



GCE A LEVEL MARKING SCHEME

SUMMER 2019

**A LEVEL (NEW)
GEOGRAPHY - UNIT 4
1110U40-1**

INTRODUCTION

This marking scheme was used by WJEC for the 2019 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

Unit 4: 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 20 marks and Section B is 22 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.

	AO1 [6 marks]	AO2 [13 marks]	AO3 [1 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>
3	<p>5-6 marks</p> <p>Secure factual knowledge and confident understanding of relevant concepts and principles</p> <p>Developed exemplification used with supporting geographical terminology</p> <p>Well-directed and well-annotated sketch maps / diagrams</p> <p>Spelling, punctuation and grammar used with a high degree of accuracy</p>	<p>9-13 marks</p> <p>Accurate application either to interpret or analyse or evaluate</p> <p>Synthesis of the connections between different elements of the response to the question</p> <p>Relevant application of the specialised concepts</p>	<p>1 mark</p> <p>The response is appropriately structured</p>
2	<p>3-4 marks</p> <p>Straightforward knowledge with some inaccuracies; some understanding of relevant concepts and principles</p> <p>Appropriate exemplification and geographical terminology is partially evident</p> <p>Annotated sketch maps / diagrams contain inaccuracies</p> <p>Spelling, punctuation and grammar used with a reasonable degree of accuracy</p>	<p>5-8 marks</p> <p>Some application either to interpret or analyse or evaluate with limited range, depth and development</p> <p>Incomplete synthesis between different elements of the response to the question</p>	
1	<p>1-2 marks</p> <p>Limited knowledge with errors and minimal understanding</p> <p>Limited use of examples and terminology; no supporting sketch maps / diagrams</p> <p>Spelling, punctuation and grammar used with limited accuracy</p>	<p>1-4 marks</p> <p>Application either to interpret or analyse or evaluate is poor; occasional relevant points are made</p>	
	<p>0 marks</p> <p>Response not creditworthy or not attempted</p>	<p>0 marks</p> <p>Response not creditworthy or not attempted</p>	<p>0 marks</p> <p>Response not creditworthy or not attempted</p>

Section A: Tectonic Hazards

1. 'Converging plate margins produce the most serious tectonic hazards.' Discuss.
[20 marks]
AO1 [6] AO2 [13] AO3 [1]

Focus: 4.1.1 / 4.1.2

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.

Likely themes and specialised concepts include:

AO1

Knowledge and understanding could include:

- Distribution of earthquakes and volcanoes with an emphasis on their link to plate boundaries (causality / place)
- The mechanics of plate movement can be linked to the processes operating at:
 - (i) Converging (ocean/ocean, ocean/continental and continental/continental) (causality / place / risk)
 - (ii) Diverging (causality / place / risk)
 - (iii) Conservative margins (causality / place / risk)
- Primary and secondary hazards associated with tectonic activity (place / risk)
- Earthquakes, and the associated wave movements, produce many hazards including:
 - Ground shaking, liquefaction, landslides, mudflows and tsunamis (place / risk / scale)
 - Role of focus, depth of focus (shallow, intermediate and deep focus) and the epicentre may be considered (place / causality / risk / scale)
- Volcanoes produce many hazards including:
 - Pyroclastic flows, lava flows, ash falls, lahars, jökulhlaups, volcanic landslides, toxic gases (place / risk / scale)
 - The type of volcano and eruption type. Reference may be made to:
 - (i) Explosive eruptions (place / risk / scale)
 - (ii) Effusive eruptions (place / risk / scale)
- Impacts:
 - (i) Environmental impacts (e.g. damage to the built environment, landslides) (place / risk / scale)
 - (ii) Demographic impacts (e.g. deaths, migration) (place / risk / scale)
 - (iii) Economic impacts (e.g. disruption to production) (place / risk / scale)
 - (iv) Social impacts (e.g. homelessness, injury, bereavement) (place / risk / scale)
- Local, regional and global impacts (place / risk / scale)

AO2

Application of knowledge and understanding is deployed to discuss whether converging margins produce the most serious tectonic hazards. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- An examination of the severity of tectonic hazards associated with converging plate margins (place / risk / scale)
- Comparing and contrasting the severity of tectonic hazards at different converging margins (ocean/ocean, ocean/continental and continental/continental) (place / risk / scale)
- Comparing and contrasting the severity of tectonic hazards at converging, diverging and conservative margins (place / risk / scale)
- Examination of the severity of demographic, social, economic and environmental impacts of tectonic activity at converging margins (place / risk / scale)
- Comparing and contrasting the severity of demographic, social, economic and environmental impacts of tectonic activity at different converging margins (ocean/ocean, ocean/continental and continental/continental) (place / risk / scale)
- Comparing and contrasting the severity of demographic, social, economic and environmental impacts of tectonic activity at converging, diverging and conservative margins (place / risk / scale)
- The impact of tectonic hazards is partially dependent on the physical characteristics of earthquakes and volcanoes and varies in magnitude (scale / place / spatial variations)
- Relative importance of: Predictability, frequency, duration, speed of onset, areal extent (scale / place / spatial variations)

AO3

- The skill of presenting well-constructed, coherent and logical arguments to discuss whether converging margins produce the most serious tectonic hazards
- The skill of constructing relevant diagrams which are annotated to meet the requirements of the question
- The skill of reaching conclusions about whether converging margins produce the most serious tectonic hazards

Credit other valid approaches.

2. 'The level of economic development is the main reason why the impact of earthquake activity varies.' To what extent do you agree? [20 marks]
AO1 [6] AO2 [13] AO3 [1]

Focus: 4.1.3 / 4.1.4

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.

