Mark Scheme (Results)

Summer 2024

Pearson Edexcel International Advanced Subsidiary Level in Geography (WGE01)
Paper 01 Global Challenges

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

General Guidance on Marking

All candidates must receive the same treatment.

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

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

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

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

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

Using the mark scheme

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

1 / means that the responses are alternatives and either answer should receive full credit.
2 ( ) means that a phrase/word is not essential for the award of the mark, but helps the examiner to get the sense of the expected answer.
3 [ ] words inside square brackets are instructions or guidance for examiners.
4 Phrases/words in **bold** indicate that the meaning of the phrase or the actual word is **essential** to the answer.
5 ecf/TE/cq (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:
- show clarity of expression
- construct and present coherent arguments
- demonstrate an effective use of grammar, punctuation and spelling.

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

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

Question Number	Answer – Identify the country closest to the epicentre of the earthquake **(1.3.1.1)**	Mark
1 a (i)	AO2 (1 mark) • C - Indonesia	**(1)**

Question Number	Answer – Describe the distribution of deaths caused by the 2004 Asian tsunami. **(1.3.2.3)**	Mark
1 a (ii)	A02 (2 marks) Award 1 mark for each correct description of the distribution of deaths • The closer to the epicentre the higher the number of lives lost (1) • The anomaly is Thailand who were closer than India and Sri Lanka but had lower deaths (1) • Indonesia experienced over 10x the amount of deaths compared with India / Indonesia was affected the most (1) • Island nations such as Sri Lanka and Indonesia experienced higher number of deaths (1) Accept other correct explanations.	**(2)**

Question Number	Answer – Suggest one reason for the variation in deaths caused by the 2004 Asian tsunami. **(1.3.2.3)**	Mark
1 a (iii)	AO1 (2 marks) Award 1 mark for identifying a reason why the impacts varied and a further expansion marks up to a maximum of 2 marks. • Indonesia was the closet to the epicentre (1) so the wave height of the tsunami would have been the highest leading to more deaths (1) • Indonesia was the closet to the epicentre (1) so the tsunami would have travelled to the island more quickly (1) • India was further away from the epicentre so was able to be warned of the approaching tsunami (1) allowing people to be evacuated away (1) • Malaysia was protected from the full tsunami due to Indonesia taking the force of the impact (1) resulting in lower wave heights (1) • Sri Lanka had a higher density of people living along the coastline (1) meaning evacuation of high amounts of people was difficult (1) • Countries with lower levels of development (1) e.g. Indonesia may have been affected due to lack of early warning systems (1) Accept other correct explanations.	**(2)**

Question Number	Answer - Explain **two** reasons why economic losses from natural disasters have increased **in 1990 (1.3.3.2)**	Mark
1 b	AO1 (4 marks) Award 1 mark for a basic explanation and a further mark for a development of the explanation. • Increased levels of development/affluence (1) have meant that the cost of infrastructure/buildings are higher to replace/rebuild (1) • Economic growth means increased businesses, which can be lost during natural disasters (1) loss of revenue from businesses /reducing economic output for the country (1) • Urbanisation results in increased population density urban areas (1) resulting in increased healthcare costs during natural disasters (1) • Increased insurance claims from people/businesses (1) in order to rebuild after natural disasters (1) Accept other correct explanations.	**(4)**

Question number	Answer - Explain why tectonic hazard responses vary between countries **(1.3.3.3)**	Mark
1 (c)	**AO1 (6 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: Accept other correct explanations. • Responses to tectonic hazards can be immediate e.g. providing shelters, rescue teams or long term e.g. improving building regulations and rebuilding homes. • Some poorer countries rely on support from aid agencies and developed governments for support in searching for survivors and coordinating responses due to the lack of internal support available. • Some countries can lack the resources to focus on long term tectonic response due to other priorities e.g. education and healthcare. • In some countries a proportion of their population live in isolated rural locations which are difficult to access limiting the response following tectonic hazards. • More wealthy countries have response plans in place e.g. Japanese school children practicing earthquake drills and emergency service	**(6)**

	practice events as they have been affected by tectonic events in the past and so wish to reduce the likelihood of extreme events. • Some countries are able to respond more quickly due to the presence of early warning systems which mean they can coordinate a widespread response. • Local community engagement varies i.e. quality and volume of first responses. • Candidates may apply the disaster-risk equation here to explore reasons for the variation in response	

