

GEOGRAPHY

Paper 0460/11
Geographical Themes

Key messages

To perform well on this style of paper candidates should:

- Follow the examination rubric correctly, answering three questions, one from each section.
- Answer the questions they choose in the spaces provided.
- Be familiar with the command words used in questions.
- Identify words which indicate the focus and context of each question, ensuring that irrelevant material is not included.
- Use and interpret a range of different types of graphs to support ideas expressed in answers.
- Interpret photographs, diagrams, graphs and maps carefully, referring to relevant evidence in them.
- Learn the meanings of geographical word and phrases to define and accurately use them.
- Use comparative words to describe differences or compare features shown in source material.
- Write answers of an appropriate length by considering the mark allocations and space provided in the answer booklet.
- Write clearly and precisely.
- Develop ideas and/or link them to others when extended writing is required in questions worth five or more marks.
- Ensure that answers are entirely based on the provided source material when this is a requirement of the question.
- Be able to describe a distribution from a map and the location of a specific feature.
- Learn a suitable range of case studies, including relevant place specific information, and choose them with care to fit the questions selected.

General comments

Many candidates performed well across the paper, displaying excellent geographical knowledge and understanding and writing answers of a consistently high quality. Whilst other candidates were not as consistent, most were able to make a genuine attempt at many parts of their chosen questions. The paper achieved widespread differentiation, enabling all candidates to show what they knew, understood and could do.

There were a very small number of candidates that made rubric errors. In some cases, all six questions were answered, whereas in other cases candidates tended to answer three or four questions from the six, selecting two from the same section rather than one from each section.

The presentation of answers from candidates was generally acceptable and answers were usually included an appropriate amount of detail. Occasionally answers worth a small number of marks were excessively long, mainly due to the inclusion of irrelevant material, whilst some other answers to questions worth more marks were too brief. Most candidates, however, were guided by the space provided and mark allocations, the best responses being concise, yet sufficiently detailed and accurate. Some candidates made use of the continuation sheets at the back of the question-and-answer booklet. When using these extra pages, it is vital that candidates indicate that the answer is continued in the main body of the answer and clearly include the number of the question on the extra page(s).

Questions 1, 4 and 5 were the most popular questions. There were good answers seen to most questions, including those requiring extended writing, in particular the **part (c)** questions on migration, deforestation, volcanic eruptions and energy supply. The strongest answers from the most perceptive candidates were well focused, with developed or linked ideas. Weaker responses were typically poorly focused with brief lists of

simple points, sometimes in bullet points, not all of which were relevant. Many candidates included unnecessary general introductions in some questions with irrelevant information about the topic being tested. In some answers where case studies contained developed ideas, they tended to be generic developments with little place detail to support them. To enable access to the higher levels, candidates need to include place detail related to the chosen example.

The following comments on individual questions will focus on candidates' strengths and weaknesses and are intended to help centres better prepare their candidates for future examinations.

Comments on specific questions

Question 1

(a) (i) There were many correct answers within tolerance.

(ii) Many answers scored 2 marks with accurate plots and shading. Some reversed the shading, and others carelessly missed the 50 line. A few plotted at 20 and 50, not understanding the cumulative nature of the graph.

(iii) Many candidates scored the full 3 marks with clear comparisons. A few candidates simply used statistics but the main reason for loss of marks was candidates not clearly comparing as required.

(iv) Most candidates commented on the greater range of jobs and higher rates of pay. Stronger answers also referred to working conditions, fringe benefits etc. whilst weaker answers sometimes missed the key word 'work' in the question and wrote about other reasons for migration.

(b) (i) This question was generally well answered. Providing candidates wrote about the actual structure rather than the shape, answers tended to score at least 2 marks with correct references to both economically active and young/old dependents. Gender references were not always accurate and did not always refer to the relevant age groups. Another error was to refer to single bands on the pyramid rather than broader age groups.

(ii) Many candidates answered this well.