Likely themes and specialised concepts include:

AO1

Knowledge and understanding could include:

- Earthquake processes and the production of associated hazards (causality / risk)
- Primary and secondary hazards associated with earthquake activity (causality / risk / place)
- Environmental impacts (e.g. damage to the built environment, landslides) (place / risk / scale)
- Demographic impacts (e.g. deaths, migration) (place / risk / scale)
- Economic impacts (e.g. disruption to production) (place / risk / scale)
- Social impacts (e.g. homelessness, injury, bereavement) (place / risk / scale)
- Local, regional and global impacts (place / risk / scale)
- The characteristics of the earthquake activity that influence its impact:
- Magnitude, predictability, frequency, duration, speed of onset, timing and areal extent (risk)
- Economic factors affecting spatial variations in vulnerability (place / risk / resilience)
- Level of development and level of technology (resilience / mitigation / adaption)
- Social factors affecting spatial variations in vulnerability in terms of the population profile (e.g. age, level of education) (place / risk)
- Political factors affecting spatial variations in vulnerability (e.g. quality of governance) (place / risk)
- Geographical factors affecting spatial variations in vulnerability (e.g. rural / urban location / degree of isolation) (inequalities / place)

AO2

Application of knowledge and understanding is deployed to examine the extent to which the level of economic development is the main reason why the impacts of earthquake activity vary. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- The magnitude of the tectonic event (scale)
- Level of economic development – availability of technology to monitor and predict tectonic activity (place / mitigation / resilience / interdependence)
- Examining the role of geographical location – densely / sparsely populated environment, rural / urban environment (inequalities / place / risk / interdependence)
- Role of social factors – influence of literacy rates / population profile (inequalities / place / risk / interdependence)
- Importance of political factors – quality of governance in reducing the impacts of tectonic activity (place / mitigation / resilience / interdependence)
- Examination of the level of preparedness (place / mitigation / resilience)
- Evidence provided to analyse why the impacts of earthquake activity vary (place / scale)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the extent to which the level of economic development is the main reason why the impacts of earthquake activity vary
- 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 level of economic development is the main reason why the impacts of earthquake activity vary.

Credit other valid approaches.

Section B: Contemporary Themes in Geography: Generic Mark Bands

[22]

	AO1 [9 marks]	AO2 [11 marks]	AO3 [2 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 communicate findings</i>
3	<p>7-9 marks</p> <p>Wide-ranging and thorough knowledge and confident understanding of relevant concepts and principles</p> <p>Developed exemplification used with supporting geographical terminology</p> <p>Well-directed and well-annotated sketch maps / diagrams</p> <p>Spelling, punctuation and grammar used with a high degree of accuracy</p>	<p>8-11 marks</p> <p>Accurate application either to interpret or analyse or evaluate</p> <p>Synthesis of the connections between different elements of the response to the question</p> <p>Relevant application of the specialised concepts</p>	<p>2 marks</p> <p>A well-constructed, coherent and logical response</p>
2	<p>4-6 marks</p> <p>Secure, straightforward knowledge and reasonable understanding of relevant concepts and principles</p> <p>Appropriate exemplification and geographical terminology is partially evident</p> <p>Appropriate, basically accurate annotated sketch maps / diagrams are included</p> <p>Spelling, punctuation and grammar used with a reasonable degree of accuracy</p>	<p>5-7 marks</p> <p>Some application either to interpret or analyse or evaluate with limited range, depth and development</p> <p>Incomplete synthesis between different elements of the response to the question</p>	<p>1 mark</p> <p>The communication in the response is limited or incomplete</p>
1	<p>1-3 marks</p> <p>Limited knowledge with errors and minimal understanding</p> <p>Limited use of examples and terminology; no supporting sketch maps / diagrams</p> <p>Spelling, punctuation and grammar used with limited accuracy</p>	<p>1-4 marks</p> <p>Application either to analyse or interpret or evaluate is poor; occasional relevant points are made</p>	
	<p>0 marks</p> <p>Response not creditworthy or not attempted</p>	<p>0 marks</p> <p>Response not creditworthy or not attempted</p>	<p>0 marks</p> <p>Response not creditworthy or not attempted</p>

3. 'The most severe threats to biodiversity come from direct action.' Discuss. [22 marks]
AO1 [9] AO2 [11] AO3 [2]

Focus: 4.2.3

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.

Likely themes and specialised concepts include:

AO1

Knowledge and understanding could include:

- Terrestrial and aquatic ecosystems (place / risk / scale)
- Threats to biodiversity from direct action and indirect action (place / causality / risk / sustainability)
- Threats may be examined at a variety of scales: local, regional, national and global (place / scale)
- Tropical rainforests such as the Amazon rainforest are threatened by deforestation and mineral exploitation (place / causality / risk sustainability)
- Coral reefs e.g. the Great Barrier Reef's biodiversity is also under threat due to climate change and coral bleaching (place / risk / causality / sustainability)
- Wetlands such as the East Anglian Fens biodiversity are under threat also because of industry, pollution and tourism (place / risk / causality / sustainability)
- Threats associated with terrestrial and aquatic ecosystems may include: Climate change, industrial pollution, acid rain, agriculture, pressure from development (place / causality / scale / risk)
 - (i) Threats linked to climate change: E.g. The increased incidence of high-impact storms causing habitat destruction, changing temperature and rainfall patterns, which may affect the tolerance of species and sea level rise, which may occur too quickly for species to adjust. (place / scale / risk)
 - (ii) Threats linked to industrial pollution: E.g. Increasing industrial activity is inadvertently causing a build-up of toxic compounds in the waters and sediments of many aquatic ecosystems. These compounds include Polycyclic Aromatic Hydrocarbons (PAHs) from oil and coal, which can persist in the environment for many years once released. (place / scale / risk)
 - (iii) Threats linked to agriculture: E.g. Cattle ranching is the largest driver of deforestation in every Amazon country, accounting for 80% of current deforestation rates. In addition, Soy cultivation is becoming a major pressure too. Today Brazil has 24-25 million hectares devoted to the growth of this crop, and is currently the second largest producer of soybeans in the world. (place / scale / risk)
 - (iv) Threats linked to pressure from development / infrastructure: E.g. In the Amazon basin, roads and other forms of infrastructure development have played a massive role in logging, deforestation, and agricultural expansion. About 95% of all deforestation occurs within 50km of highways or roads in the Brazilian Amazon. (place / scale / risk)
- The impacts of direct and indirect action on the biotic and abiotic components of terrestrial and aquatic ecosystems:
 - (i) Provisioning services: Impacts on food, water, timber and fibre E.g. The Caribbean has seen a significant decline in fish stocks since the mid-1980s. Furthermore,

destructive fishing practices (such as the use of cyanide and dynamite) also have a major impact. (place / risk / scale / inequality)

- (ii) Regulating services: Impacts on climate / rainfall, water (e.g. flooding), waste, and the spread of disease. E.g. Pollution in wetlands is a growing concern, affecting drinking water sources and biological diversity. Drainage and run-off from crops introduces high concentrations of nitrogen and phosphorous nutrients to water bodies. Pesticides applied to cotton crops alone account for 25 per cent of the global insecticide market, but the area of cotton grown is just 2.4 per cent of the world's arable land. (place / risk / scale / inequality)
- (iii) Cultural services: Impacts on the beauty, inspiration and recreation opportunities that contribute to our spiritual welfare. E.g. The World Meteorological Organisation says that coral reefs yield more than \$30 billion annually in goods and services (place / risk / scale / inequality)
- (iv) Supporting services: Impacts on soil formation, photosynthesis and nutrient cycling, which underpin growth and production. E.g. Costa Rica loses about 860 million tons of valuable topsoil every year (place / risk / scale / inequality)

AO2

Application of knowledge and understanding is deployed to discuss the threats to biodiversity from direct and indirect action. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- Impacts on biodiversity at a range of scales - local, regional, national and global (scale)
- Changes in the nature of threats over time (time scales)
- Assessment of the severity of the threats in different contexts: Environmental, economic, social and political (place / scale / time scale / sustainability)
- An examination of the relative importance of threats (place / risk / scale)
- Evidence provided to assess the severity of direct and indirect threats to biodiversity (place / scale / sustainability)
- Tropical rainforests tend to be more fragile because of the importance of biomass as a nutrient store and because of high levels of biodiversity. Many ecological niches are highly specialised and losing them can have dramatic effects on the food chain. (place / causality / risk)
- Freshwater ecosystems in rivers, lakes and wetlands occupy less than 1% of the Earth's surface but they have a disproportionately large amount of biodiversity and provide important goods and services. (inequality / place / risk / scale)
- Unlike the change in rainforests, the loss of coral reefs is difficult to assess from satellites (place / scale / temporal scale)
- The nature and severity of threats may change over time (place / risk / scale / temporal scale)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the threats to biodiversity from direct and indirect action
- 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 threats to biodiversity from direct and indirect action

Credit other valid approaches

4. 'Physical factors have the most significant influence on ecosystem succession at a local scale.' To what extent do you agree? [22 marks]

AO1 [9] AO2 [11] AO3 [2]

Focus: 4.2.5

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.

Likely themes and specialised concepts include:

AO1

Knowledge and understanding could include:

- An ecosystem is a discrete structural, functional and life sustaining environmental system. The environmental system consists of biotic and abiotic components in a habitat. Biotic components of the ecosystem include the living organisms; plants, animals and microbes, whereas the abiotic component of the system includes basic inorganic elements and compounds, such as soil, water, oxygen, phosphates and a variety of organic compounds (by-products of organic activities or death) (place / system / interdependence)
- Succession of plants in **one** local ecosystem. This may include an examination of primary and secondary succession in:
 - (i) Deciduous woodland (place / causality)
 - (ii) Sand dunes (place / causality)
 - (iii) Wetland areas (place / causality)
- The role of physical factors in the development of their chosen ecosystem:
- Temperature, moisture, light, nutrient availability, salinity, aeolian and fluvial processes (place / causality / interdependence)
- Temperatures need to reach a critical level for an ecosystem to function (thresholds)
- Temperature and moisture also influence the rate of weathering and therefore nutrient availability (interdependence)
- Physical factors can disrupt vegetation succession as a result of fire, disease and change in climate (place / causality / interdependence)
- The role of plants and animals (place / causality / interdependence)
- The role of human activity – E.g. trampling, introducing animals, controlled burning, fires etc. (place / causality / mitigation / risk)

AO2

Application of knowledge and understanding is deployed to examine to what extent physical factors have the most significant influence on ecosystem succession at a local scale. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- Ecosystems are complex and rely on a variety of interlinked processes to function effectively (interdependence)
- Relative role of physical factors in the evolution of an ecosystem e.g. role of temperature, moisture, soils etc. (place / causality / interdependence)
- Relative role of biotic components in the evolution of an ecosystem e.g. role of flora and fauna (place / causality / interdependence)
- Relative role of human activity in the evolution of an ecosystem (place / causality / interdependence)
- Evidence provided to examine the extent to which abiotic factors influence vegetation succession (place / scale)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about whether physical factors have the most significant influence on ecosystem succession at the local scale
- The skill of constructing relevant diagrams, which are annotated to meet the requirements of the question
- The skill of reaching conclusions about whether physical factors have the most significant influence on ecosystem succession at the local scale

Credit other valid approaches.