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1-2**	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Understanding addresses a narrow range of geographical ideas which lack detail. (AO1)
Level 2	**3-4**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Understanding addresses a range of geographical ideas which are not fully detailed and/or developed. (AO1)
Level 3	**5-6**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Understanding addresses a broad range of geographical ideas which are detailed and fully developed. (AO1)

Question Number	Answer - Explain how ice albedo feedback causes increased global temperatures (1.3.5.4)	Mark
2 a (i)	AO2 (2 marks) / A01 (1 marks) Award 1 mark for how the ice albedo feedback system results in increased global temperatures and a further two extension marks. • Ice albedo is a positive feedback loop (1) resulting in increased ice melting due to reduced albedo (1) resulting in more sunlight being absorbed so global temperatures increasing (1) • Solar radiation is reflected off snow but as temperatures rise less energy is reflected (1), so more solar energy is absorbed by the ocean (1), resulting in a positive feedback loop/ cycle continues (1) • Melting of ice sheets means lower reflection of sunlight (1) Darker Ocean surfaces absorb heat (1) creating a positive feedback loop/cycle continues (1) Accept other correct explanations.	**(3)**

Question Number	Answer - Define the term climate change tipping point (1.3.5.2)	Mark
2 a (ii)	AO1 (2 marks) • The point/threshold that when crossed leads to large and irreversible changes in Earth's climate (1) for example coral reefs die-offs/Greenland Ice Sheet melting/permafrost melting/ forest die-back (1) • Where temperature reaches a point that lead to accelerated and irreversible further warming (1) for example coral reefs die-offs/Greenland Ice Sheet melting/permafrost melting/forest die-back (1)	**(2)**

Question Number	Answer – Explain two ways that carbon emissions can be mitigated (1.3.6.1)	Mark
2 (b)	AO1 (4 marks) Award 1 mark for each basic explanation and a further mark for a development of the explanation. • Renewable energy (such as solar, wind, tidal) will generate green energy due to natural forces (1) therefore lowering the need for fossil fuel-based energy production which releases carbon emissions (1) • Encouraging the switch to electric cars (1) by incentivising the purchase of them through reduced road tax (1) • Countries have encouraged the use of public transport (1) which means less people are using private cars and therefore reducing the amount of emissions (1)	**(4)**

	• Carbon taxes are levies which are placed on the fossil fuel content in fuel usage (1). Increased taxes may lead to need to seek a financially viable alternative to remain profitable (1) • Collection of materials which are then processed / remade so to reduce demand on extraction of the same resources (1). This reduces carbon emissions in either the extraction process or the process of waste of unrecycled materials such as burning (1). • Carbon capture storage projects will store carbon (1) therefore reducing the amount of carbon released into the atmosphere (1) • Countries could engage in afforestation (1) which pulls carbon dioxide from the atmosphere/acts as a carbon store (1) • Countries have agreed to protocols such as the Kyoto protocol (1) which sets limits on the amount of carbon released (1) Accept other correct explanations.	

Question number	Answer - Explain why some farmers may not be able to adapt to the changing climate caused by global warming (1.3.5.3/1.3.6.2)	Mark
2 (c)	**AO1 (6 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive, and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: • Adaptation to climate change refers to adjustments or changes in the system to minimise the negative impact and optimise the positive impacts of climate change • Some farmers lack money to be able to buy disease resistant or drought resistant crops, meaning they will continue to farm crops which will not be able to survive in climates that are hotter or more vulnerable to changing rainfall patterns. • Some farmers in developing countries lack the technology to adapt to a changing climate such as sprinkler irrigation and therefore will loose crops during periods of droughts. • Changes in rainfall patterns may mean that farmers are unable to farm crops with which they have experience and so they may be forced to move away to areas in which they can still grow their crops. • Some farmers may be able to adapt especially in agricultural aid and education has been provided by NGOs and they have been taught strategies to adapt e.g. magic stones, terracing. • Some farmers may have noticed changes in warming, rainfall or rainfall variability over a number of years, but do not know that these changes constitute climate change. Accept any other valid responses.	**(6)**

