GCE A LEVEL MARKING SCHEME

AUTUMN 2020

A LEVEL
GEOGRAPHY - COMPONENT 3
A110U30-1

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INTRODUCTION

This marking scheme was used by WJEC for the 2020 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.

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GCE A LEVEL GEOGRAPHY

AUTUMN 2020 MARK SCHEME

COMPONENT 3: CONTEMPORARY THEMES IN GEOGRAPHY

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.

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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.

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Section A: Tectonic Hazards: Generic Mark Bands [38 marks]

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

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	AO1 [14 marks]	AO2 [20 marks]	AO3 [4 marks]
3	**7-9 marks** 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. Demonstrates knowledge and understanding through the use of appropriate, generally accurate and developed examples. The use of appropriate and mostly relevant geographical terminology is evident. Appropriate, basically accurate annotated sketch maps / diagrams are included and should be credited.	**11-15 marks** 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. Demonstrates application of knowledge and understanding through the partial synthesis of the connections between different elements of the question. Demonstrates application of knowledge and understanding through the mostly relevant application of the specialised concepts.	**3 marks** The response uses mostly relevant qualitative skills to construct structured arguments and conclusions where coherence is variable.
2	**4-6 marks** Demonstrates straightforward knowledge with some inaccuracies; some understanding of relevant concepts and principles that is linked to the question. Demonstrates knowledge and understanding through the use of limited examples that may not always be appropriate or accurate. The use of geographical terminology is limited. Annotated sketch maps / diagrams are basic and should be credited.	**6-10 marks** 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. Demonstrates application of knowledge and understanding through the limited synthesis of the connections between different elements of the question. Demonstrate application of knowledge and understanding through limited application of the specialised concepts.	**2 marks** The response uses limited qualitative skills to construct argument(s) and conclusion(s) that are superficial in structure with minimal coherence.

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	AO1 [14 marks]	AO2 [20 marks]	AO3 [4 marks]
1	**1-3 marks** Demonstrates poor knowledge with errors and minimal understanding and linkage to the question. Basic use of examples or if evident, lack relevance to the question asked. Geographical terminology is rarely used within the response.	**1-5 marks** Demonstrates application either to interpret or analyse or evaluate in order to produce a response which lacks coherence and is unsupported by appropriate evidence. Demonstrates application of knowledge and understanding through the superficial synthesis of the connections between different elements of the question. Demonstrate application of knowledge and understanding through superficial application of the specialised concepts.	**1 mark** The response uses qualitative skills superficially to construct an argument / conclusion that is incomplete and lacks coherence.
	0 marks Response not creditworthy or not attempted.	**0 marks** Response not creditworthy or not attempted.	**0 marks** Response not creditworthy or not attempted.

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Section A: Tectonic Hazards

1. 'Hazards associated with explosive volcanic eruptions are always greater than hazards associated with effusive ones.' To what extent do you agree?

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

Focus: 3.1.2

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 the hazards associated with explosive and effusive volcanic eruptions could include:

- Explosive volcanic eruptions are characterised by cooler (600-1000°C), more viscous magmas (such as andesite and rhyolite). Silica and aluminium rich lava flows therefore are thick and sticky and do not flow downhill easily. Viscous lava may plug volcanic cones and fracture violently when pressure is released. Dissolved gases cannot escape easily, so pressure may build up until gas explosions blast rock and lava fragments into the air. Andesitic magma is violently fragmented and rapidly expelled (causality). Pyroclastic flows are a product of explosive volcanic eruptions, they consist of hot, dense mixtures of ash, rock and gas that can move downslope at speeds of up to 100 km/h for distances of up to 10km (risk). Pyroclastic flows pose a great risk because of their speed of onset (time scale). Explosive eruptions typically have a moderate to large VEI (Volcanic explosivity index) with an eruption column height that may exceed 50km and they eject large volumes of material (scale). Examples of explosive eruptions include the eruption of the Fuego volcano in Guatemala (2018)
- Effusive volcanic eruptions are characterised by hot (1000 -1200^{o}C) basaltic (mafic) magmas reaching the surface. Dissolved gases escape easily as the magma erupts, forming lava of low viscosity that flows downhill quite easily. Eruptions typically have a low VEI (Volcanic explosivity index) with an eruption column up to approximately 3km in height and they eject smaller volumes of solid material (scale). Examples of effusive eruptions include the eruption of Kilauea, Hawaii (2018)
- Other hazards associated with volcanic activity include volcanic gases, superheated steam, lahars, earthquakes and tsunami (see diagram)

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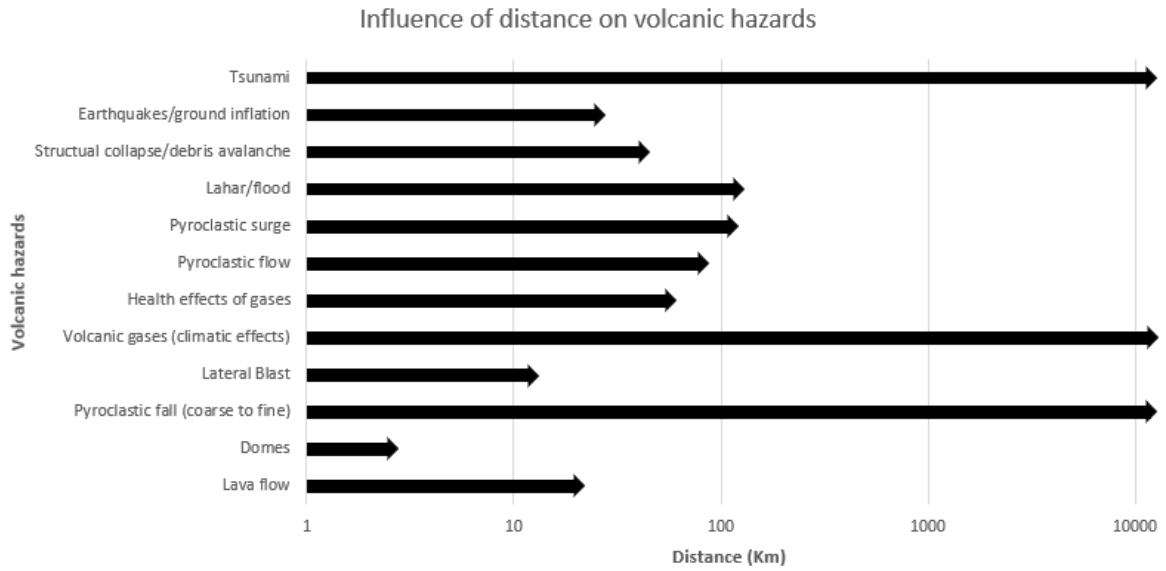

Source: Chester et al., 2001

AO2

Application of knowledge and understanding is deployed to evaluate whether the hazards associated with explosive volcanic eruptions are always greater than the hazards associated with effusive ones. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion.