5. 'India's physical environment provides more opportunities than constraints for economic development.' To what extent do you agree? [22 marks]
AO1 [9] AO2 [11] AO3 [2]

Focus: 4.3.1

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.

Likely themes and specialised concepts include:

AO1

Knowledge and understanding could include:

- The Indian subcontinent covers a vast geographical area of 3.3 million sq. km and therefore has a wide range of physical features that can promote or hinder development (place / scale / causality)
- The role of the following factors may be considered:
- Climate:
 - (i) A wide variety of climatic regions can be observed in India varying from arid desert in the west, humid tropical climates in the far south and alpine tundra in the Himalayan north. The distribution of human activities can be linked to the variability of climate. The arid climate of the Thar Desert presents a major constraint in the west whilst the monsoon rainfall can be hugely disruptive in the growing urban areas as it weakens infrastructure. (place / scale / risk / causality / interdependence)
 - (ii) Climate variability - constraining effects of climate on human activity including droughts and floods. These threats can be studied in the context of agriculture and urban activities where they can affect electricity supply, sanitation and lead to water contamination (place / causality / risk / interdependence)
- Rivers / water availability - Rivers in India fluctuate greatly in volume due to the presence of the monsoon and/ or being snow-fed from the Himalayas. Water availability becomes more limited nearer the Thar Desert in the west. (place / causality / risk / interdependence)
- Relief and drainage patterns – The agricultural sector in India is very strong and provides employment for the majority of the population. The fertile floodplains of the north are the result of its unique physical environment and as such support a successful agricultural sector. E.g. The Indo-Gangetic Plain (which is dominated by three major rivers – The Ganges, the Indus and the Brahmaputra) However, the remote mountainous regions can often prohibit the development of industry and services. E.g. The Himalayan Mountains., The Peninsular Plateau, The Coastal Plains, The Thar Desert and The Islands (place / causality / interdependence)
- Resource base - Availability of energy sources and minerals – India has a wealth of energy and mineral resources. There are coal and bauxite reserves that are relatively unexplored and unutilised. Copper and gold are also present but under explored (place / causality / interdependence)
- The influence of political systems and the role of government in the location and development of economic activity (place / scale)
- The global shift, outsourcing and offshoring including the role of India as the global outsourcing capital (globalisation / inequality)
- India's use of political (soft) power in the wider world including its participation in global organisations, governance, conventions and treaties (globalisation / scale)
- The relative importance of these factors spatially (place / scale)

AO2

Application of knowledge and understanding is deployed to examine the extent to which India's physical environment provides opportunities for economic development. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- The interdependence of climatic, hydrological, natural resource and topographical factors (interdependence)
- Spatial variations (place / scale)
- Variation in the importance of factors over time (time scale)
- The relative role of political and economic factors in providing opportunities for development (scale / place / inequality)
- Evidence provided to examine the relative importance of the physical environment / political and economic factors in the development of India (place / scale)
- Evidence provided to examine the relative importance of the physical environment in the economic development of India (place / scale)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the extent to which India's physical environment provides opportunities for economic development.
- The skill of constructing relevant diagrams which are annotated to meet the requirements of the question
- The skill of reaching conclusions about the extent to which India's physical environment provides opportunities for economic development.

Credit other valid approaches.

6. 'Industrial pollution is the biggest threat associated with economic growth in India.' Discuss. [22 marks]

AO1 [9] AO2 [11] AO3 [2]

Focus: 4.3.6

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.

Likely themes and specialised concepts include:

AO1

Knowledge and understanding could include:

- The environmental impact of uncontrolled development across India has been mostly negative as the country develops (globalisation / risk / sustainability / inequality)
- There are a number of pressures associated with economic growth in India:
 - (i) Industrial pollution: E.g. The Bhopal disaster (place / risk / sustainability / scale)
 - (ii) Fossil fuel use – E.g. Air pollution in India has become so severe that yields of crops are being cut by almost half. (place / risk / sustainability / scale)
 - (iii) Soil erosion – Nearly 30 per cent per cent of the country's total geographical area is undergoing degradation according to the ISRO (place / risk / sustainability / scale)
 - (iv) Deforestation – E.g. Over the last 30 years, forests nearly two-thirds the size of Haryana have been lost to encroachments (15,000 sq km) and 23,716 industrial projects (14,000 sq km), according to government data (place / risk / sustainability / scale)
- Economic development has also led to the following problems:
 - (i) Water security – E.g. Narmada dam – influence on Gujarat and Madhya Pradesh / Coca Cola in Varanasi (place / risk / sustainability / scale)
 - (ii) Food security - Food security cannot be maintained without water security and as India has become increasingly industrialised the demands on water have increased rapidly. (place / risk / sustainability / scale)
 - (iii) Energy security - The recent growth in affluence has increased the purchasing power of the population, which creates an increasing demand for energy. (place / risk / sustainability / scale)
 - (iv) Rapid urbanisation - E.g. Dharavi slum in Mumbai. (place / risk / sustainability / scale)
- Strategies instigated to deal with the threats associated with economic development E.g. Eco-cities – The Taj Eco City initiative, Agra, Uttar Pradesh (place / mitigation / adaptation / sustainability / resilience):

