Mark Scheme (Final)

Summer 2023

Pearson Edexcel International Advanced Subsidiary Level In Geongraphy (WGE02)
Paper 02
Unit 2: Geographical Investigations

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.

Question Number	Answer	Mark
1(a)(i)	**AO2 (1 mark)** **Label X** = C Sea wall	1

Question Number	Answer	Mark
1(a)(ii)	**AO2 (1 mark)** **Label Y** = B Offshore breakwater	1

Question Number	Explain **one** way that coastal management decisions cause conflict between different players. Answer	Mark
1(b)	**AO1 (2 marks)** Award **1** mark for explaining a way and a further expansion mark, up to a maximum of 2 marks each: - Coastal management decisions rarely involve agreement by all players / stakeholders (1) so choices will inevitably leave some groups / people / stakeholders who feel not listened to or neglected (1). - Different stakeholders / players want different solutions (1) which means that people think that outcomes creates "winners and losers" (1) - Some places are simply too low value to protect or used for farmland (1) so people who have assets / property will feel they are being neglected (1) - Environmentalists want to protect biodiversity (1) but some management decisions involve damaging habitats (1). Credit other valid explanations.	2

Question Number	Examine how coastal ecosystems can help protect coasts from erosion and flooding. Indicative content	
1(c)	**AO1 (6 marks)/AO2 (2 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 • Primary / plant succession can happen when bare sand or mud is colonised by plants. • Plants and ecosystems provide an energy buffer and help to dissipate wave energy • Plants help stabilise ground / soil • Coastal dunes help prevent wave overtopping and tidal inundation during storm events or hazards (tsunami) • The presence of vegetation in coastal areas improves slope stability, consolidates sediment and reduces wave energy moving onshore • Coastal ecosystems provide a buffer against wind erosion • Ecosystems are one part of the wider coastal system which includes sediment transfers and other parts of the coastal sediment cell. **AO2** • Other parts of the coastal system, such as sediment sources and transfers of sediment (longshore drift) also contribute to overall stability by maintaining the coastal sediment cell. • Importance of vegetation can depend on its type (height, density) and quality; it will also be affected by other factors such as local topography • Vegetation and ecosystems may protect from coastal flooding and not erosion or vice versa. • The width of the vegetation buffer will be significant in its role as an energy dissipator and stabilise coastal areas. • Future sea-level rise and climate change may change coastal systems affecting their overall resilience. Could argue that in the longer term, this is the main threat to coastal stability. • Overall, it might be argued that lots of factors e.g. role of people, can either stabilise or destabilise coastal ecosystems. Expect a Level 3 answer to make one or more judgements, for example assessing the protection from different coastal ecosystems.

Level	Mark	Descriptor
Level 0	0	No acceptable response.
Level 1	1–3	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate. (AO1) • Understanding addresses a narrow range of geographical ideas. (AO1) • Understanding of geographical ideas lacks detail. (AO1) • Applies knowledge and understanding to geographical information/ideas, with limited logical connections/relationships. (AO2)

Level 2	4–6	• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Understanding addresses a range of geographical ideas. (AO1) • Understanding of geographical ideas is not fully detailed and/or developed. (AO1) • Applies knowledge and understanding to geographical information/ideas logically to find some relevant connections/relationships. (AO2)
Level 3	7–8	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Understanding addresses a broad range of geographical ideas. (AO1) • Understanding of the geographical ideas is detailed and fully developed. (AO1) • Applies knowledge and understanding to geographical information/ideas logically to find fully relevant connections/relationships. (AO2)

Question Number	Identify **two** possible problems caused by the population densities of Hong Kong and Dhaka. Answer	Mark
2(a)(i)	**AO2 (2 marks)** Award **1** mark for each idea: • Unaffordable housing • Increased rental costs in the city • Land and water pollution from overcrowding • Transport congestion/high risk of accidents • Pollution of air/water • Informal / unregulated / illegal settlements • Pressure on medical services/schools Note – must be related to high population densities and not just high population. Also no mark for 'Pollution' alone.	**2**