The evidence could include:

- The level of risk and vulnerability to the hazards associated with both explosive and effusive volcanoes depend on the availability and accuracy of prediction and warning, which may be affected by level of development and governance and localised circumstances e.g. tourism (White Island, New Zealand). Unexpected effusive eruptions may present a serious hazard. The number of fatalities was greater from the effusive eruption of Nyiragongo, 2002 than the explosive eruption of Montserrat, 1997 (mitigation / resilience)
- The level of risk and vulnerability to the hazards associated with both explosive and effusive volcanoes depend on the degree of community preparedness, which may be affected by level of development and governance (mitigation / resilience)
- The level of risk and vulnerability to the hazards associated with both explosive and effusive volcanoes depend on social factors including population density and population profile (risk /vulnerability).
- The level of risk and vulnerability to the hazards associated with both explosive and effusive volcanoes depend on geographical factors including location, land use, time of day and degree of isolation (causality / risk/ place)
- Lava flows from effusive fissure eruptions can be very dangerous to human life, as highly fluid basalt magma can move down a hillside at 50km/hr and can spread a long way from the source. One deadly lava flow erupted from the Nyiragongo volcano in the Democratic Republic of Congo, draining the lava lake which had collected at the summit; it killed 72 people and devastated the town of Goma in 2002
- Lahars are a secondary hazard that may result from both explosive and effusive eruptions. Lahars comprise ash and debris mixed with water (rain or melted glacier ice - jökulhlaup in Icelandic) and can flow at very high speeds e.g. 22 m/s over long distances, usually along river valleys (causality) and kill huge numbers of people in their path (risk). The eruption of Nevado del Ruiz, Colombia in 1985 resulted in lahars that travelled 100 km, killing over 23,000 people in Armero, 40 km away

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- Volcanic landslides may be triggered by both explosive and effusive eruptions (causality / risk)
- Basaltic lava may give rise to explosive activity e.g. Eyjafjallajökull (2010), Iceland erupted spectacularly when its magma met melting ice (causality / risk)
- Additional secondary hazards such as volcanic smog ('vog') may result from both effusive and explosive eruptions. Sulphur and other volcanic pollutants can settle easily with moisture and dust to create a haze, with tiny sulphuric acid droplets that can pose respiratory problems e.g. Kilauea, Hawaii in 2018 ((causality / risk)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the hazards associated with explosive and effusive volcanoes
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill in covering both the breadth and depth of the question
- The skill of reaching conclusions about whether the hazards associated with explosive volcanic eruptions are always greater than the hazards associated with effusive ones

Credit other valid approaches.

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2. To what extent is it possible to mitigate earthquake hazards? [38 marks]
AO1 [14] AO2.1c [20] AO3.3 [4]

Focus: 3.1.5

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 hazards associated with earthquake activity and strategies to mitigate and adapt to hazards could include:

- The connections between the processes operative at tectonic plate boundaries and causes of earthquake hazards (causality)
- Although there is a strong degree of correlation in the location of plate boundaries and seismic events, earthquakes can and do occur away from plate boundaries
- Hazards generated by earthquakes include ground shaking, liquefaction, landslides and tsunami (risk)
- Strategies to mitigate earthquake hazards including modifying the vulnerability (adaptation to earthquake events using aseismic architecture, prediction and warning, community preparedness and land use planning) and modifying the loss (aid and insurance) (mitigation / resilience/ adaptation)
- Mitigation is any action taken to reduce or eliminate the risk from earthquake hazards to human life and property. It can take place at a personal, community or government level and can take place before, during or after an earthquake event (see table below):

Before (preparation)	**During (managing impacts including aftershocks)**	**After (overcoming impacts to improve the situation)**
Insurance (may include state funding schemes e.g. New Zealand)	Coordination of emergency aid and rescue plans	Short and long-term aid to develop resilience
Community preparedness and education	Implementation of safety routines e.g. 'drop, cover and hold on', turning off utilities, placing breakable objects on floor	Land use planning to avoid rebuilding in high risk areas e.g. areas at risk from liquefaction and landslides. Remapping to identify fault lines and update risk maps
Earthquake resistance designs including high-tech aseismic buildings and retrofitting old buildings. Enforcement of building regulations		Long-term aid to strengthen and rebuild the economy
Preparation of disaster and emergency management plans. Risk mapping		Rebuilding and retrofitting buildings. Enforcement of building regulations
Monitoring and prediction in high risk zones		

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AO2

Application of knowledge and understanding is deployed to evaluate to what extent it is possible to mitigate the hazards associated with earthquake activity. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- The level of economic development can determine which types of strategies local communities affected can afford and have a bearing on their effectiveness (resilience / inequality), for example expensive aseismic buildings in California and Japan do perform well even in high magnitude earthquakes and regular drills ensure effective community preparedness
- Variations in the threshold of aseismically designed buildings. The design forces used for sea walls in Japan were based on the assumption of 5 m waves and these were inadequate for the size of tsunami generated by the Tohoku earthquake in 2011 (threshold)
- The effectiveness of mitigation strategies depends on the type of earthquake hazard (risk / resilience). Prediction and warning are increasingly effective in mitigating the tsunami hazard with warning systems in both the Pacific and Indian Ocean; land use planning which avoids building on unconsolidated ground is effective in mitigating against the hazard of liquefaction
- The effectiveness of mitigation strategies depends on the quality of governance e.g. the inadequate government relief effort after the Gorkha earthquake, Nepal in 2015
- The characteristics of earthquake activity (physical hazard profile): whether shallow or deep focus, its magnitude, duration of shaking, time of day, foundation material and geographical location (place /risk). Mitigation is likely to be more effective in low magnitude compared with high magnitude earthquake events. Very high magnitude events are very difficult to prepare for and manage once they have occurred e.g. the Great East Japan (Tōhoku) earthquake in March 2011, despite this event striking one of the best prepared countries in the world
- Interdependence of strategies: tsunami warnings need to be accurate, communicated to vulnerable people and acted upon and supported by community education and evacuation, otherwise the strategy of prediction and warning itself is ineffective e.g. the 7.5 magnitude earthquake off the island of Sulawesi, Indonesia in September 2018. Indonesia's meteorological and geophysics agency issued a tsunami warning of potential waves of 0.5 to three metres that was lifted 30 minutes later. Palu, a city in Sulawesi located in a narrow bay, was not evacuated and was hit by waves six metres in height which brought buildings down and caused widespread destruction and over 1000 deaths.
- Changes over time (time scales). Prediction and warning of a tsunami hazard has advanced since the Boxing Day tsunami (2004) with the establishment of the Indian Ocean warning systems in addition to the Pacific Warning System established in 1948 (adaptation)
- Variations over space due to inequalities. In the Kobe earthquake (1995), poorer communities were hit harder than wealthy areas in terms of impacts (more physical damage to neighbourhoods) as well as recovery (fewer had insurance)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the hazards associated with earthquake activity and strategies to mitigate and adapt to the hazards
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill in covering both the breadth and depth of the question
- The skill of reaching conclusions about the extent to which it is possible to mitigate the hazards associated with earthquake activity

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Section B: Contemporary Themes in Geography: Generic Mark Bands [45 marks]

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

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	AO1 [20 marks]	AO2 [20 marks]	AO3 [5 marks]
4	**13-16 marks** Demonstrates accurate factual knowledge and confident understanding of relevant concepts and principles throughout the response that is relevant to the question. Demonstrates knowledge and understanding through the use of appropriate, accurate and developed examples. Appropriate, accurate and relevant geographical terminology is evident. Appropriate, mostly accurate and relevant annotated sketch maps / diagrams are included and should be credited.	**13-16 marks** 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. Demonstrates application of knowledge and understanding through the synthesis of the connections between different elements of the question. Demonstrates application of knowledge and understanding through the relevant application of the specialised concepts.	**4 marks** The response uses relevant qualitative skills to produce clear, coherent and appropriately structured arguments and conclusions.
3	**9-12 marks** Demonstrates secure, straightforward knowledge and reasonable understanding of relevant concepts and principles throughout most of the response that is mostly relevant to the question. Demonstrates knowledge and understanding through the use of mostly appropriate, mostly accurate and developed examples. Mostly appropriate, accurate and mostly relevant geographical terminology is evident but is variable in its use. Appropriate, basically accurate annotated sketch maps / diagrams are included and should be credited.	**9-12 marks** 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. Demonstrates application of knowledge through the partial synthesis between different elements of the question. Demonstrates application of knowledge and understanding through the partial application of some specialised concepts.	**3 marks** The response uses mostly relevant qualitative skills to produce a structured response but where coherence is variable.