AO2

Application of knowledge and understanding is deployed to discuss whether industrial pollution is the biggest threat associated with economic growth in India. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- The risks posed to the environment will continue to grow without focus on sustainable development. (risk / sustainability)
- The relative importance of problems associated with economic development varies spatially (causality / place)
- The relative importance of problems associated with economic development varies temporally (causality / place / time scale)
- The relative importance of problems associated with economic development may vary according to scale (scale)
- Examination of strategies instigated to deal with the problems of economic development in India: (place / sustainability)
 - (i) E.g. rainwater harvesting projects to manage water shortages in Gujarat or Rajasthan (place / scale / sustainability / mitigation / resilience)
 - (ii) Banning auto-rickshaws in Delhi to combat vehicle pollution (place / scale / sustainability / mitigation / resilience)
 - (iii) Biogas production in rural Maharashtra provides a good example of a sustainable solution to improved energy security (place / sustainability / mitigation / adaptation / resilience)
 - (iv) The ways in which local government and private investors address the growth of slums (place / sustainability / mitigation / resilience / inequality)
- Evidence provided to examine the threats associated with economic growth in India (place / scale)

AO3

- The skill of presenting well-constructed, coherent and logical arguments about whether industrial pollution is the biggest problem associated with economic growth in India
- The skill of constructing relevant diagrams which are annotated to meet the requirements of the question
- The skill of reaching conclusions about whether industrial pollution is the biggest problem associated with economic growth in India

Credit other valid approaches.

7. 'China's physical environment provides more opportunities than constraints for economic development.' To what extent do you agree? [22 marks]
AO1 [9] AO2 [11] AO3 [2]

Focus: 4.3.3

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.

Likely themes and specialised concepts include:

AO1

Knowledge and understanding could include:

- The role of the following factors may be considered:
 - (i) Climate: There are significant climatic variations within China including vast differences in rainfall totals. Temperatures vary and influence the length of the growing season across the country (place / scale / causality)
 - (ii) Climate variability - Historically, China has suffered from both droughts and flooding. (place / risk / time scale / causality)
 - (iii) Natural disasters can render land less productive and can lead to food insecurity. This can, in turn, bring economic hardship and can lead to outmigration on a grand scale. (place / risk / time scale / causality)
 - (iv) Rivers / water availability (place / scale / causality)
 - (v) Relief: Mountainous terrain in the west to the flat terrain in the east (place / scale / causality)
 - (vi) Resource base: Mineral and resource exploitation can play in regional economic development and the development of industry / the location and development of container ports (place / globalisation / interdependence)
- The influence of political systems and the role of government in the location and development of economic activity (place / scale)
- The global shift, outsourcing and offshoring including the role of China as the workshop of the world (globalisation / inequality)
- China's use of political (soft) power in the wider world including its participation in global organisations, governance, conventions and treaties (globalisation / scale)

AO2

Application of knowledge and understanding is deployed to examine the extent to which China's physical environment provides opportunities for economic development. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- The interdependence of climatic, hydrological, natural resource and topographical factors (interdependence)
- The relative importance of these factors spatially (place / scale)
- The relative role of political and economic factors in providing opportunities for development (scale / place / inequality)
- Evidence provided to examine the relative importance of the physical environment / political and economic factors in the development of China (place / scale)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the extent to which China's physical environment provides opportunities for economic development.
- The skill of constructing relevant diagrams which are annotated to meet the requirements of the question
- The skill of reaching conclusions about the extent to which China's physical environment provides opportunities for economic development.

Credit other valid approaches.

8. 'Industrial pollution is the biggest threat associated with economic growth in China.' Discuss. [22 marks]
AO1 [9] AO2 [11] AO3 [2]

Focus: 4.3.6

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.

Likely themes and specialised concepts include:

AO1

Knowledge and understanding could include:

- The environmental impact of uncontrolled development across China has been mostly negative as the country develops (globalisation / risk / sustainability / inequality)
- There are a number of pressures associated with economic growth in China:
 - (i) Industrial pollution: Many waterways are polluted, and industrial waste has led to an increased incidence of cancer in some areas - dubbed 'Cancer Villages'. (place / risk / sustainability / scale)
 - (ii) Fossil fuel use - Air quality issues are particularly apparent in urban areas, the cities in China's industrial north regularly making international headlines. (place / risk / sustainability / scale)
 - (iii) Soil erosion – Is a particular problem on the Loess Plateau. (place / risk / sustainability / scale)
 - (iv) Deforestation has led to desertification in the north and west of China. (place / risk / sustainability / scale)
- Economic development has also led to the following problems:
 - (i) Water security – E.g. Agriculture accounts for between 65 and 70 percent of China's water use and vast amounts are wasted by inefficient irrigation. (place / risk / sustainability / scale)
 - (ii) Food security - Food security cannot be maintained without water security and as China has become increasingly industrialised the demands on water have increased rapidly. (place / risk / sustainability / scale)
 - (iii) Energy security - The recent growth in affluence has increased the purchasing power of Chinese people. This creates an increasing demand for energy and has contributed to debates on energy security within China. (place / risk / sustainability / scale)
 - (iv) Rapid urbanisation - E.g. Shanghai - Since China's economic reform in the late 1970s, Shanghai has experienced rapid expansion and urbanisation, resulting in environmental and ecological consequences. (place / risk / sustainability / scale)
- Strategies instigated to deal with the threats associated with economic development E.g. Eco-cities. (place / mitigation / adaptation / sustainability / resilience):

AO2

Application of knowledge and understanding is deployed to examine whether industrial pollution is the biggest problem associated with economic growth in China. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- The risks posed to the environment will continue to grow without focus on sustainable development. (risk / sustainability)
- The relative importance of problems associated with economic development varies spatially (causality / place)
- The relative importance of problems associated with economic development varies temporally (causality / place / time scale)
- The relative importance of problems associated with economic development may vary according to scale (scale)
- Examination of strategies instigated to deal with the problems of economic development in China (place / sustainability)
- Evidence provided to examine the threats associated with economic growth in China (place / scale)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about whether industrial pollution is the biggest problem associated with economic growth in China
- 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 industrial pollution is the biggest problem associated with economic growth in China

Credit other valid approaches.

