Consideration of how those living in poverty are involved in the development process. Who are the decision makers and gate-keepers to the development aid budget?
- Consideration of the scale of the chosen strategies, with the monitoring and measurement of the success of small-scale, bottom-up strategies being more straightforward
- Comparison of the success of similar strategies employed in different environments (place)
- The extent of the improvements in the success of measures over time (time scales)
- Consideration of time-scales for the implementation of strategies, such as World Bank and IMF strategies, may be long, reducing their effectiveness
- The extent of reliance on the co-ordination of agencies for the success of strategies, which sometimes fail to act together (interdependence)
- That some strategies are more successful because they are sustainable and holistic, with strategies involving local economic development often being more sustainable (sustainability)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the strategies used to promote development
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions evaluating the success of strategies

Credit other valid approaches.

11. 'The environmental problems associated with fossil fuels are greater than political ones'. To what extent do you agree? [45 marks]
AO1 [20] AO2.1.c [20] AO3.3 [5]

Focus: 3.4.5

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1

Knowledge and understanding of the environmental problems and political problems associated with the extraction, transport and use of fossil fuels could include:

Environmental problems:

- Coal is the most polluting source of energy (greenhouse gases, acid rain and smog) (causality). Underground mines lead to surface subsidence and toxic waste and water. Opencast pits scar the landscape. Although legislation requires restoration, new ecosystems are of low quality
- Oil infrastructure from large oilfields visually pollutes a large area. Oil spills at production sites (Gulf of Mexico Deepwater Horizon oil spill) along pipelines and tanker routes are ecologically disastrous. Ecological issues surround oil exploration in fragile, environmentally sensitive areas such as the Arctic (risk)
- Natural gas is generally seen as the cleanest of fossil fuels in greenhouse gas terms, but flare-off as a waste product of oilfields causes major environmental problems (causality)
- Unconventional sources of oil and gas such as tar sands and shale gas may lead to water contamination, the threat of earthquakes and environmental degradation

Political problems:

- Problems of energy security where fossil fuel resources cross international boundaries (interdependence)
- The problems of risk associated with unstable suppliers and volatile pathways (Russia/Ukraine, Libya)
- The pricing and production of oil is largely controlled by cartels such as OPEC (globalisation) or national governments, with prices often high and volatile
- Public protests such as anti-fracking campaigns and the refusal of planning permission in the UK have delayed plans for the extraction of shale gas

AO2

Application of knowledge and understanding is deployed to consider whether the environmental problems associated with fossil fuels are greater than political ones. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- Consideration of whether new technologies for fossil fuels, including carbon capture and sequestration and gasification (mitigation) which will reduce the environmental problems associated with fossil fuels (sustainability), therefore the relative importance of the two categories of problem may change over time (time scales)

- Whether in some countries the political concern for energy security over-rides environmental concerns (China) particularly in the short-term (time scales), although this is changing due to concerns about the pollution associated with fossil fuels
- The relative importance of the two categories of problem may vary spatially and temporally. The mine disaster at the Gleision colliery, Swansea Valley in 2011 raised concerns about site safety and inspection which, locally and temporarily, raised the profile of political vis-a-vis environmental problems
- Consideration of the interdependence of environmental problems and political problems; whether governments need to harmonise actions to limit CO₂ output from fossil fuels
- The extent to which finding agreement is difficult and whether implementing policies can make governments unpopular with their electorates

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the environmental problems and political problems associated with the extraction, transport and use of fossil fuels
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions on whether the environmental problems associated with fossil fuels are greater than political ones

Credit other valid approaches.

12. Discuss the view that a country's energy mix is mainly determined by its level of development.

[45 marks]

AO1 [20] AO2.1.c [20] AO3.3 [5]

Focus: 3.4.6

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1

Knowledge and understanding of the influence of the level of development on a country's energy mix could include:

- The use of traditional sources of energy such as fuelwood and animal dung by developing countries due to their low cost and degree of accessibility (causality) compared to other energy sources; lower level of technology will also limit the use of other sources of energy (in Botswana there is extensive use of woody biomass, providing over 90% of the country's energy mix)
- The diminishing importance of traditional sources of energy such as fuelwood and animal dung in emerging economies and the replacement of traditional sources with fossil fuels and alternative energy sources associated with increased economic and technological change (in Vietnam the contribution of traditional sources of energy is declining, with fossil fuels, wind, solar, nuclear and biofuels taking a greater share)
- The more limited use of traditional sources of energy such as fuelwood and animal dung in developed economies' energy mix and the growing proportion of renewables as developed countries develop the technology for harnessing renewable energy and implement energy policies to mitigate against climate change (sustainability)

AO2

Application of knowledge and understanding is deployed to discuss whether a country's energy mix is mainly determined by its level of development. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- The relative availability of energy sources as an important factor influencing a country's energy mix. The oil crises and subsequent rises in oil prices in 1973 and 1979 led many countries to develop alternative energy sources such as biofuels in Brazil
- The extent to which specialised location factors (place) influencing a country's energy mix. Botswana has significant reserves of coal estimated at over 200 billion tons, the country's amount of solar insolation is one of the highest levels in the world, and as the country is landlocked and high pressure dominates, average wind speeds are too low to make wind energy attractive
- The contested role of government policies on a country's energy mix. International emissions' targets have led to a shift towards cleaner fossil fuels and renewables and government taxation policies can promote renewable energy, as in Germany, through community grants and subsidies (mitigation)