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	AO1 [20 marks]	AO2 [20 marks]	AO3 [5 marks]
2	**5-8 marks** Demonstrates some knowledge, but limited in scope with some inaccuracies; some understanding of relevant concepts and principles. Demonstrates knowledge and understanding through the use of limited examples, which are mostly accurate but un-developed. Limited geographical terminology is evident, not all of which is appropriate or accurate. Basic sketch maps / diagrams are used but contain inaccuracies. Credit should be given when used appropriately.	**5-8 marks** 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. Limited synthesis between different elements of the question. Demonstrates application of knowledge and understanding through the limited application of some specialised concepts.	**2 marks** The response uses some qualitative skills to produce a response with superficial structure, with minimal coherence.
1	**1-4 marks** Demonstrates poor knowledge with errors and minimal understanding and linkage to the question. No use of examples or, if evident, lack relevance to the question asked. Geographical terminology is rarely used within the response.	**1-4 marks** Demonstration of application either to analyse or interpret or evaluate is poor, producing a response which lacks coherence and is unsupported by appropriate evidence. Synthesis between different elements of the question is poor. Demonstrates application of knowledge and understanding through the superficial application of basic specialised concepts.	**1 mark** The communication in the response is incomplete.
	0 marks Response not creditworthy or not attempted.	**0 marks** Response not creditworthy or not attempted.	**0 marks** Response not creditworthy or not attempted.

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Section B: Contemporary Themes in Geography

3. 'Ecosystems are mainly valued for their economic benefits.' Discuss.

[45 marks]

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

Focus: 3.2.1

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 benefits of ecosystem goods and services could include:

- Economic benefits may include those derived from both ecosystem goods and ecosystem services
- Ecosystem goods are products that can be derived directly from the ecosystem e.g. timber from trees, water, food (and the nutrients derived from plants and animals) and medicines
- Ecosystem services are benefits that people obtain from ecosystems. These services result from the interactions among organisms and their natural environments e.g. purification of air and water, mitigation of floods and droughts, carbon storage, decomposition of wastes, pollination of crops and natural vegetation, control of potential agricultural pests, dispersal of seeds and translocation of nutrients, moderation of temperature extremes (resilience) and the provision of aesthetic beauty and intellectual stimulation
- Ecosystem services can be categorised as: provisioning services (direct products of ecosystems such as food); regulating services (benefits from natural regulation of, for example, CO_2); cultural services (non-material benefits obtained from natural systems, such as aesthetic pleasure from looking at scenery); supporting services (e.g. soil formation, nutrient cycling)

AO2

Application of knowledge and understanding is deployed to discuss whether ecosystems are mainly valued for their economic benefits. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion.

This evidence could include:

- The interdependence of the economic, social, cultural and environmental benefits derived from ecosystem goods and services e.g. food production promotes improved nutrition and well-being (interdependence). Valuing the social benefits can lead to climate mitigation and improved social well-being (mitigation) leading to improved economic well-being
- Spatial variations in the accrual of benefits. The economic benefits derived from ecosystem goods and services accruing in HICs may lead to ecosystem degradation and a loss of ecosystem services compromising social, cultural and environmental benefits elsewhere (place /inequality). Palm oil production for use as biofuels and in the manufacturing of foods, cosmetics and pharmaceuticals in Indonesia and Malaysia is associated with a loss in biodiversity and the displacement of communities

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- Variations over space. In Brazil the current administration under Bolsonaro values the tropical rainforest for its economic benefits whereas in Costa Rica the emphasis is on its environmental value
- Changes over time. Traditionally ecosystems have been viewed as important for the economic benefits derived from them, but associated losses in biodiversity have led to the growing appreciation of their social, cultural and environmental benefits (time scales). The largest coral reef system in the northern hemisphere off the coast of Belize supports the Belizean economy of fishing and tourism, but recent bleaching has increased awareness of their role in supporting food webs and mitigating the increased risks from hurricanes
- The unsustainable economic use of ecosystem goods and services may destroy the realisable role of services and place humans at risk when the system loses equilibrium; recognition of their societal value is leading to a reduction in the threat of irreversible damage to ecosystems (equilibrium / thresholds), for example through peat restoration in the southern Pennines in Yorkshire. Human life depends on the continuing capacity of the biosphere's ecosystems to provide a multitude of benefits (sustainability).
- Different groups may regard the benefits of same ecosystem good or service differently e.g. seals and whales may be viewed as a more important economic benefit by the Inuit, whilst whale watching is perceived as a more important social benefit by tourists
- The economic benefits derived from ecosystem goods and services are generally easier to value in a monetary sense than social, cultural and environmental benefits. The global value of coral reef tourism is estimated to be around US$9.6 billion

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the benefits of ecosystem goods and services
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill in covering both the breadth and depth of the question
- The skill of reaching conclusions about the extent to which ecosystems are mainly valued for their economic benefits

Credit other valid approaches.

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4. Evaluate the success of different strategies to conserve biodiversity.[45 marks]
AO1 [20] AO2.1c [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 within the indicative content.

AO1

Knowledge and understanding of different strategies to conserve biodiversity could include:

- The spectrum of approaches and methodologies (see figure 2 below) from total protection through to token protectionism within growth and development strategies.

Total protection →	Protection strategies but with limited sustainable economic opportunities →	Protection strategies with development →	Token protection with growth and development
Pre-1990s style Strict scientific or nature reserves with no access for local people e.g. Costa Rica Biological reserves	Creation of biosphere reserves surrounded by buffer zones for sustainable development by local people e.g. Korup, Cameroons	Combines conservation with opportunities for local people to earn a living such as ecotourism or extractive reserves e.g. SMMA, St Lucia	For example, by TNCs with some investment in selected areas e.g. Amazonian development

- Exemplified details of conservation issues could include:
  - which habitats to conserve from representative eco-regions or selected hotspots of endemism (Myers) i.e. greatest value highest threat.
  - which species to conserve – key species which support the whole ecosystem or iconic symbols such as pandas or polar bears or endemics.
  - what scale to conserve at, from single, large to several smaller reserves (SLOSS debate)
  - how to designate schemes, whether via global frameworks, RAMSAR convention for wetlands, or local schemes (SSSIs), partially funded by community (Wildlife Trusts).
  - who funds schemes, whether IGOs (global agencies) such as UNEP, UNESCO, or private or charitable organisations such as INGOs, e.g. WWF, or local NGOs.
- The definition of what is meant by **success**, which can be measured in many different ways:
  - Environmentally, as to how the biodiversity is conserved and the threats to it managed (both direct and indirect).
  - Economically, as to whether the schemes are good value for money and bring wealth to countries and communities.
  - Politically, as to whether it fulfils the aims of the scheme and avoids stakeholder conflicts (at a variety of scales).
  - Socially, as to whether local people are involved in the scheme with add-on values for them.

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  - Whether the scheme is sustainable for the future (future proof) to anticipate threats such as from climate warming
- Details of exemplars to support knowledge and understanding of issues of both ecosystem conservation and how to measure success are likely to come from rainforest, reef, wetlands (3.2.3) or Arctic tundra biome (3.2.6/7).