Question Number	Explain **one** problem for cities that have low population density. Answer	Mark
2(a)(ii)	**AO1 (2 marks)** Award **1** mark for explaining a problem, with a further expansion mark, up to a maximum of **2** marks each:	**2**

	• High use of cars (1) which release particulate matter therefore lowering air quality (1). • Long journey times(1) so additional commuting times/delivery costs (1). • High use of personal transport (1) means there is a high energy use (1). • Increased urban sprawl (1) thereby reducing forest/biodiverse areas (1). • Loss of surrounding agricultural land to development (1) means less space for growing. crops / reduces agricultural productivity (1). • Pressure on local governments to provide new infrastructure (1) which will be expensive because of the distances involved (1). Credit other valid ideas.	

Question Number	Assess the problems of waste management for developing and developed world cities. Indicative content
2(b)	AO1 (6 marks) AO2 (2 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** • Many cities are seeing very high urban growth rates, especially in S.E Asia. These creates problems of both waste collection and disposal. • Rural to urban migration is a process that is creating waste disposal problems associated with illegal dumping. • Health issues are linked to poor waste management and disposal. • Informal slum housing (developing cities) has environmental problems associated with pollution and waste management. • There is a very strong correlation between municipal waste generation per capita and income of a country or region. • Illegal dumping of waste, including hazardous waste, is an issue in many cities • Waste tips may allow harmful chemicals to enter water courses, soil or air (e.g. ammonia) or release greenhouse gases (e.g. methane) or take up valuable land. **AO2** • There are opportunities for much greater waste recycling in many cities, reducing the need for landfill, but this has cost implications. • In developing and rapidly growing cities the lack of good waste management links to other factors, e.g. education and skills, employment opportunities, quality of life, health etc.

- Waste collection can be expensive, time-consuming and slow, especially in densely populated cities, and lorries add to congestion.
- NGO and community groups play a role in improving housing and services in slum areas in developing world cities.
- Waste may be seen as a resource, both by the poorest in developing cities (who sort and sell it), and for burning to generate electricity ('Waste to Energy').
- In developed world cities urban air pollution is probably much more of a problem than waste management.
- In some cities waste management has been improved with varying degrees of success.

Expect a Level 3 answer to make one or more judgements, for example assessing the problems of waste management in both developed and developing cities.

Level	Mark	Descriptor
Level 0	0	No acceptable response.
Level 1	1–3	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate. (AO1) • Understanding addresses a narrow range of geographical ideas. (AO1) • Understanding of geographical ideas lacks detail. (AO1) • Applies knowledge and understanding to geographical information/ideas, with limited logical connections/relationships. (AO2)
Level 2	4-6	Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Understanding addresses a range of geographical ideas. (AO1) • Understanding of geographical ideas is not fully detailed and/or developed. (AO1) • Applies knowledge and understanding to geographical information/ideas logically to find some relevant connections/relationships. (AO2)
Level 3	7-8	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Understanding addresses a broad range of geographical ideas. (AO1) • Understanding of the geographical ideas is detailed and fully developed. (AO1) • Applies knowledge and understanding to geographical information/ideas logically to find fully relevant connections/relationships. (AO2)

Question Number	Explain **one** reason why your title or question was appropriate for your fieldwork investigation. Answer	Mark
3(a)	**AO3 (3 marks)** ***NB:*** *the aim / question / hypothesis provides a context for the investigation and the subsequent parts that follow – no credit for this.* Award **1** mark for explaining the purpose and further marks for explanation (should be linked to why it was appropriate), up to a maximum of **3** marks. Marks are not awarded for what was done and where it was done, but for **why** the question/chosen location was suitable**.** The nature of the purpose (or focus) will vary depending on the fieldwork areas chose. • A local coastal area offered a range of different coastal ecosystems (1). This was a manageable scale (1) and therefore the fieldwork could be repeated in order to consider reliability (1). • The urban environment had already been researched documenting change and rebranding (1) meaning that we use our results of other people (1) allowing comparisons (1) • The rebranding was concentrated in small areas making it accessible (1) and as we had past data we could effectively measure success (1). • Past transport data from another student's project formed the basis of our comparison (1) allowing us to link patterns of traffic in the same area (1) with those that were found 5 years ago before the new road was built (1). • Explains why the question was appropriate for the location (1) • No government/legal restrictions the chosen question (1) with details. • The chosen question was culturally acceptable (1) with details.	**3**