9. 'Quantitative measures of development are more reliable than qualitative measures.' Discuss with reference to selected Sub-Saharan African countries.

[22 marks]

AO1 [9] AO2 [11] AO3 [2]

Focus: 4.3.8

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.

Likely themes and specialised concepts include:

AO1

Knowledge and understanding could include:

- Single and composite quantitative indicators of development for different Sub-Saharan African countries (inequality / place / scale). These may include:
 - Demographic indicators – E.g. Equatorial Guinea (2016) – Birth rate: 34.1/1,000 / Death rate: 10.2/1,000 / Infant mortality rate: 67.4/1,000 / TFR: 4.7 (inequality / place / scale / temporal scale)
 - Economic indicators – E.g. Equatorial Guinea (2016) – GDP per capita: \$9,217 (inequality / place / scale / temporal scale)
 - Environmental indicators – E.g. Carbon dioxide emissions per capita (inequality / place / scale / temporal scale)
 - Social indicators – E.g. Literacy rate (inequality / place / scale / temporal scale)
 - Composite indicators – E.g. Gender-related Development Index (GDI) / Gender Empowerment Measure (GEM) / Gender Inequality Index (GII) / Human Development Index (HDI) / The Multidimensional Poverty Index (MPI) (inequality / place / scale / temporal scale)
- Qualitative indicators of development for different Sub-Saharan African Countries. Subtler aspects of development have been identified, such as democracy, freedom of speech and environmental sensitivity. E.g. The Happy Planet Index (HPI) developed by the New Economics Foundation (NEF) and Friends of the Earth (FOE). The Happy Planet Index is based on measures of life satisfaction, life expectancy and ecological footprint. Botswana (16.6) 126/140, South Africa (15.9) 128/140 (inequality / place / scale / temporal scale)

AO2

Application of knowledge and understanding is deployed to examine whether quantitative measures of development are more reliable than qualitative measures, with reference to selected Sub-Saharan African countries. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- A comparison of the indicators presented for selected Sub-Saharan countries (inequality / place / scale)
- An examination of the reliability of the different indicators presented (inequality / place / scale / temporal scale)
- Some countries may have imbalances in these measures, so a country may have very high levels of wealth and economic development, but poor levels of political freedom and social development (inequality / place / scale / temporal scale)

- It is therefore better to look at a number of different measures of development of places before coming to a judgment about its level of development (inequality / interdependence / place / scale)
- The most powerful measure is probably the Human Development Index, because it combines a variety of variables into one figure (inequality / place / scale / temporal scale)
- Variations in levels of development between regions, ethnic groups and genders is becoming increasingly important. More recent measures to calculate gender inequality such as the GEM (Gender Empowerment Measure) or GDI (Gender-related Development Index) can be used to help identify development patterns in Sub-Saharan Africa, which are different to those generated through reliance on more traditional income-focused measures. (inequality / place / / scale / temporal scale)
- Qualitative aspects of development are more problematic but reflect more accurately the ways in which development is now viewed. (causality / inequality / place / / scale / temporal scale)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about whether quantitative measures of development are more reliable than qualitative measures, with reference to selected Sub-Saharan African countries
- The skill of constructing relevant diagrams, which are annotated to meet the requirements of the question
- The skill of reaching conclusions about whether quantitative measures of development are more reliable than qualitative measures, with reference to selected Sub-Saharan African countries

Credit other valid approaches.

10. Evaluate strategies used to promote development in selected Sub-Saharan African countries.

[22 marks]

AO1 [9] AO2 [11] AO3 [2]

Focus: 4.3.14

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.

Likely themes and specialised concepts include:

Knowledge and understanding could include:

- Reasons for a lack of development in selected Sub-Saharan African countries – physical and human factors may be introduced e.g. resource base / climate / trade blocs / MNCs / colonialism / neo-colonialism etc. (causality / risk)
- Impacts of a lack of development may be considered – E.g. impact on GDP per capita / HDI / literacy rates / IMR / birth and death rates etc. (place / inequality)
- Strategies to promote development in Sub-Saharan Africa:
 - (i) National governments – E.g. Special Economic Zones in Ethiopia, Nigeria and Zambia / Botswana - Largely free of kleptocracy and civil conflict - it has maintained a transparent, law-abiding government and it has implemented good policies, including a hyper-prudent fiscal policy (mitigation / resilience / sustainability / adaptation / scale)
 - (ii) International aid agencies, NGOs and micro-finance schemes – E.g. Practical Action in Kenya / Kenya Women Finance Trust (KWFT) (mitigation / resilience / sustainability / adaptation / scale)
 - (iii) World Bank and IMF – E.g. World Bank in the Niger Delta - investments in hydropower plants, reservoirs, irrigation schemes, and navigation facilities (mitigation / resilience / sustainability / adaptation / scale)
- An assessment of the effectiveness of strategies used to promote development in selected Sub-Saharan African countries (mitigation / resilience / sustainability / adaptation / scale)

AO2

- Application of knowledge and understanding is deployed to evaluate 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. The evidence could include:
 - The scale of the strategies employed – local / regional / global (scale)
 - The longevity of the strategies (time scales)
 - Comparison of the success of different measures employed in different countries (place)
 - Improvements in the use of strategies over time (time scales)
 - Evidence for success by referring to indicators: indicators covered may include social, environmental and demographic measures of improvement indicative of progress made (inequality / resilience / globalisation)
 - The interdependence of strategies used to promote development in Sub-Saharan African countries (interdependence)
 - Evidence provided to evaluate strategies used to promote development in Sub-Saharan Africa (place / scale / sustainability)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about strategies used to promote development in two or more Sub-Saharan African countries
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions about strategies used to promote development in two or more Sub-Saharan African countries

Credit other valid approaches.