(c) A full range of benefits and problems were evident in candidates' answers. The USA was often used as case study here, mostly to good effect as candidates were able to write in some detail about the workforce with relevant developed or linked ideas. The problems of large amounts of immigration were less well described with many candidates writing Level 1 statements about various 'pressures' and/or over-simplifying the crime/drugs idea. A significant number of candidates included place detail.

Question 2

(a) (i) This was usually correctly answered.

(ii) Many candidates managed to score at least 1 mark, and a significant proportion scored the full 2 marks.

(iii) Many candidates omitted this question, perhaps not familiar with the term 'threshold population'. A full range of mark scheme ideas were seen from others, though rarely 3 of them in the same answer. Most candidates who scored typically gained 1 or 2 marks.

(iv) The quality of answers to this question varied. Most candidates were able to identify some correct answers with 'many customers' and 'access' being the most common.

(b) (i) Most candidates recognised the link between size and services for 1 mark. Generally, however, the data in the table was not well used which prevented many candidates gaining further marks.

(ii) This question was poorly answered overall with few candidates scoring more than 2 marks. Many candidates referred to people 'needing' the services in large settlements, along with the idea of more people 'supporting' the businesses and making them profitable. Few candidates referred to access, sphere of influence, etc.

(c) This was a challenging question for many candidates. A full range of answers were evident in responses. Many different urban areas were chosen as case studies, not all valid as some weaker candidates were unable to name an urban area, naming a country instead. Stronger candidates did include references to functions, developing or linking some valid ideas. Candidates benefit in questions about functions by choosing somewhere with a clear function, such as tourism or a port, enabling them to write clearly about the reasons for the function. Weaker responses referred only in general terms to the chosen settlement which prevented candidates from making valid references to either growth or functions.

Question 3

(a) (i) Many candidates correctly identified the anemometer. The most common incorrect answer was wind vane. Some incorrect answers were made up such as 'wind speedometer'.

(ii) Many candidates scored both marks. Common incorrect answers were temperature and rainfall.

(iii) Stronger candidates scored 3 marks by typically referring to high/trees/buildings/open areas.

(iv) Most candidates attempted to explain how the data was obtained from the instruments and differentiation was achieved through the clarity of their explanations. A common error was to state that the instruments were blown by the wind rather than the cups/arrow. Many candidates did not score the mark for the digital display of wind speed.

(b) (i) Many candidates answered this question correctly and gained all 3 marks. Some candidates misread the question and gave temperature, pressure and rainfall statistics rather than dates. Others did not show an understanding of 'range' of temperature as they wrote down several dates when the highest maximum temperature was recorded.

(ii) This question differentiated well. Some candidates demonstrated good knowledge of this procedure and scored full marks with very clear explanations. Other candidates scored no marks because they wrote about other weather phenomena rather than rainfall. Some wrote about rainfall but showed minimal knowledge beyond the need to check daily and gave little correct detail about the process of measuring the rainfall.

(c) A full range of answers were evident. Some excellent responses described the impacts fully and clearly, including place detail, with candidates having chosen an area with which they were familiar, e.g. from Central America or the Caribbean. Weaker responses tended to at least gain Level 1 marks through simple references to death, destruction of homes, etc. The strongest responses contained a range of sophisticated and well developed ideas.

Question 4

(a) (i) Nearly all candidates answered this question correctly.

(ii) Many candidates answered this question correctly. Incorrect answers either reversed the answers or wrote the names of plates or types of plates, e.g. oceanic/continental.

(iii) 'On plate boundaries' was the most common generic reference in response to this question, with both linear and clustered seen. Other candidates gained marks for examples of named plates or areas. 'Ring of Fire' was a common example, and many referred to the plates around the Philippines, only scoring if they referred to 'between' named plates which many did not do.

(iv) This question was generally well answered with many candidates scoring highly. Many listed 4 of the hazards referenced in the mark scheme. Others scored by reference to their impacts such as death, destruction of housing, etc.