Question Number	Explain **one** benefit of using secondary research in your fieldwork investigation. Answer	Mark
3(b)	**AO3 (3 marks)** Award **1** mark for explaining the benefit and further marks for explanation (may be linked to why it was appropriate or how it helped the investigation), up to a maximum of **3** marks. The nature of secondary data will vary depending on the location as well as the context of the investigation.	**3**

- Historic interview data was a benefit because it included information from a number of respondents (1) and was used to find out about attitudes towards rebranding in the city (1) which allowed us to plan our own questionnaire (1).
- Old questionnaires (using open questions) were a benefit because they helped gauge opinions from stakeholders (1) such as impacts of change (1) and established whether they were positive or not (1).
- Coastal flood risk data from the Environment Agency was a benefit because it helped gauge local risk factors (1) and therefore better analyse the coastal stretch (1) and making the fieldwork design safer (1).
- Old postcards were a benefit because they showed evidence of change (1) which was later used to help evaluate the degree of rebranding in the city (1) and to examine the specific impacts on particular places (1).
- Local council reports were a benefit when planning the investigation (1) by highlighting a past issue/regeneration plan (1) and the investigation found out the extent to which it had been successfully managed(1).

Credit other valid ideas.

Question number	Explain why the techniques you used to present your geographical data were suitable. **Answer**
3(c)	**AO3 (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

Content depends on students' choice of research question. Presentation and suitability may include some of the following ideas:

- A combination of cartographical and graphical methods allowed us to present the fieldwork data from different locations.
- Graphs were used to show the rate of change in a variable.
- Graphs were used to show changes over time and space.
- Graphs were used to compare differences in opinions between two different areas.
- Annotated field sketches showed how the vegetation changed along a transect.
- Annotated maps were used to show the differences in coastal protection for two stretches of coast.

Nature of responses will be heavily dependent on the context of the fieldwork and the environment in which it was undertaken.

| | | However, examiners should reward for detailed clear and specific data and information which are supported with depth and detail in terms of factual accuracy and realism linked to conclusions. |

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1–2**	• Limited understanding of the relationships between geographical questions and the background information, geographical context and research question (AO3) • Uses a limited range of fieldwork research skills and techniques to obtain information that may link to, but not support, the investigation of the research question. (AO3) • Limited evidence of an ability to draw conclusions and the evaluation is simplistic, limited to one stage in the route to enquiry. (A03)
Level 2	**3–4**	• Some understanding of the relationship between the background information, geographical context and research question (AO3) • Uses some fieldwork research skills and techniques to obtain information that may link to, but not support, the investigation of the research question. (AO3) • Some evidence of an ability to draw conclusions and the evaluation is relevant, but restricted to one or two stages in the route to enquiry. (A03)
Level 3	**5–6**	• A full understanding of the relationship between the background information, geographical context and research question (AO3) • Evaluates fieldwork research skills and techniques to obtain information that may link to, but not support, the investigation of the research question. (AO3) • Clear evidence of an ability to draw conclusions and the evaluation is full, across a number of stages in the route to enquiry. (A03)

Question number	Evaluate the accuracy and reliability of the conclusions to your fieldwork investigation. **Answer**
3(d)	**AO3 (12 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**

Content depends on students' choice of research question. Accuracy and reliability could include some the following:

- Accuracy and reliability will be affected by sampling and frequency of the fieldwork methods.
- Accuracy includes having appropriate methods of sampling or data collection which will reduce error and be close to the true value.
- Reliability includes the idea of repeatability, in other words, would you get similar results on another occasion.
- Locational considerations, especially precise details of sites, or transects and sampling locations will impact on the accuracy and reliability of the conclusions.
- Considerations may also include temporal decision-making, e.g. when it is safe or appropriate to collect data and information which is likely to be most accurate and or reliable.
- Methods could include the design of specific methods e.g. questionnaires, interviews, EQS etc. There might be comments on ease of analysis or reduction in subjectivity due to good design. and therefore improving the accuracy and reliability of the conclusions.
- Consideration of recording sheets (methods), adaptation, use of weightings to give particular focus linked to the question or aim.
- Consideration of equipment, and how that is used to minimise operator error during and improve reliability of conclusions.