11. Evaluate the relative importance of economic problems associated with fossil fuels.

[22 marks]

AO1 [9] AO2 [11] AO3 [2]

Focus: 4.4.5

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.

Likely themes and specialised concepts include:

AO1

Knowledge and understanding could include:

- Reference to the economic problems associated with the extraction, transport and use of fossil fuels. E.g. Fuel poverty and costs associated with the use of petrol, natural gas etc. (place / risk / sustainability / scale)
- Environmental problems:
 - (i) Pollution from fossil fuel sources and their role in global climate change (place / risk / sustainability / scale / temporal scale)
- Political problems:
 - (i) E.g. Management of oil supplies by OPEC and national governments (place / risk / sustainability / scale)
 - (ii) E.g. Management of oil and gas exploration and production by MNCs and national governments (place / risk / sustainability scale)
 - (iii) E.g. Managing the imbalance between the supply of and demand for oil and gas through transfers, storage and pricing (place / risk / sustainability / scale)
- Technological problems:
 - (i) E.g. Problems extracting fossil fuels (place / risk / sustainability / scale)

AO2

Application of knowledge and understanding is deployed to evaluate the relative importance of economic problems associated with fossil fuels. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- Evaluation of the relative importance of economic problems. (place / causality / interdependence / risk / scale)
- Evaluation of the relative importance of economic problems in comparison to additional concerns. (place / causality / interdependence / risk / scale)
- The scale of problems identified – local, regional, national and global impacts. (place / scale / risk / sustainability)
- The changing importance of problems over time (place / time scale / risk / sustainability)
- The relative importance of problems varies spatially (causality / place)
- Evidence provided to highlight the problems associated with fossil fuels and other forms of energy (place / scale)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the relative importance of economic problems associated with fossil fuels
- The skill of constructing relevant diagrams, which are annotated to meet the requirements of the question
- The skill of reaching conclusions about the relative importance of economic problems associated with fossil fuels

Credit other valid approaches.

12. 'Increased energy efficiency is the most sustainable solution to the growing demand for energy.' Discuss. [22 marks]
AO1 [9] AO2 [11] AO3 [2]

Focus: 4.4.7

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.

Likely themes and specialised concepts include:

AO1

Knowledge and understanding could include:

- Promoting energy efficiency: Heat escapes from poorly insulated homes, newer lightbulbs use a tenth of the energy of traditional ones, lights are left on when not needed, the list goes on. It is estimated that carbon emissions could be stabilised by greater efficiency (place / adaptation / mitigation / sustainability)
- Demand reduction policies: Walking or cycling instead of using a car is a direct reduction. Using public transport also achieves reduction, by the fact that it takes less energy to transport people in large numbers on one vehicle than for them all to use their own cars. Modern telecommunications can make travelling to attend meetings redundant (place / scale / sustainability)
- Clean technologies for fossil fuels including carbon capture, carbon sequestration and gasification and transport technologies (sustainability / adaptation / mitigation)
- Alternative energy sources:
 - (i) Nuclear is a major supplier world-wide, but generates debate (place / risk / sustainability)
 - (ii) Wave and wind power have relatively little damaging impact but much of their potential is yet to be developed (place / sustainability)
 - (iii) HEP schemes have led to the release of methane, more powerful as a greenhouse gas than CO₂ (place / risk / sustainability)
 - (iv) Biofuels lead to destruction of rainforest and use of agricultural land needed for food (place / risk / sustainability)
 - (v) Geothermal, tidal and solar sources of power have few drawbacks, but the range of locations where they can be exploited is limited (place / risk / sustainability / scale)
- An assessment of the sustainability of strategies used to meet demands for energy (sustainability / place / scale)

AO2

Application of knowledge and understanding is deployed to examine whether increased energy efficiency is the most sustainable solution to meet the demand for energy. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- A discussion of the strategies used to meet the demands for energy at a variety of scales (adaptation / place / resilience / scale / sustainability)
- A comparison of the effectiveness of different strategies used to meet the demands for energy (adaptation / place / resilience / scale / sustainability)
- Spatial variations in the implementation of strategies designed to meet the demands for energy (place / scale / sustainability)

- Changes over time – examination of the effectiveness of different approaches adopted over time (adaptation / mitigation / place / scale / sustainability / time scales)
- Evidence provided to evaluate the strategies used to meet the demands for energy (place / scale / sustainability)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about whether increased energy efficiency is the most sustainable solution to meet the demand for energy
- 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 increased energy efficiency is the most sustainable solution to meet the demand for energy

Credit other valid approaches.

13. 'Extreme weather events have limited consequences.' Discuss. [22 marks]
AO1 [9] AO2 [11] AO3 [2]

Focus: 4.5.4

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.