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	0	No rewardable material.
Level 1	**1-2**	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Understanding addresses a narrow range of geographical ideas which lack detail. (AO1)
Level 2	**3-4**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Understanding addresses a range of geographical ideas which are not fully detailed and/or developed. (AO1)
Level 3	**5-6**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Understanding addresses a broad range of geographical ideas which are detailed and fully developed. (AO1)

Question Number	Answer - What key term would describe a company such as Nike? (1.4.2.1)	Mark
3a (i)	AO2 (1 mark) • B = Transnational Corporation	**(1)**

Question Number	Answer - Describe the distribution of Nike's workforce (1.4.2.1)	Mark
3a (ii)	AO1 (1 mark) / A02 (1 mark) Award 1 mark for each correct description of the distribution of Nike's production • The highest numbers (+100,001) workers are based in Asia/emerging countries i.e. China, Indonesia • Few workers are employed directly by Nike in North and South America i.e. less than 10,000 workers • An exception to this is Mexico which has between 10,0001-100,000 workers • Limited employment of Nike workers in Africa except counties such as Egypt and South Africa.	**(2)**

Question Number	Answer - Suggest one reason why TNCs such as Nike have outsourced their production (1.4.2.1)	Mark
3a (iii)	AO1 (2 marks) Award 1 mark for a correct reason why TNC such as Nike have outsourced their production to new markets and a further extension mark up to a total of 2 marks. • Outsourcing to new markets such as Africa and South America have occurred due to low cost labour (1) this means that Nike can increase its profit margin (1) • Traditional production areas such as China have become more expensive (1) so Nike has moved its production to cheaper locations such as South America. • Nike has outsourced to Australia as they are trying to increase their market share in the country (1) and having production means they can bypass the importation rules (1). Accept other correct explanations.	**(2)**

Question Number	Answer - Explain how two named intergovernmental organisations (IGOs) have promoted globalisation. (1.4.2.3)	Mark
3 b	AO1 (4 marks) Award 1 mark for a basic explanation and a further mark for a development of the explanation up to 2 marks. • WTO promotes free trade /abolish import tariffs (1) this allows countries to trade more effectively and increases the volume of global trade/ reduces barriers to trade (1). • The IMF looks to promote international trade by making funds available to those in financial difficulty (1), this allows countries to invest in production and increases the volume of global trade (1) • The World Bank aims to end extreme poverty and promote shared prosperity (1) by doing so they hope to encourage countries to trade thereby increasing the links between countries (1) • The World Health Organisation (WHO) has facilitated the sharing of vaccine production (1) which has resulting in the sharing of information/ distribution of vaccines (1) Accept other correct explanations.	**(4)**

Question number	Answer Explain the social and environmental problems that economic restructuring led to in many developed countries (1.4.3.1)	Mark
3 (c)	**AO1 (6 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.	**(6)**

	Indicative content guidance The indicative content below is not prescriptive, and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: Social • The outsourcing of jobs to Asia resulted in unemployment. This can lead to mental health issues and increased reliance on government support such as universal credit. • Due to increased unemployment there is less income for services, leading to closures of shops etc. This then impacts councils as less income is being received meaning less funding for local projects etc. • The population of an area declines as people are forced to relocate due to lack of employment opportunities. This results in the closure of key services such as schools/hospitals and these services struggle to attract high-skilled workers. • Out-migration from an area / population imbalance as people seek employment opportunities elsewhere. • Crime rates increase leading to a growing reputation as the area declines which can put off people moving there. Environmental: • Land pollution from contaminated industrial land will require remediation before it can be reused. This has high cost which may be unviable for local councils due to reduced taxes. • Reduced environmental quality leading to derelict housing (concentrated of poor and/or vulnerable families) Accept other correct explanations.	