Note: the focus for this particular question means that the bullets 3 and 4 in the Levels descriptors **below** are most relevant to the desired response.

Nature of responses will be heavily dependent on the context of the fieldwork and the environment in which it was undertaken.
However, examiners should reward for detailed clear and specific data and information which are supported with depth and detail in terms of factual accuracy and realism.

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–4	- Limited understanding of the relationships between geographical questions and the background information, geographical context and research question (AO3) - Uses a limited range of fieldwork research skills and techniques to obtain information that may link to, but not support, the investigation of the research question. (AO3) - Limited interpretation, analysis based on the data / information collected. (AO3) - Limited evidence of an ability to draw conclusions and the evaluation is simplistic, limited to one stage in the route to enquiry. (A03)

Level	Mark	Descriptor
Level 2	**5–8**	• Some understanding of the relationship between the background information, geographical context and research question (AO3) • Uses some fieldwork research skills and techniques to obtain information that may link to, but not support, the investigation of the research question. (AO3) • Interpretation and analysis based on the data / information collected form part of the response (AO3) • Some evidence of an ability to draw conclusions and the evaluation is relevant, but restricted to one or two stages in the route to enquiry. (A03)
Level 3	**9–12**	• A full understanding of the relationship between the background information, geographical context and research question (AO3) • Evaluates fieldwork research skills and techniques to obtain information that may link to, but not support, the investigation of the research question. (AO3) • Critically considers the role of interpretation, analysis based on the data / information collected. (AO3) • Clear evidence of an ability to draw conclusions and the evaluation is full, across a number of stages in the route to enquiry. (A03)

Question Number	Suggest **one** possible risk for students visiting the area shown. Answer	Mark
4(a)(i)	**AO3 (2 marks)** Award **1** mark for a relevant risk related to the photograph and a second mark for the consequence. Maximum **2** marks. - Slips, trips, bumps (1) which cause bruising (1) - Swimming in the sea (1) which could lead to death (1) - Cuts, stings, bites (1) which lead to kins irritation / reactions (1) - Falling from a high point (1) which lead to injury or even death (1) - Sprained ankles from rough ground (1) leading to possible hospitalisation (1) - Weather related – sunburn / cold / hypothermia (1) leading to swelling / inflammation / heart respiratory problems / dehydration (1). - Students are unfamiliar with the area (1) so they may get lost (1). Accept other valid ideas.	**2**

Question Number	Explain **one** way the students could manage this risk. Answer	Mark
4(a)(ii)	**AO3 (3 marks)** Award **1** mark for explaining a way a risk is managed and further expansion marks to a maximum of **3**. - Ensure all students wear warm clothes (1) to protect them from hypothermia (1) by keeping the body protected from the cold (1). - Application of sun-tan lotion (1) will help protect skin from sunburn (1)to reduce the risk of skin cancer (1). - Wearing walking books / sturdy footwear to offer stability when walking (1) so risk from trips / slips should be reduced (1). - Risk assessment drawn up (1) to say that no student is permitted in the sea (1) which reduces the risk of drowning (1). - Carry out a risk assessment (1) including consulting the tide timetable (1) to avoid being trapped by the tide (1). Accept other valid ideas.	**3**

Question Number	Calculate the mode for beach slope angle. Answer	Mark
4(b)(i)	**AO3 (1 mark)** Award **1** mark for performing the calculation of data up to a maximum of **1** mark. • 8 (1)	**1**