Likely themes and specialised concepts include:

AO1

Knowledge and understanding could include:

- Different types of extreme weather:
 - (i) Increased temperatures and drought - E.g. The occurrence of heat waves – The summer of 1976 in the UK. Heatwaves in Europe in 2003 and 2017. Extreme heat in Southern Europe in 2017 led to a three-day heatwave in early August dubbed 'Lucifer' (place / scale / risk)
 - (ii) Decreased temperatures – E.g. December 2010 in the UK. Arctic air caused the temperatures to drop significantly below the average. At night temperatures of -10°C were not uncommon. (place / scale / risk)
 - (iii) Increased precipitation and flooding – E.g. Boscastle, August 2004 - Three times the average rainfall for the whole of August fell in just one day (place / scale / risk)
 - (iv) Hurricanes and storms – E.g. Storm Brian (21st October 2017) brought strong gusts across the UK. Gusts reached 76mph in Mumbles. Hurricane Harvey brought maximum wind speeds of 130 mph and caused devastation across The Caribbean, Latin America and the USA (place / risk)
- Consequences of extreme weather events:
 - (i) Demographic – E.g. Extreme heat is associated with increased mortality – 14,000 people died in France as a result of the 2003 heat wave (risk / inequalities / place / scale)
 - (ii) Economic – E.g. Lower crop yields, cessation of production and costs of damage. The cold snap of 2010 came in the run up to Christmas and was estimated to have cost the British economy up to £1.2 billion a day with a total cost of £13 billion (risk / inequalities / place / scale)
 - (iii) Social – E.g. Homelessness, impacts on infrastructure and health. Storm Brian led to the closure of a number of seafront roads and many ferries and trains cancelled. (risk / inequalities / place / scale)
 - (iv) Environmental impacts – E.g. Landslides, flooding - (risk / inequalities / place / scale)
- Short term and long term impacts of extreme weather events (temporal scale)
- Local, regional, national and global implications of extreme weather events (scale / place / inequality)
- Vulnerability of populations to extreme weather events (place / resilience / adaptation)

AO2

Application of knowledge and understanding is deployed to examine if extreme weather events have limited consequences. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- Comparison of local, regional, national and global impacts (place / scale / risk)
- Category of impact (demographic, economic, social, environmental) (scale / place)
- Temporal impacts of extreme weather events – short term and long-term implications (time scale)
- The severity of impact may vary seasonally (time scales)
- Level of development – influence on preparation and response (mitigation / adaptation / resilience / risk)
- Interdependence of impacts for example wildfires cause impacts in the short-term (loss of life and property) and in the long-term (cessation of agricultural production) affecting their severity (time scales)
- Variations over space - E.g. The people who can least afford more extreme weather are the ones worst affected. Since 1970, more than 95 percent of lives lost due to natural disasters have been in developing countries. Within these countries, people in megacities and on small islands are especially vulnerable. (scale / inequality)
- Evidence provided to examine whether extreme weather events have limited consequences (place / scale)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the impact of extreme weather events
- 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 impact of extreme weather events

Credit other valid approaches.

14. Evaluate strategies used to reduce the impact of human activity on urban climates and air quality. [22 marks]
AO [9] AO [11] AO3 [2]

Focus: 4.5.6

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.

Likely themes and specialised concepts include:

AO1

Knowledge and understanding could include:

- The formation of urban microclimates. (place / causality)
- The main impact of human activities in urban areas is to destroy the existing microclimate and create a new one. (place / causality / risk / sustainability)
- Urban areas affect all microclimate variables:
 - (i) Temperatures increase (place / causality / scale)
 - (ii) Wind characteristics are altered, including wind speed, wind direction and turbulence (place / causality / scale)
 - (iii) Precipitation levels are higher with thunderstorms and hail more likely (place / causality / scale)
 - (iv) There are also changes to the hydrology of urban areas in terms of humidity levels and evapotranspiration rates (place / causality / scale)
 - (v) Changes in air quality including particulate pollution, photochemical smog and acid rain
- Impacts of human activities on urban climates and air quality. Demographic, economic, social and environmental consequences (place / risk / scale / sustainability / temporal scale)
- Strategies used to reduce the impact of human activity on urban climates and air quality:
 - (i) Land use planning and improved urban design E.g. Smog-eating bus shelters in China (place / mitigation / sustainability / scale / time scale)
 - (ii) Improve air quality through transport policies, legislation and technological solutions E.g. Paris, France; car-free Sunday, rapid bus network in Bogota, Colombia and cycling initiatives in Copenhagen, Denmark (place / mitigation / sustainability / scale / time scale)
- An evaluation of the success of strategies used to reduce the impact of human activity on urban climates and air quality (place / mitigation / sustainability)

AO2

Application of knowledge and understanding is deployed to evaluate strategies used to reduce the impact of human activity on urban climates and air quality. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- Positive and negative impacts of human activity on urban climates and air quality (place / sustainability / risk / mitigation / adaptation / sustainability)
- The scale of the impacts (place / sustainability / risk / mitigation / adaptation / sustainability / temporal scale)

- Strategies used to reduce the impact of human activity on urban climates and air quality at a local, regional, national and global scale (place / mitigation / adaptation / resilience / sustainability)
- The sustainability of strategies used to reduce the impact of human activity on urban climates and air quality (place / mitigation / adaptation / resilience / sustainability / temporal scale)
- The interdependence of strategies used to reduce the impact of human activity on urban climates and air quality (place / mitigation / adaptation / resilience / sustainability)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about strategies used to reduce the impact of human activity on urban climates and air quality
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions about strategies used to reduce the impact of human activity on urban climates and air quality.

Credit other valid approaches.