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1-2**	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Understanding addresses a narrow range of geographical ideas which lack detail. (AO1)
Level 2	**3-4**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Understanding addresses a range of geographical ideas which are not fully detailed and/or developed. (AO1)
Level 3	**5-6**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Understanding addresses a broad range of geographical ideas which are detailed and fully developed. (AO1)

Question Number	Answer - Define the term migration (1.4.5.3)	Mark
4 a (i)	AO1 (1 mark) • The movement of **people** from one place to another • The movement of **people** either within a country or between countries	**(1)**

Question Number	Answer - Suggest **two** reasons why some countries have a high number of refugees seeking asylum (1.4.5.3)	Mark
4 a (ii)	AO1 (3 mark)/ A02 (1 mark) Award 1 mark for a basic explanation and a further mark for a development of the explanation. • Asylum seekers tend to seek safety in neighbouring countries e.g. Syria, Pakistan (1) due to ease of access/similar culture/cost of transportation (1) • Asylum seekers access Turkey as a gateway to Europe (1) allowing them to access greater governmental support/reach family members/access employment (1) • Germany historically has been supportive of asylum seekers (1) following the Chancellor announcing support for asylum seekers fleeing wars e.g. Syria, Afghanistan and Iraq. • Countries such as Italy and Greece have received financial support from the EU to strengthen their asylum systems (1) which means many are processed and accepted/returned from these locations (1) • Candidates may reference other countries which have seen an influx of asylum seekers due to more recent conflicts than 2021. Accept other correct descriptions.	**(4)**

Question Number	Answer - Explain the challenges of youthful populations for developing countries (1.4.4.2)	Mark
4 (b)	AO1 (4 marks) Award 1 mark for each basic explanation and a further mark for a development of the explanation. • High levels of education are needed so demand for schools and teachers is high (1), representing a high economic cost (1)– which is often not adequately provided. • Demand for health care is high (1), especially maternity and child vaccination (1) • High level of youth dependency (1) may limit female participation in the workforce/ pressure on economically active to support them (1) • If not fully employed, there is a risk of a disaffected, under-used youth (1) which can cause economic and political tensions (1). Accept other correct explanations.	**(4)**

Question number	Answer - Explain how globalisation has increased migration **both** within and between countries (1.4.5.1)	Mark
4 (c)	**AO1 (6 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: Within: • Low skilled workers are pushed from the rural areas to urban areas due to the action of commercial organisations in the rural area. These commercial farming practices in rural areas causes local farmers to become outcompeted. Therefore, there is low economic viability in farming at a subsistence level leads to step migration towards urban areas. • Workers are attracted to the urban areas due to potential for greater earnings / employment in global trade, either directly with large organisations or to work in manufacturing which supply global brands. The relative earnings, while small, may be an improvement on the life they had in the rural area. • Advertising / internet allows people to perceive an improved lifestyle in the urban area. With a farther-reaching infrastructure mobile technology is more widely available therefore younger generations are less inclined to follow traditional family business and therefore move to the urban areas. • The creation of Special Economic Zone (SEZs) led to a high influx of rural-urban migrants seeking employment. Between: • Regions with large emigrating populations are generally lower income ones, so economic migration could be seen as a key explanation. • International migration to Asia has occurred due to increased economic development in the region leading to an influx of migrants searching for work within the region, government migration policies that encourage the influx of low-cost migrant labour e.g. Saudi Arabia. • Globalisation has led to increased transport connections which have made more locations accessible and connected them to the global markets. The resulting international migration to global hubs has been made possible through these developments. Max Level 2 if both within and between are not addressed Accept any valid responses	**(6)**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1-2**	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Understanding addresses a narrow range of geographical ideas which lack detail. (AO1)
Level 2	**3-4**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Understanding addresses a range of geographical ideas which are not fully detailed and/or developed. (AO1)
Level 3	**5-6**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Understanding addresses a broad range of geographical ideas which are detailed and fully developed. (AO1)