Question Number	Calculate the median for sediment long axis. Answer	Mark
4(b)(ii)	**AO3 (2 marks)** Award **1** mark for placing numbers into a rank order and **1** mark for correct answer up to a maximum of **2** marks. • Idea of ranking 6,6,8,9,9,10,12,12,12,14 (1) • Median 9.5 (mm) (1)	**2**

Question Number	Explain why the data shown in Figure 3b may lead to unreliable conclusions. Answer	Mark
4(b)(iii)	**AO3 (4 marks)** Award **1** mark for one or more reasons, with further expansion marks up to a maximum of **4** marks. • "Sample number" is confusing (1) as its ambiguous not knowing if it refers to sites or number of samples (1) • The observations to collect beach slope may be inaccurate (1) therefore the data is not very trustworthy (1) • Small number of samples (1) so conclusions cannot be validated or compared against other data (1). • Long axis is small and difficult to measure accurately (1) so may reduce the strength of the overall conclusions (1.) • Only 10 samples sites (1) so could be different at different places up / across the beach (1) • Data only collected on a single day (1) so don't know how the system changes weekly / seasonally (1). Accept other ideas, based on information in the Figure 3b	**4**

Question Number	Suggest **one** possible risk for students visiting the area shown. Answer	Mark
5(a)(i)	**AO3 (2 marks)** Award **1** mark for a relevant risk related to the photograph and a second mark for the consequence. Maximum **2** marks. • Slips, trips, bumps (1) causing bruising (1). • Hit by cars / bike (1) which could lead to harm / injury / death (1) • Sprained ankles from uneven surfaces, or broken pavement (1) leading to possible hospitalisation (1). • Air pollution (1) leading to breathing problems (1). • Weather related – sunburn / cold / hypothermia (1) leading to swelling / inflammation / heart respiratory problems /dehydration (1). • The students are unfamiliar with the area (1) so they may get lost (1). Accept other valid ideas.	**2**

Question Number	Explain **one** way the students could manage this risk. **Answer**	Mark
5(a)(ii)	**AO3 (3 marks)** Award **1** mark for explaining a way a risk is managed and further expansion marks to a maximum of **3** marks. • Carry out a risk assessment (1) to include warning about careful crossing of roads at designated places (1) which reduces the risk of being struck by a vehicle (1). • Warn students about broken paving (1) so risk from trips and slips is reduced (1). • Wearing warm clothes (1) protects someone from hypothermia (1) by keeping the body protected from the cold (1). • Application of sun-tan lotion (1) will help protect skin from sunburn (1) so risk of skin cancer reduced (1). • Ensure all have clear instructions about meeting places (1) staying in groups (1) and have emergency phone numbers to avoid getting lost (1). Accept other valid ideas.	**3**

Question Number	Calculate the mode for noise level. **Answer**	Mark
5(b)(i)	**AO3 (1 mark)** Award **1** mark for performing the calculation of data up to a maximum of **1** mark. • 65 (1)	**1**

Question Number	Calculate the median for number of vehicles. Answer	Mark
5(b)(ii)	**AO3 (2 marks)** Award **1** mark for placing numbers into a rank order and **1** mark for correct answer up to a maximum of **2** marks. • 70,72,80,85,101,102,109,121,126,145 (1) • Median 101.5 (1)	**2**

Question Number	Explain why the data shown in Figure 4b may lead to unreliable conclusions. Answer	Mark
5(b)(iii)	**AO3 (4 marks)** Award **1** mark for one or more reasons, with further expansion marks up to a maximum of **4** marks. • "Sample number" is confusing (1) as its ambiguous not knowing if it refers to sites or number of samples (1) • The observations to vehicle counts may be inaccurate (1) therefore the data is not very trustworthy (1) • Small number of samples (1) so conclusions cannot be validated or compared against other data (1) • Noise level can be difficult measure accurately (1) so may reduce the strength of the overall conclusions (1) • Only 10 samples sites (1) so could be different at different places within city centre (1) • Data only collected on a single day (1) so don't know how the noise / traffic changes hourly / weekly / seasonally (1). Accept other ideas, based on information in the Figure 4b	**4**