AO2

Application of knowledge and understanding is deployed in the evaluation of the success of different conservation strategies. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion

Students are likely to tackle this question in a number of ways with some opting for an in-depth approach via a number of case studies evaluating strategies employed in different environments/places whereas others may take a wide ranging factoral approach.
The evaluation of success could include:
Comparing methodologies across the spectrum, with total protectionism being environmentally very successful, but less successful in other ways, whereas extractive reserves such as Campfire project may be more successful economically for local people. Sustainable development, eg.in Udzungwa, Tanzania, may be seen as a halfway house between largely successful conservation of biodiversity, whilst at the same time involving indigenous people in economic development and in ecotourism. Involving them in the schemes may be politically more acceptable too.

- There is an interdependence between economic development and biodiversity in successful schemes.
- Sustainable, holistic schemes are usually more successful (sustainability)
- The funding and management of agencies involved in schemes is also crucial. Sometimes funds run out over time and management agencies conflict. Money invested goes much further in developing country schemes (time scales, inequalities)
- The design of the conserved areas can be crucial. The small-scale schemes with a narrower focus are often more flexible and achievable. Smaller areas are easier to protect – findings from WWF reports on eco-regions suggest that isolated settings of ‘highlands and islands’ are more successful, for instance, invasive species and disruptive groups such as poachers can be controlled (scale)
- Time scales are crucial as whilst longer time scales may generate visible improvements, for example, sustainable forest management (SFM), longer time scales can reduce the effectiveness of some strategies (time scales)
- Geographical considerations are also very important as many conservation schemes are based on national boundaries whereas ecosystems frequently cross them. For future sustainability, cross-country cooperation and the development of wildlife corridors are essential for the management of climate change (place)
- The focus on species can be very successful, for example, iconic flagship species such as polar bears and pandas generate massive donations to the WWF for future conservation. Reliance on endemic species as opposed to key stone species has led, as in the case of ‘hotspots’ over reliance on species-rich tropics at the expense of the growing awareness of the need to conserve less diverse, but no less distinctive, temperate and arctic regions

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AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about different strategies to control biodiversity and evaluating their success.
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question.
- The skill in covering both the breadth and depth of the question
- The skill of reaching conclusions evaluating different strategies to conserve biodiversity.

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5. Evaluate the role of government in the location and development of economic activity in India. [45 marks]

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

Focus: 3.3.4

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 location and development of economic activity in India could include:

- India is the world's most populous democracy
- Types of government. After independence and Partition (whereby British India separated into India and Pakistan) in 1947, India's aim was to develop economically without the participation or influence of foreign capital. Economic policies had a strong anti-export bias. Socialist governments ensured a high level of state control over key industries, which in turn led to excessive bureaucracy and very slow economic growth. A major economic crisis in 1991 forced the governing Congress Party to borrow money from the International Monetary Fund (IMF). This opened up the economy to economic globalisation. India is now among the ten fastest-growing economies in the world.
- Economic activity in India may include the development of manufacturing industries, service and financial industries and agriculture. Rapid economic growth in India has been due to the expansion of the service sector rather than to the growth of manufacturing. India's large service industry accounts for 56% of the country's GDP while the industrial and agricultural sectors contribute 29% and 15% respectively
- Agribusiness plays an increasingly significant role in agricultural exports. They control much of the chain, from seeds and fertilisers to finance, distribution and marketing
- Manufacturing includes the growth of modern steel, pharmaceuticals, textiles, clothing, and a substantial high-tech electronics sector e.g. mobile phone.
- The services sector includes financial services, software services, accounting services and entertainment industries like Bollywood, the growth of service industries includes call centres, back office jobs, outsourcing from Europe / US
- Locations of economic activity include rural areas such as Gujarat and the Punjab (agribusiness), SEZs (manufacturing), Bangalore (BPO), Mumbai (Bollywood). There are nearly 200 Indian SEZs

AO2

Application of knowledge and understanding is deployed to evaluate the role of government in the location and development of economic activity in India. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion.

This evidence could include:

- India faced a major economic crisis in 1991 which forced the governing Congress Party to borrow money from the International Monetary Fund (IMF). This opened up the economy to economic globalisation. India is now among the ten fastest-growing economies in the world (causality)
- To attract larger foreign investments in India, the Special Economic Zones (SEZs) Policy was announced in April 2000 (globalisation)
- Achieving self-reliance in defence manufacturing is a key government target, with the

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BJP planning to spend US$130 billion on defence industries over the next 5 years and encouraging partnerships with foreign investors (causality/ globalisation). Political tensions with neighbouring Pakistan and China are seen as a catalyst for the development of India's aeronautical, satellite and nuclear technologies

- The National Highways Act has been modified to help reduce tolls on national motorways, bridges and tunnels. The national government is also implementing a new policy that aims to improve India's telecommunication systems. All these much-needed infrastructure changes will promote economic development (interdependence)
- In addition to the role of government, factors responsible for the rapid growth of manufacturing industries include the emergence and investment policies of TNCs (globalisation)
- Another contributing factor is the growth of an urban, educated, middle-class population whose members have become consumers themselves and who provide a large market for new consumer goods (causality)
- Technological factors have also played a significant role, particularly the speed and distance over which communications and movement can now take place due to changes in computer, transport and communication technologies (causality)
- Reasons for the rapid expansion in the service sector include lower labour costs, a large English-speaking workforce, a highly skilled and educated workforce and ICT skills shortages in some developed countries (interdependence)
- The role of government varies by sector (the distribution and development of agriculture is also influenced by physical factors e.g. Punjab and Haryana have fertile soils and access to groundwater, whereas the distribution of manufacturing is influenced by the location of SEZs)
- The role of physical geography e.g. heavy industry in the Damodar valley in connection with deposits of coal and iron ore and in the lack of good anchorage influencing the location of ports (India's coastline lacks good anchorage given its length) (causality)
- The role of colonial legacy influencing the railway network, military structures and parts of the educational system (causality)
- In addition to national government, state governments are also important in influencing the development of industry. States vary in terms of their politics, some adopt a free enterprise approach, others are communist (Kerala) with different levels of commitment to enacting land, labour or other business-friendly reforms. Maharashtra is one of the most industrialised states and Bihar one of the least (scale / place)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the location and development of economic activity in India
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill in covering both the breadth and depth of the question
- The skill of reaching conclusions about the role of government in the location and development of economic activity in India

Credit other valid approaches.

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6. 'In India, economic growth is more important than the environment.' Discuss.
[45 marks]
AO1 [20] AO2.1c [20] AO3.3 [5]

Focus: 3.3.6

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 threats to India's environment associated with economic growth could include:

- In 1991, India's GDP was ranked 16th in the world; it is currently ranked the seventh largest economy in the world with a GDP in 2019 amounting to $2.7 trillion
- Environmental problems associated with fossil fuel use – at present coal is the dominant energy source, accounting for 56 per cent of India's total electricity generation (2018). The burning of coal produces greenhouse gases, sulphur dioxide, nitrogen oxide and particulate matter (causality /risk). Although the proportion of coal derived energy is falling with 550 thermal power station projects cancelled in the past 7 years, coal will continue to be significant for several decades to come
- Environmental problems associated with industrial pollution - 764 industrial units along the main stretch of the River Ganges and its tributaries discharge 500 million litres a day of toxic waste (causality /risk)
- Environmental problems associated with or soil erosion – 30% of India's gross agricultural output is lost every year to soil degradation, poor land management and counter-productive irrigation (causality /risk)
- Environmental problems associated with deforestation - India is witnessing a rising demand for forest-based products causing deforestation and encroachment into forest protected areas (causality /risk)
- Environmental problems associated with desertification – 25 per cent of India's total land is undergoing desertification while 32 per cent is facing degradation: the major forms of land degradation include soil erosion (which accounts for over 71 per cent of the total degradation), and wind erosion (10 per cent)
- Strategies to manage environmental problems associated with economic growth (mitigation)

AO2

Application of knowledge and understanding is deployed to evaluate whether economic growth is more important than the environment in India. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion.