Question number	Suggest reasons why disaster risk varies between countries such as these. (1.3.1.3/1.3.2.1)
5 (a)	**AO1 (5 marks)/AO2 (5 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: AO1: • Disaster risk is expressed as the likelihood of loss of life, injury or destruction and damage from a disaster in a given period of time. • Disaster risk is the combination of the severity and frequency of a hazard, the numbers of people and assets exposed to the hazard, and their vulnerability to damage. • The countries shown have a range of risk components as a result of differences in vulnerability and coping capacity. AO2: • Disasters are an indicator of management failures, meaning that disaster risk is a measure of the sustainability of development. Hazard, vulnerability and exposure are influenced by a number of risk drivers, including poverty and inequality, badly planned and managed urban and regional development, climate change and environmental degradation. • Risk can be reduced by government actions and management plans however this is difficult in developing countries which lack the economic capacity • Risk is constantly changing as people move into more vulnerable areas this increases population density so the management challenge increases / areas with rapid change present a particular management challenge. • Development plays a role in hazard risk, with Haiti having a low capacity to low and high vulnerability. Haiti • Overall Haiti's disaster risk is high due to combined very high hazard risk and very low capacity to cope. • Haiti's geographical location makes it vulnerable to natural hazards due to its location in the path of Atlantic hurricanes, sits atop two major fault zones and climate change is increasing the frequency and strength of tropical storms. • Haiti's vulnerability to disasters and its ability to cope with them are impacted by more than physical geography. Haiti is the poorest country in the western hemisphere and has suffered from decades of political instability and corruption causing problems with their infrastructure. Japan • Overall Japan's disaster risk is medium due to the impact of their capacity to cope reducing their vulnerability levels.

	• Japan is an archipelago situated along the Pacific Ring of Fire so is vulnerable to earthquakes, tsunamis and volcanic eruptions so the hazard risk is very high. • The Japanese government invests in disaster prevention systems such as earthquake alert systems, emergency facilities, evacuation centres, as well as earthquake-resistant buildings resulting in a high capacity to cope. • Whilst Japan has high coping capacity driven by adaptation and mitigation technologies and low vulnerability, ultimately the risk is still very high showing that hazard risk can only be mitigated to some extent. Morrocco • Morocco's disaster risk is medium driven by their high vulnerability, but low hazard risk when compared to the other countries. • Morocco is regularly prone to flooding, earthquakes, drought and coastal erosion. • Morocco only recently (2021) announced a national plan to address the risk of natural hazards and improve response capacity. This can be tied to Morocco's level of development and that they have not had the additional funds to focus on hazard mitigation.

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1–4**	• Demonstrates isolated elements of geographical knowledge. (AO1) • Demonstrates isolated elements of geographical understanding, some of which may be inaccurate. (AO1) • Applies knowledge and understanding to geographical information / ideas, making limited logical connections / relationships. (AO2) • Applies knowledge and understanding to geographical information / ideas to produce an interpretation that is not relevant and / or supported by evidence. (AO2)
Level 2	**5-7**	• Demonstrates geographical knowledge, which is mostly relevant and may include some inaccuracies. (AO1) • Demonstrates geographical understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Applies knowledge and understanding to geographical information / ideas logically, making some relevant connections / relationships. (AO2) • Applies knowledge and understanding to geographical information / ideas to produce a partial but coherent interpretation that is mostly relevant and supported by evidence. (AO2)
Level 3	**8-10**	• Demonstrates accurate and relevant geographical knowledge throughout. (AO1) • Demonstrates accurate and relevant geographical understanding throughout. (AO1) • Applies knowledge and understanding to geographical information / ideas logically, making relevant connections / relationships. (AO2)

		• Applies knowledge and understanding to geographical information / ideas to produce a full and coherent interpretation that is relevant and supported by evidence. (AO2)