- The scale of appropriate micro generation of solar, biogas, wind and hydro power (sustainability) promoted by international aid agencies and NGOs (interdependence) in developing countries through technology transfer
- The extent to which security of supplies can influence a country's energy mix (risk)
- How far public opinion and cultural preferences can influence a country's energy mix. In Germany public distrust following the Fukushima nuclear disaster in 2011 (risk) has led to the policy decision to phase out nuclear power in Germany by 2022

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the influence of the level of development on a country's energy mix
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions on whether a country's energy mix is mainly determined by its level of development

Credit other valid approaches.

- 13. To what extent can the destructive effects of low-pressure systems be minimised?** [45 marks]
AO1 [20] AO2.1.c [20] AO3.3 [5]

Focus: 3.5.5

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1

Knowledge and understanding of the main characteristics of hazards associated with low-pressure systems and strategies used to minimise the destructive effects could include:

- The risks to people associated with low-pressure systems including high rainfall, strong winds, storm surges and landslides
- Destructive effects include direct impacts: wind and storm surge effects on buildings, power transmission, telecommunications, transport (causality)
- Destructive effects include indirect impacts: landslides, flooding, contamination
- Impacts are environmental (eg water contamination), demographic (eg deaths, migration), economic (disruption to production) and social (eg homelessness, illness, bereavement)
- Ways to manage the damaging effects may follow a temporal sequence – pre, during and post disaster (Park’s model of response curve) and involve risk assessment, mitigation and adaption preparedness and emergency plans including the hazard management cycle framework of monitoring, prediction, warning, immediate response and long-term planning

AO2

Application of knowledge and understanding is deployed to consider the extent to which the destructive effects of low-pressure systems can be minimised. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- Evaluation of the vulnerability of different groups in society and whether or not strategies are designed to help them
- Strategies such as hazard mapping prioritise mitigating economic risk or social risk
- Assessment of the effectiveness and success of different elements of the hazard management cycle which increase resilience and mitigate against the effects
- Comparison of the success of different measures employed in different environments (place). For example the response in November 2013 to Typhoon Haiyan was more effective in Vietnam than in the Philippines
- The extent of improvements in the use of measures over time (time scales)
- Evaluation of the size and intensity of the low-pressure system (scale) with the assertion that the larger and more intensive the low-pressure system is, the more difficult it will be to minimise its destructive effects (Typhoon Haiyan, Philippines, November 2013)
- Consideration of changes over time (time scales) as climate change, rising sea levels and water temperatures provide increasing amounts of energy for major

- weather events (causality), making the minimisation of their destructive effects more difficult
- Discussion of the effects of the magnitude, the timing and the track of low-pressure systems as, when low-pressure systems reach locations at their peak, the destructive effects are greater and more difficult to minimise
 - Evaluation of the vulnerability of various populations in various locations and their ability to mitigate against the effects of low pressure weather systems

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the destructive effects of low-pressure systems and strategies to minimise these
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions on the extent to which the destructive effects of low-pressure systems can be minimised

Credit other valid approaches.

14. To what extent do large cities affect local climate? [45 marks]
AO1 [20] AO2.1.c [20] AO3.3 [5]

Focus: 3.5.6

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1

Knowledge and understanding of the various ways in which large cities affect local climate could include:

- The main effect of large cities on local climates is to destroy the existing microclimate and create a new one (causality)
- Large cities affect all microclimate variables
- increases in temperatures, particularly during anticyclonic conditions, in the night and in winter
- Changes in atmospheric composition, higher concentrations of gases such as carbon dioxide and sulphur dioxide and particulates
- Higher incidence of cloud, and therefore lower amounts of sunshine
- Higher levels of precipitation with thunderstorms and hail more likely
- Higher frequency, duration and intensity of fog
- Changes to the hydrology of urban areas in terms of humidity levels (lower) and evapotranspiration rates (higher) (interdependence)
- Altered wind characteristics, including wind speed and direction and turbulence

AO2

Application of knowledge and understanding is deployed to consider the extent to which large cities affect local climate. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- The extent to which the scale of the city influences the existence, intensity and shape of the urban heat island (scale). The larger the city, the more pronounced the effects
- The relative impact of different locations (places) as the effect of regional climates may operate to intensify the effects. The 'urban heat island' is more pronounced under high pressure conditions and in continental interiors
- The relative impact of different factors that influence the effects of cities on local climates including density of housing, existence of parkland / water surface, vertical development of buildings, relief, energy consumption and the nature of economic activity (causality)
- The contested role of climate change in exaggerating the effects of large cities on local climates (causality)
- The extent to which changes over time influence local climate (time scales) as with the projected growth in urbanisation (70% by 2050), there will be more megacities which will have a more profound effect on local climates
- How far building efficiency and transport efficiency measures implemented in cities to reduce energy use have affected local climates
- (resilience, mitigation)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the ways in which large cities affect local climates
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions on the extent to which large cities affect local climate

Credit other valid approaches.