The evidence could include:

- The lack of political commitment, lack of a comprehensive environmental policy, poor environmental awareness, functional fragmentation of the public administration system, poor mass media concern, and prevalence of poverty which are some of the major factors responsible for increasing the severity of environmental problems (inequality). Environmental issues have been creeping up the political agenda in India, but the challenges of addressing poverty as well as managing the environment sustainably are huge

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- The declared priority of both national and state governments is to promote economic growth and move people out of poverty and India's energy policy is based on low-grade, widely distributed coal. These priorities all conflict with environmental protection
- The lack of environmental education in India, particularly in poorer rural communities where it would be particularly beneficial (inequalities)
- Assessment of the effectiveness and success of strategy(ies) to manage the environment which increase resilience and mitigate against the effects
- Comparison of the success of different measures employed in different environments (place) e.g. the Chipko movement and Project Tiger
- Different interest groups will have different views on whether the economy or the environment is 'more important'
- Improvements in the environment over time (time scales). As a country becomes more developed it can develop the technology to use resources more sustainably and efficiently. Theoretically, increased wealth associated with economic development should result in more investment to limit India's environmental and ecological footprint (Kuznets curve). After the UN Conference on the Human Environment 1972, environmental issues were included in the national 5-year Plans. In the 1980s a Ministry of Environment and Forests was created and now there are numerous autonomous agencies, offices, institutions set up by national and state governments. There is a will to have environmental improvement, but this often conflicts with other demands. India has embarked on an extensive programme of developing renewables, currently accounting for 20 per cent of India's power generation, especially solar and wind and has extended its hydropower projects
- The sheer scale of environmental problems in India is daunting and the high rates of urban and rural change make it hard to ensure that the best environmental decisions are taken (spatial and time scales)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the threats to India's environment associated with economic growth
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill in covering both the breadth and depth of the question
- The skill of reaching conclusions about whether economic growth is more important than the environment in India

Credit other valid approaches.

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7. Evaluate the role of government in the location and development of economic activity in China. [45 marks]

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

Focus: 3.3.4

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 distribution and development of economic activity in China could include:

- In 1976 China's GDP was ranked 124th in the world: China's economy is currently ranked the second largest in the world in terms of its GDP
- Between 1949 and 1976 government locational decisions were dominated by Marxism-Leninism, with a socialist, collectivist and centrally planned agenda. After the death of Mao Tse-Tung (Mao Zedong) in 1976, China's economy took a major change in direction. In 1978, Deng Xiaoping, the new leader of the Chinese Communist Party, introduced the 'Open Door' policy, which was designed to overcome China's isolation from the world's economies. The country had become increasingly aware that the world, and south-east Asia in particular, was developing and leaving China behind. China moved towards a socialist market economy. The development of economic activity in China includes the development of manufacturing industries, service and financial industries and agriculture. Rapid economic growth in China has been due to the expansion of the manufacturing sector (causality)
- Since 1979, five special economic zones (SEZs) and 14 open cities have been established. These offer reduced restrictions on land, labour, wages, taxes and planning regulations to overseas firms, especially those involved in high-technology industries. The result has been the emergence and dominance of economic activity in coastal areas, which have received most of the internal investment as well as having imported capital, technology and entrepreneurial skills, at the expense of the interior. The PRC has established special economic zones in Shenzhen, Zhuhai and Shantou in Guangdong Province, Xiamen in Fujian province and designated the entire province of Hainan a special economic zone (causality)
- Between 1949 and the late 1970s manufacturing in China was undertaken almost entirely by state-owned enterprises (SOEs), mainly heavy industries such as oil, chemicals, power, iron and steel. In order to reduce regional disparities, industry was dispersed. The 1980s focus on increased productivity forced SOEs towards reform. Large SOEs have improved their management and smaller SOEs eventually privatised. Chinese firms have gradually become more Westernised (globalisation)
- During Mao's era, rural industries called town and village enterprises (TVEs) produced heavy goods such as iron, steel, cement, chemical fertiliser and farm tools. After 1978 these enterprises expanded to develop a wider range of businesses. Many Chinese farmers preferred to invest their resources in rural industry rather than agriculture. This encouraged the growth of small businesses run by the most successful peasants. A new entrepreneurial class began to emerge and TVEs have become the backbone of development in rural areas (causality)
- The government have promoted the integration of both internal (Tibet HST) and external (new Silk Road or Belt and Road initiative) transport networks that promote economic activity in more remote parts of China and overseas

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- Government policies can impact negatively on the development of economic activity e.g. through the Sino-US trade war and policies to restrict the spread of the coronavirus (causality)

AO2

Application of knowledge and understanding is deployed to evaluate the role of government in the distribution and development of economic activity in China. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- Inevitably in a centrally planned economy, the role of government is important in the location and development of economic activity, but other factors play an important role (causality)
- Although established by a communist government, SEZs were deliberately located far from the centre of political power in Beijing, minimising political influences. More specifically, the original four zones were sited in coastal areas of Guangdong and Fujian that had a long history of contact with the outside world through outmigration, and at the same time were near Hong Kong, Macao and Taiwan (place / identity). The choice of Shenzhen was especially strategic because it is situated near Hong Kong, the key area from which to learn capitalist modes of economic growth (globalisation)
- The growth in economic activity in these coastal locations, which minimise costs and maximise export opportunities, has been reinforced by the investment decisions of TNCs (globalisation)
- The growth in economic activity in these locations has been reinforced by high levels of rural-urban migration, infrastructure improvements and the investment policies of TNCs. The result has been the emergence and dominance of economic activity in coastal areas, which have received most internal investment as well as having imported capital, technology and entrepreneurial skills, at the expense of the interior (inequalities)
- The government have been instrumental in implementing the Western China Development project, created in 2000, to help the western provinces to catch up with coastal areas. The main components of the strategy include the development of transport, hydropower plants, energy, and telecommunications, enticement of foreign investment, increased efforts on ecological protection, promotion of education and retention of talent flowing to richer provinces
- China's physical geography also has a role to play. Agriculture is concentrated on the plains and deltas to the east. Raw materials such as coal also influence the location of manufacturing industry: although coal deposits are widely scattered (some coal is found in every province), most of the total is located in the northern part of the country (causality)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the distribution and development of economic activity in China
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill in covering both the breadth and depth of the question
- The skill of reaching conclusions about the role of government in the distribution and development of economic activity in China

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8. 'In China, economic growth is more important than the environment.' Discuss.
[45 marks]
AO1 [20] AO2.1c [20] AO3.3 [5]

Focus: 3.3.6

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 threats to China's environment associated with economic growth could include:

- In 1976 China's GDP was ranked 124th in the world: China's economy is currently ranked the second largest in the world in terms of its GDP
- Environmental problems associated with fossil fuel use: China opened 2 new coal-fired power stations every 10 days between 2005-8; coal demand doubled from 1990 to 2007 resulting in increased emissions of carbon dioxide, nitrous oxides, acid precipitation (which falls on 30% of China) and smog (causality/risk)
- Environmental problems associated with industrial pollution: 90% of urban waterways and lakes are severely polluted and major pollution incidents are common. Nine of the ten most polluted cities in the world are in China (causality/risk)
- Environmental problems associated with or soil erosion: 40 percent of China's territory suffers from soil erosion (causality/risk). Environmental problems associated with deforestation: only 2% of China's forests remain intact and only 0.1 percent of these surviving forests are properly protected. The rest are threatened by plantations: in Hainan and Yunnan, for example, indigenous trees are felled to make way for fast-growing eucalyptus plantations, which are used to make paper pulp (causality/risk)
- Environmental problems associated with desertification: up to 400 million people are at risk of desertification in China – the affected area could cover as much as 35 per cent of the total land area (causality/risk)
- Strategies to manage environmental problems associated with economic growth include the 'Green Wall of China', the world's largest ecological project, which was launched in 1978 and aims to increase human-made tree cover from five per cent to 15 per cent of the country's vast landmass. These forests are envisioned to stretch across four million square kilometres of the country's north by the year 2050 (mitigation / sustainability)

AO2

Application of knowledge and understanding is deployed to evaluate whether economic growth is more important than the environment in China. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion.

The evidence could include:

- Although the Chinese government has mapped out ambitious environmental initiatives in recent five-year plans, few have been realised (mitigation). Environmental concerns are being taken seriously, but bureaucratic problems and some corruption inhibit national policies being put into practice in local communities
- Improvements in the environment over time (time scales). As a country becomes more developed it can develop the technology to use resources more sustainably and efficiently. Theoretically, increased wealth associated with economic development should

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result in more investment to limit China's environmental and ecological footprint (Kuznets curve). China's mounting environmental crisis poses a serious threat to China's economic growth, costing the country roughly 3 to 10 percent of its gross national income. It is also leading to social unrest (inequality)

- As part of its pledge to cut its carbon footprint, China is one of the biggest investors in renewables and recyclables (investing nearly $90 billion in 2014 compared to the United States' $51.8 billion). Chinese firms continue to invest in and partner with international companies (globalisation) to develop renewable energy technologies. China's decision to alter its energy mix is motivated by economic and political concerns as well as environmental ones (interdependence)
- China emerged as a leader in negotiations at the 2015 UN Climate Conference in Paris where 195 countries signed a breakthrough accord (globalisation / mitigation). China's decision to assume a global leadership role, following the withdrawal of the US from the Paris Climate Accord, is driven by economic and political motives as well as environmental ones (interdependence)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the threats to China's environment associated with economic growth
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill in covering both the breadth and depth of the question
- The skill of reaching conclusions about whether economic growth is more important than the environment in China

Credit other valid approaches.

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9. 'The development gap is widening.' Discuss this statement with reference to <u>two or more</u> Sub-Saharan African countries. [45 marks]
AO1 [20] AO2.1c [20] AO3.3 [5]

Focus: 3.3.8

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 development gap of two or more Sub-Saharan African countries could include:

- Definition of the 'development gap'. The development gap refers to the difference in levels of development within countries, for example between regions or between urban and rural areas, and/or between countries (<u>inequality</u>)
- Difficulties in defining the term 'development'. The definition is dynamic, due to changing definitions and changes in the development process itself. The term 'development' has been defined in different ways: in economic terms, in human terms and increasingly in terms of sustainability (<u>sustainability</u>)
- There is a range of simple quantitative measures available to measure the development gap (e.g. GNI, CBR, CDR, IMR, life expectancy, Gini coefficient)
- There is a range of composite quantitative measures available to measure the development gap (e.g. HDI, GEM)
- There is a range of more recent qualitative measures (freedom, security, the plight of minority ethnic groups and sustainability) available to assess the development gap

AO2

Application of knowledge and understanding is deployed to evaluate whether the development gap of two or more Sub-Saharan African countries is widening. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion.

The evidence could include:

- Spatial variations in the development gap (<u>place</u>) within or between countries. Certain countries (e.g. South Africa, Botswana, Namibia, Zambia, Central African Republic and Lesotho) are notable for the concentration of land and socio-economic assets in the hands of a few. These countries lead the SSA region in income inequality and highlight the development gap. By contrast, Burkina Faso, Mali, Niger, Burundi and Guinea, characterised by communal land ownership and egalitarian access to land, rank among the most equal countries in the SSA region and reveal more of a development continuum. The relative position of SSA countries along the development continuum is changing (the economic growth rate of Ethiopia was over 8 per cent in 2017, whereas in Sierra Leone more than 50 percent of government revenue comes from foreign aid and the majority of the population rely on subsistence agriculture) leading to either a widening or narrowing of the gap between countries, depending on the ones selected for discussion (<u>inequality</u>)
- The aspect of development under consideration. A country's development gap may be narrowing in economic terms, but not in terms of gender equality
- Regional variations. In Nigeria although the gender gap in education has narrowed nationally, the distribution of gains has been uneven by ethnic group, with significant

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gender gaps persisting in the Northwest and Northeast. The globalisation of economic activity may result in improved levels of development nationally, but the benefits accrue to particular groups in specific locations

- The interdependence of development indicators. In Kenya, nearly every child in the Central province is enrolled in primary school, only three per cent of women have no education and there are about 20,000 people per doctor whereas in the North Eastern province only one out of three children go to school, 93 per cent of women have no education and there is one doctor for every 120,000 people
- Variations over time (time scales), often associated with quality of governance. Since the Rwandan genocide of 1994 the development gap has narrowed significantly, particularly in terms of gender. In 2017 the World Economic Forum (WEF) ranked Rwanda fourth globally (after Nordic countries Iceland, Norway and Finland), in closing gender-based disparity. This is arguably down to the law, which imposes a mandate on national and local government to ensure a minimum of 30% of seats are held by women (causality)
- Strategies to reduce the development gap. Certain aid programmes can assist with a narrowing of the development gap e.g. employment creation for women through fair trade, microfinance schemes and health resources (adaptation/ mitigation)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the development gap of 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 in covering both the breadth and depth of the question
- The skill of reaching conclusions about whether the development gap of two or more Sub-Saharan African countries is widening

Credit other valid approaches.

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10. 'Environmental impacts of development are always negative.' With reference to <u>two or more</u> Sub-Saharan African countries, to what extent do you agree?

[45 marks]

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

Focus: 3.3.12

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 impact of development on the environment could include:

- Environmental impacts of agro-industrialisation include the use of agrochemicals which destroy soil structure and pollute water courses leading to an increased risk of soil erosion in the dry season and further land degradation (<u>risk</u>)
- Environmental impacts associated with resource exploitation e.g. Shell in Niger Delta and gold mining in Ghana (<u>risk</u>)
- Impact of manufacturing on the environment, including unregulated waste, authorities turning a 'blind eye', poor governance and environmental accountability, corruption (<u>risk</u>)
- Economic development (and poverty reduction) leads to an increase in the number of middle-class people. Increased income means more spending power and aspirations for more western-style consumption e.g. white goods, fast food, petrol, cars increasing waste and emissions (<u>risk</u>)
- Water shortages, especially in the dry season due to growth in agribusiness, extractive industries, manufacturing and growth of consumerism e.g. Cape Town, South Africa now has very serious water shortages (<u>sustainability</u>)
- Traditional land-use practices such as slash-and-burn agriculture and livestock grazing are increasingly associated with land degradation due to increasing population pressure (<u>causality</u> / <u>risk</u>)
- Positive environmental impacts including conservation and ecotourism (<u>mitigation</u>)

AO2

Application of knowledge and understanding is deployed to evaluate whether the impact of development on the environment is always negative. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion.