Question number	"The magnitude and pace of current climate warming is different from climate change in the past" To what extent do you agree? (1.3.4.1/1.3.4.2)
5 (b)	**AO1 (5 marks)/AO2 (15 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance (page 3) and the qualities outlined in the levels-based mark scheme below. Responses that demonstrate only AO1 without any AO2 should be awarded marks as follows: • Level 1 AO1 performance: 1 mark • Level 2 AO1 performance: 2 marks • Level 3 AO1 performance: 3 marks • Level 4 AO1 performance: 4 marks **Indicative content guidance** The indicative content below is not prescriptive, and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: **AO1** • Climate change is the significant variation of average weather conditions becoming, for example, warmer, wetter, or drier—over several decades or longer. • The largest global-scale climate variations in Earth's recent geological past are the ice age cycles which are cold glacial periods followed by shorter warm periods. The last few of these natural cycles have recurred roughly every 100,000 years. • Trends in globally averaged temperature, sea level rise, upper-ocean heat content, land-based ice melt, arctic sea ice, depth of seasonal permafrost thaw provide consistent evidence of a warming planet. • Earth's climate is now changing faster than at any point in the known history of the climate, primarily as a result of human activities. Atmospheric levels of carbon dioxide ($C0_2$) were fairly stable over the past 2000 years at 270 to 285 parts per million (ppm) until the 18^{th} century. Global $C0_2$ levels have been increasingly rapidly breaking the 400ppm threshold (highest level in the last three million years). **AO2** • We know about past climates and how they changed because of evidence left in tree rings, layers of ice in glaciers, ocean sediments, coral reefs, and layers of sedimentary rocks. The chemical make-up of the ice provides clues to the average global temperature over the past 800,000 years. • Milankovitch cycles are major changes which occur between 26,000- and 100,000-years dependent on the cycle. The cycles affect the amount of sunlight and therefore energy that earth absorbs from the sun. They provide a framework for understanding long term climate change and are responsible for triggering the beginning and end of glaciation periods (Ice Ages).

	• Precession (Axial Rotation): As the Earth rotates, it wobbles slightly upon its axis and the cycle of precession occurs over a period of roughly 26,000 years. Axial precession makes seasonal contrasts more extreme in one hemisphere and less extreme in another. Currently the precessions make the Southern Hemisphere summers hotter and moderates Northern Hemisphere seasonal variations. • Eccentricity (orbital shape): Eccentricity, is the shape of the Earth's orbit around the Sun. Over time, the pull of gravity from Jupiter and Saturn causes the shape of the Earth' orbit to vary from being nearly circular to being mildly elliptical. This explains why our seasons are slightly different lengths i.e. summers being 4.5 days longer than winters in the Northern Hemisphere. When the Earth's orbit is at its most elliptic, about 23% more solar radiation reaches Earth each year than it does at its furthest point. • Axial tilt (Obliquity): The angle of the Earth's axis of rotation is tilted as it travels around the sun and explains why we have seasons. Over the last million years, it has varied between a tilt of 22.1° to 24.5° and back again. As obliquity decreases the seasons become milder, resulting in warmer winters, and cooler summers that gradually allow snow and ice at high latitudes to build up into large ice sheets. This then reflects more of the Sun's energy back into space, promoting even more cooling. • These orbital changes are very small over the last several hundred years, and alone are not sufficient to cause the observed magnitude of change in temperature since the Industrial Revolution, nor to act on the whole Earth. • Recent estimates of the increase in global average temperature since the end of the last ice age are 4 to 5 °C. That change occurred over a period of about 7,000 years, starting 18,000 years ago. CO2 has risen more than 40% in just the past 200 years, much of this since the 1970s. • Carbon dioxide levels have risen mostly due to the large-scale burning of fossil fuels that began during the Industrial Revolution. Prior of this the concentration of C02 in the atmosphere stood around 280ppm in 1750. In more recent years emerging countries such as China and India have continued to use coal-based energy in order to fuel their industrialisation. • Deforestation accounts for around 20% of global C02 emissions. This is both from the removal of the carbon store as well as burning trees for fuel. Deforestation rates have increased in countries such as Brazil who are using their natural resources in order to improve their level of economic development. • Methane has increased due to increased demand for meat due to the spread of the western diet. Cattle, sheep and goats from CH4 as part of their normal digestive process. Potential areas of assessment: • The speed of the current climate change is faster than most of the past events, making it more difficult for human societies and the natural world to adapt.