The evidence could include:

- Recognition that 'development' can take a variety of forms along a spectrum from resource exploitation to sustainability (<u>sustainability</u>)
- Strategies to address environmental degradation e.g. the Great Green Wall and the importance of trees in the water cycle/carbon cycle (<u>sustainability</u>). The GGW is a collaborative effort involving 20 countries under the leadership of the African Union (<u>globalisation</u>)
- Changes over time. A recognition there are positive aspects to agribusiness. e.g. Cadbury in Ghana safeguarding supplies of high-quality cocoa beans (<u>sustainability</u> / <u>time scales</u>)
- Variations by economic sector. There is growing awareness that the maintenance of economic activities, particularly agriculture and tourism, depends on managing the

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environment sustainably (interdependence/ sustainability). In 2018 the Rwandan Government received land from the African Wildlife Foundation (AWF) to create more gorilla roaming space in the famous Volcanoes National Park (sustainability). The wealth generated from tourism can be invested in national parks, wildlife rangers and breeding programmes, promoting further development (feedback)

- Variations over space due to spatial variations in economic activity and its associated impact on the environment (place)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the impact of development on the environment
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skills in covering both the breadth and depth of the question
- The skill of reaching conclusions evaluating whether the impact of development on the environment is always negative

Credit other valid approaches.

Note: The mark scheme refers exclusively to the environmental impacts of economic development as laid out in Focus 3.3.12 although this word was omitted. Some candidates will adopt a wider, holistic view of development and therefore, after definitions in AO1, may formulate arguments against the quotation, not surprisingly recognising that some aspects of social or political development will have minimal impacts on the environment, or could even benefit it in a very positive way.

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11. 'Technological problems are the main reason why greater use is not made of alternatives to fossil fuels.' To what extent do you agree? [45 marks]
AO1 [20] AO2.1c [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 technological problems associated with using alternative energy sources could include:

- Alternatives to fossil fuels include renewable and recyclable energy sources
- The more electric energy supplied by renewables, the more unstable national grids become as renewables, such as wind and solar, only produce electricity intermittently. As more renewables come online it becomes more complex to manage fluctuations in the grid
- There are technological risks associated with nuclear energy (risk) such as designing for safety, accidents of core melting e.g. Chernobyl (1986), Fukushima (2011), the disposal of nuclear waste and the decommissioning of nuclear plants
- There are many ways of producing power to meet future demands, but most of the technology needs further development. The technology for large-scale energy generation from the ocean is unproven. Hydrogen fuel cells are a promising technology for use as a power source for electric vehicles, but not quite at the stage where it can be employed in consumer vehicles on a mass scale
- HEP is one of the most mature of the alternative sources of energy but most technologically feasible sites have been used up
- Much of ocean energy's potential is yet to be developed, although there are some promising projects underway e.g. the world's largest tidal energy plant, the Meygen project in Scotland
- Only the most developed countries have the research facilities and the funding to develop new technologies (place /inequalities)
- In terms of low technology, fuelwood is still a major source of heating and cooking energy in developing countries. Wood burning in confined domestic spaces is one of the greatest sources of ill health (place /inequalities)

AO2

Application of knowledge and understanding is deployed to discuss whether technological problems are the main reason why greater use is not made of alternative energy sources. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion.

The evidence could include:

- The interdependence of economic problems and technological problems, as new technologies for alternative energy sources are expensive. Alternative forms of energy need massive investment in research and development, and almost all forms are expensive to build:
  - Wave and tidal energy are at a developmental phase, so costs are high

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  - Construction costs of nuclear power plants are high e.g. the cost of the construction of Hinkley Point C nuclear power station is estimated at £20 billion
  - Although HEP generates a cheap form of electricity, the initial cost of infrastructure can be high (Three Gorges Dam, China US$25 billion)
  - Oceanic sources have low energy densities and so large numbers of devices are needed to harness this energy, making it expensive (causality)
- Linked to the above, the economic problems associated with alternative energy sources should decrease with increasing economies of scale (thresholds), therefore the relative importance of the problems will change over time (time scales). Costs per MWh – until recently energy generation has been more expensive from renewable sources than non-renewable fossil fuels and often required state subsidies. By 2020 all mainstream renewable and recyclable power generation technologies are expected to offer average costs at the lower end of the fossil fuel cost range and some will provide some of the lowest cost electricity from any source. Technological developments such as nuclear fusion will make nuclear power much more cost effective than at present
- Political factors present challenges to the adoption of alternative energy sources in some countries. Through direct subsidies, tax breaks, and other incentives, US taxpayers help fund the fossil fuel industry's research and development, mining, drilling, and electricity generation. Subsidies have increased domestic fossil fuel production, diverting capital from energy efficiency and constraining the growth of renewable energy (solar and wind enjoy fewer subsidies and, generally, receive much less preferential political treatment) (causality)
- The Kyoto protocol and its successors (Copenhagen, Paris) place limits on greenhouse gas emissions (risk/ mitigation) that encourages investment and research in alternative energy sources (sustainability). Global political problems associated with fossil fuels need to be addressed at the international, national and local level (scale). Political decisions at the national level can influence the cost and technological development of alternative energy sources e.g. the Swansea tidal barrage
- All alternative energy sources have associated social and environmental problems
- Variation over space, as for LICs most renewables present both economic and technological problems that are greater than for HICs (inequality). However, LICs may benefit from technology transfer and micro-generation (place). Emerging economies such as China are increasingly at the forefront of renewable energy technological innovations, strengthening the role of renewables and reducing their cost. The strength of the fossil fuel lobby in countries such as the USA and Russian Federation discourages the use of alternative energy sources.

AO3

Skills evidenced could include:
- The skill of presenting well-constructed, coherent and logical arguments about the problems associated with using alternative energy sources
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill in covering both the breadth and depth of the question.
- The skill of reaching conclusions about the extent to which technological problems are the main reason why greater use is not made of alternative energy sources

Credit other valid approaches.

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12. 'Future energy needs cannot be met without reducing the demand for energy.' Discuss. [45 marks]

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

Focus: 3.4.7

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 future energy needs and measures to reduce energy demand could include:

- A distinction may be made between total energy demand and per capita demands
- During the 20th century, the global demand for energy increased tenfold. By 2050 consumption is expected to double to around 900 exajoules due to economic growth, population growth, increasing affluence and changing technology (causality / globalisation)
- Energy demand can be reduced through an absolute reduction in the demand for energy through walking, cycling, using public transport, the use of technology to offset the need to travel (teleworking/videoconferencing) and using smart meters (adaptation / mitigation)
- Energy demand can also be reduced through greater efficiency: through efficiency measures in buildings (Singapore aims to have 80 per cent of its buildings achieving a 'Green Mark' standard by 2030 - in one housing development buildings face towards the wind and away from the sun, natural ventilation is favoured over air-conditioning, rooftops collect rainwater and protect against the sun and plants insulate against the heat), the transport sector (hydrogen-powered buses or electric cars) and the establishment of low carbon cities (adaptation / mitigation). Singapore promotes energy efficiency in the industry, household and public sectors through legislation, incentives and public education (causality)

AO2

Application of knowledge and understanding is deployed to discuss the extent to which future energy needs can be met without reducing the demand for energy. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion.