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1–5**	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)

		• Applies knowledge and understanding of geographical ideas, making limited and rarely logical connections / relationships. (AO2) • Applies knowledge and understanding of geographical information / ideas to produce an interpretation with limited coherence and support from evidence. (AO2) • Applies knowledge and understanding of geographical information / ideas to produce an unsupported or generic conclusion, drawn from an argument that is unbalanced or lacks coherence. (AO2)
Level 2	**6–10**	• Demonstrates geographical knowledge and understanding, which is occasionally relevant and may include some inaccuracies. (AO1) • Applies knowledge and understanding of geographical information / ideas with limited but logical connections / relationships. (AO2) • Applies knowledge and understanding of geographical ideas in order to produce a partial interpretation that is supported by some evidence but has limited coherence. (AO2) • Applies knowledge and understanding of geographical information / ideas to come to a conclusion, partially supported by an unbalanced argument with limited coherence. (AO2)
Level 3	**11-15**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and accurate. (AO1) • Applies knowledge and understanding of geographical information / ideas to find some logical and relevant connections / relationships. (AO2) • Applies knowledge and understanding of geographical ideas in order to produce a partial but coherent interpretation that is supported by some evidence. (AO2) • Applies knowledge and understanding of geographical information / ideas to come to a conclusion, largely supported by an argument that may be unbalanced or partially coherent. (AO2)
Level 4	**16-20**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Applies knowledge and understanding of geographical information / ideas to find fully logical and relevant connections / relationships. (AO2) • Applies knowledge and understanding of geographical information / ideas to produce a full and coherent interpretation that is supported by evidence. (AO2) • Applies knowledge and understanding of geographical information / ideas to come to a rational, substantiated conclusion, fully supported by a balanced argument that is drawn together coherently. (AO2)

Question number	Suggest reasons for the global shift in the share of the world's Gross Domestic Product (GDP). (1.4.3.3/1.4.1.2/1.4.1.3)
6 (a)	**AO1 (5 marks)/AO2 (5 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: AO1 • The global shift in GDP can be linked to the movement of manufacturing, or the economic centre of gravity, to recently industrialising countries. It's the shift from western dominated activity to places like China. • The USA has seen a steady increase in percentage of global GDP rising from 3% in 1820 to 28% in 2020. • China was historically the global leader on GDP percentage share with 33% in 1820 but this has continued to fall through to 1970 when it was 5%. Since then however, % global share has increased to place it third with 20%. • Europe has remained a leader in % share being either 1st or 2nd ranked over the time period. • Developing countries like China have experienced an unprecedented growth rate over the last three decades because of the global restructuring of manufacturing industries. Driven by the globalisation process, it has been common for transnational companies headquartered in developed countries to move their manufacturing sections to developing countries where they can benefit from lower labour costs, cheaper land prices, and the almost non-existent environmental awareness. AO2 **China** • In 1820s China was the world's largest economy, however foreign and civil wars and weak and ineffective governments caused the share of global GDP to shrink to 5% in 1970. • The introduction of the open-door policy in 1979 led to China becoming the largest exporter and second largest importer of goods in the world, fueling their % share in GDP growth. • China's swift reopening after the COVID-19 outbreaks in the late 2022, meant that China's economy rebounded much more rapidly than countries such as the USA and those within the EU who had enforced strict regulations impacting their national economies. **Europe** • Europe has retained its position as having one of the highest % share in global GDP since 1820 due to the British Industrial Revolution and colonial empires driving economic growth.

	• Europe has seen the outsourcing of manufacturing e.g. in the 1950s with cheap mass-produced goods, e.g. toys and textiles, relocating to Japan. **USA** • Historically the USA has had a low % share of global GDP, only becoming prevalent in 1920 (21% share). The USA experienced an economic boom through the mass production of goods e.g. Henry Ford cars, development of new industries and new technologies. • The establishment of institutions such as the World Bank, World Trade Organisation and International Monetary Fund enabled the continued dominance of the USA and other western nations due to the western ideologies and high voting power for the USA. • The Global Financial Crisis in 2007-08 spread from the US to the rest of the world through linkages in the global financial system. This impeded USA's economic growth and slowed its recovery allowing China to make steps to take a greater % share of global GDP.	
Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1–4**	• Demonstrates isolated elements of geographical knowledge. (AO1) • Demonstrates isolated elements of geographical understanding, some of which may be inaccurate. (AO1) • Applies knowledge and understanding to geographical information / ideas, making limited logical connections/relationships. (AO2) • Applies knowledge and understanding to geographical information / ideas to produce an interpretation that is not relevant and/or supported by evidence. (AO2)
Level 2	**5-7**	• Demonstrates geographical knowledge, which is mostly relevant and may include some inaccuracies. (AO1) • Demonstrates geographical understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Applies knowledge and understanding to geographical information / ideas logically, making some relevant connections / relationships. (AO2) • Applies knowledge and understanding to geographical information / ideas to produce a partial but coherent interpretation that is mostly relevant and supported by evidence. (AO2)
Level 3	**8-10**	• Demonstrates accurate and relevant geographical knowledge throughout. (AO1) • Demonstrates accurate and relevant geographical understanding throughout. (AO1) • Applies knowledge and understanding to geographical information / ideas logically, making relevant connections/relationships. (AO2) • Applies knowledge and understanding to geographical information / ideas to produce a full and coherent interpretation that is relevant and supported by evidence. (AO2)

Question number	"Rising populations and resource demands are an increasingly difficult challenge for megacities to manage" To what extent do you agree? (1.4.4.3/1.4.6.2/1.4.6.3)
6 (b)	**AO1 (5 marks)/AO2 (15 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance (page 3) and the qualities outlined in the levels-based mark scheme below. Responses that demonstrate only AO1 without any AO2 should be awarded marks as follows: • Level 1 AO1 performance: 1 mark • Level 2 AO1 performance: 2 marks • Level 3 AO1 performance: 3 marks • Level 4 AO1 performance: 4 marks **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: **AO1** • Megacity city populations have been growing at an exponential rate – by 2030 there will be 43 megacities – with all but one of the new ones in Asia (home to 630 million people, 13.6 per cent of the world's projected urban population) • With increasing population is a greater demand on resources, water and food (accept a wider interpretation of resources as well). Increasing population equals an increasing need to supply water. The increasing need for water leads to an increasing stress on water and therefore greater numbers of areas are facing water scarcity. • Malthus argued that increasing populations will lead to a critical point beyond which population will crash. • Boserup argued that with increases in population will come improvements in innovation therefore allowing technology to overcome our shortages with resources. • The Club of Rome is a group of organisations and individuals which deal with overcoming global issues such as the issue of population versus resource supply. **AO2** • Food production (while being altered by GM cropping and strain resistant crops) needs to maintain pace with rising city populations, influenced by rising demand for water. Much of this demand comes from agricultural production in rural areas which are being undermined by declining populations driven by rural-urban migration. • Increasing populations may lead to water shortages, which result in the need for transfers or investment in large-scale water management projects (at great cost) to support demand. • The quality of a city's infrastructure is central to its residents' quality of life, economic opportunities and feeling of social inclusion. Infrastructure supply lags behind demand, basic public services – such as water connections and solid waste disposal – don't reach the majority, and many residents live on marginal land. • Rising population as a result of rapid and unplanned urbanisation can cause a host of problems due to a combination of high population density, aging populations, poverty

	and lack of infrastructure can have a negative impact on public health, creating conditions in which communicable diseases can flourish. • The difficulties with gaining access to water, health or fuel are created through the absence of a coherent government, this results in millions living in locations of self-management and self-help, which can cause tensions and conflicts. • In developed countries there are good examples where megacities are well-governed, such as Tokyo. Two major factors are essential to ensure good governance: expertise and adequate financing. The latter is closely related to the level of economic development.' Assessment • Candidates may argue that the statement is true but not in all cases as some megacities such as Tokoyo in developed nations have strong management to resolve the implication of megacity growth.

Level	Mark	Descriptor
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		• Applies knowledge and understanding of geographical information / ideas to come to a conclusion, largely supported by an argument that may be unbalanced or partially coherent. (AO2)
Level 4	**16-20**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Applies knowledge and understanding of geographical information / ideas to find fully logical and relevant connections / relationships. (AO2) • Applies knowledge and understanding of geographical information / ideas to produce a full and coherent interpretation that is supported by evidence. (AO2) • Applies knowledge and understanding of geographical information / ideas to come to a rational, substantiated conclusion, fully supported by a balanced argument that is drawn together coherently. (AO2)

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