The evidence could include:

- To meet the growing demand for energy, demand reduction needs to be used in conjunction with the use of alternative energy sources (sustainability). Future policies should be directed to the reduction of fossil fuel-based energy and towards a low energy path based on accelerated development of and increasing use of renewable energy (geothermal, biomass, solar, wind, ocean) by improving the costing and reliability of alternative energies and by increasing awareness of the climate emergency through education (sustainability)
- Reducing energy demand is more problematic in LICs than HICs as most people in LICs use less energy anyway. The low use of energy is one sign of a low standard of living and if living standards are to improve, more energy is needed in industry, transport and the home (inequalities)
- The capacity for implementation of policies for demand reduction depends on locational, political, economic and social contexts (place)

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- Changes over time (time scales). Greater efficiencies are being made both in producing energy and using it. The rise of the less energy-intensive service sector plays an increasing part as economies develop. Increased priority should be given to demand-reduction strategies either as the prime strategy or part of a combination of strategies (sustainability)
- New technologies for fossil fuels are being developed, including carbon capture and sequestration and gasification (mitigation / adaptation) to meet the growing demand for energy and reduce the environmental problems associated with fossil fuels

Need to emphasise finite nature of all fossil fuels esp. oil and gas, peak oil etc as this should until recently have made reduction in future. demands essential.

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about meeting future energy needs
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill in covering both the breadth and depth of the question
- The skill of reaching conclusions about the extent to which future energy needs can be met without reducing the demand for energy

Credit other valid approaches.

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13. 'Seasonal variations are the most distinctive characteristic of climate.' Discuss this statement with reference to one or more climate types. [45 marks]
AO1 [20] AO2.1c [20] AO3.3 [5]

Focus: 3.5.2

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 one or more climate types could include:

- The climatic characteristics of their chosen climatic type(s) in terms of temperature, precipitation (type, amount and distribution), prevailing winds and pressure, together with important seasonal and diurnal variations
- The factors influencing the formation and location of the distinctive climatic type(s) in terms of global atmospheric circulation and the seasonal movement of the ITCZ and pressure and wind belts associated with the apparent movement of the sun's overhead position through the year (causality)
- The specification requires candidates to make detailed reference to the Monsoon climate and the UK's climate (Maritime West Margin European type). Knowledge and understanding of these two will provide the basis for answering any questions on major climate types. In synoptic terms however, it may be appropriate to refer to the Savanna climate if one chosen option theme is Development in an African Context
- The monsoon climate is marked by a distinct hot wet and a cooler dry season, determined by the annual movement of the ITCZ between the tropics and associated movement of pressure belts and seasonal reversal of winds consequent on this (causality)
- The UK's climate is characterised by relatively mild temperatures (average seasonal range 5–20ºC), along with high humidity and precipitation (averaging 600 mm) throughout the year with a winter maximum

AO2

Application of knowledge and understanding is deployed to discuss whether seasonal variations are the most distinctive characteristic of the climate type(s) selected. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion.

The evidence could include:

- Although seasonal variations are the most distinctive characteristic of certain climate type(s), they are not the most distinctive characteristics of others. In tropical regions, the monsoon and savanna climate types are characterised by marked seasonal contrasts in precipitation, but the equatorial climate is more uniform; in temperate regions the continental interior type is characterised by marked seasonal contrasts in temperature
- Some climatic variables show more seasonality than others. In most tropical climates, seasonality is defined more by variations in precipitation patterns than temperature variations, as seasonal temperature ranges are often small
- In desert and equatorial climates, diurnal variations may be considered a more distinctive characteristic as the ranges in temperature are greater on a diurnal than a seasonal basis (time scales)

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- Other variables exert important influence on climate including variations by latitude, the effects of warm and cool ocean currents, orographic influences, air masses and temperature differences between continental land masses and ocean waters (causality)
- The scale of analysis is important. In all climate types, human activities can modify or intensify (feedback) climate characteristics, such as in built up areas, creating an urban 'heat island'. On a global scale, climate change is having an increasing influence on the characteristics of climate, mainly associated with extremes of precipitation and temperature (place / scale/ thresholds)

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the distinctive characteristics of one or more climate types
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill in covering both the breadth and depth of the question
- The skill of reaching conclusions about whether seasonal variations are the most distinctive characteristic of one or more climate types

Credit other valid approaches.

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14. 'The impacts of hazards associated with low-pressure systems are becoming increasingly difficult to manage.' To what extent do you agree? [45 marks]
AO1 [20] AO2.1c [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 hazards associated with low-pressure systems and strategies to manage the impacts of low-pressure hazards could include:

- In the tropics, hazards associated with low-pressure systems are tropical storms and cyclones with torrential rain and high winds. They trigger the secondary hazards of flooding, storm surges and sea incursions, landslides, mudflows and windborne debris. In temperate regions, hazards associated with low-pressure systems include severe storms, heavy rainfall or snowfall and gale-force winds. They trigger the secondary hazards of flooding, sea incursions (especially where the deep depression coincides with a time of very high tides), landslides and windborne debris (risk)
- Modifying human vulnerability to hazard risk through prediction and warning, community preparedness and land use planning (mitigation / adaptation)
- Modifying the hazard event and vulnerability through environmental control (cloud seeding) and hazard resistant design such as building design, hazard proofing and the development of various defence systems, such as flood walls and control dams for secondary hazards (mitigation / adaptation)
- Modifying the loss through aid and insurance (mitigation / adaptation)

AO2

Application of knowledge and understanding is deployed to evaluate whether the impacts of hazards associated with low-pressure systems are becoming increasingly difficult to manage. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion.

The evidence could include:

- The magnitude, frequency, duration, areal extent and speed of onset of the low-pressure hazard will influence the success of the strategies used to manage its impacts (causality/ risk)
- Comparison of similar strategies employed in different environments (place). The increasing exposure of growing populations with low adaptive capacity (resilience) make the impacts of hazards associated with low-pressure systems increasingly difficult to manage e.g. Typhoon Haiyan, Philippines (2013) Hurricane Cyclone Idai, Mozambique (2019)
- Improvements in strategies over time (time scales). Technological advances including weather satellites, ocean buoys, radar and computer modelling to forecast, track and predict hazards associated with low-pressure systems in theory should improve the management of their impacts (mitigation / adaptation) However, predictions made using technology need to be communicated to vulnerable people and acted upon, otherwise the technology itself is ineffective e.g. Hurricane Katrina (2005), Cyclone Idai (2019) (risk)

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- The intensity of low-pressure systems and the number of Category 4 and 5 hurricanes have increased since the 1980s.These increases are attributed to warmer sea surface temperatures associated with climate change in areas where low-pressure systems form and pass through e.g. Indian Ocean Dipole. The increasing intensity of low-pressure systems associated with climate change (causality) make their impacts increasingly difficult to manage
- The impacts of hazards associated with low-pressure systems have increased due to the relative increase in sea-level e.g. sea levels rose approximately 30cm over the last century off the coast of New York City, as a result, the storm surge, flooding and associated damage to infrastructure and communities were more severe when Hurricane Sandy (2012) hit than they would have been a few decades ago (risk) making them more difficult to manage
- The growing concentration of people (40% of the world's population lives within 100 km of the coast) and increased value of infrastructure in coastal areas where low-pressure systems strike has resulted in increased damage when these storms make landfall (risk) making them more difficult to manage
- The increased exposure of coastlines that have experienced the removal of mangroves and destruction of coral reefs (risk) make the impacts of low-pressure systems increasingly difficult to manage

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the strategies used to manage the impacts of hazards associated with low-pressure systems
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill in covering both the breadth and depth of the question
- The skill of reaching conclusions to evaluate whether the impacts of hazards associated with low-pressure systems are becoming increasingly difficult to manage

Credit other valid approaches.

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