(b) (i) This question was poorly answered overall. References to the colour of the rock and the circular/oval shape of the crater were the most common correct responses with relatively few candidates using words like 'steep'/'flat' to describe appropriate parts of the crater. 'Wide', 'big', 'deep', etc. were often used which were too subjective for credit.

(ii) Answers to this question were often quite impressive with some understanding shown by most candidates. All mark scheme ideas were seen. The most common references seen in answers were to fertile soils and tourism; some of these were developed for additional credit.

(c) There were some excellent responses to this question clearly and fully explained the sequence of events which caused an earthquake in a named area. In contrast, weaker candidates wrote about the impacts of the earthquake rather than its causes, often naming a large country rather than a precise location within it. Many Japanese examples were seen, along with examples such as the earthquake in Nepal and examples from Central and South America. Some candidates included place detail by referring to correct plate names or other details such as the date it occurred. Some weaker responses which did refer to causes showed little understanding with ideas such as plates 'bumping into each other' rather than references to friction, pressure, pressure release and seismic waves. Long introductions, sometimes including the impacts, were frequently seen and these gained no credit.

Question 5

(a) (i) Many candidates answered this question correctly but there were also a significant number of inaccurate responses.

(ii) Most candidates scored 1 or both marks for this question. Common errors were reading the graph without enough precision or omitting 'thousands'.

(iii) Most candidates scored marks for this question. All mark scheme ideas were regularly seen.

(iv) The impacts of school/work holidays and temperature were the most common correct responses given by candidates, though many stated these without really explaining them and consequently only scored 2 of the 4 marks. Common errors were vague references to weather/climate or writing opposites as separate reasons. Some candidates ignored the reference to 'during the year' in the question and instead wrote about variation over a longer period of time.

(b) (i) This was well answered by many candidates and many responses scored 2 or 3 marks. All mark scheme ideas were seen with references to air and water pollution, along with litter, being the most common answers.

(ii) This was generally well answered and many candidates scored high marks by referring to a range of appropriate ideas, some of which were developed. Weaker candidates tended to include a more limited number of valid points.

(c) Almost all candidates selected an appropriate example of an area where the tourist industry is important, although some named large countries which limited their mark. Many used local examples to good effect, showing detailed knowledge of a variety of attractions, with a blend of physical and human as required. Weaker responses tended to list attractions rather than describe them in detail and consequently scored at Level 1. Others included irrelevant detail, such as the benefits of tourism to local people, rather than focussing fully on what the question asked.

Question 6

(a) (i) This question was mostly answered correctly. A few candidates misread the scale of the graph.

(ii) This was generally well answered, with many responses relating in some way to the rivers being polluted. The fact that rivers may sometimes dry up was also a common correct answer.

(iii) Many candidates scored the full 3 marks with clear comparisons of the use of different methods of water supply. Some candidates compared two different villages, rather than Ikoga and Maun, as the question asked.

(iv) There were many high scoring answers to this question. All mark scheme ideas were seen, especially reference to the reduction of waterborne disease, improved sanitation and the use of water for irrigation. Weaker responses tended to be brief and simplistic with references to 'more healthy people', 'improving the economy' and 'less disease'.

(b) (i) Many candidates used the key accurately to compare statistics for Africa and Australasia. Stronger responses interpreted the statistics by referring to generally higher values and greater variation in Africa. An error made by some candidates was to refer to the maps showing water use for agriculture and/or industry rather than focussing on domestic use.

(ii) Most candidates recognised that the variation reflected the importance of agriculture and industry in different areas. More perceptive candidates made a clear link with development.

(c) A full range of answers was evident in response to this question. A variety of case studies were seen, with many using TNCs such as Nike, Starbucks and Walmart and describing their impacts in a variety of countries, particularly ones in Southeast Asia. The case study requirement discriminated well, with stronger candidates showing detailed knowledge of a variety of impacts, both on people and the natural environment. Many answers described in detail various ways in which workers were exploited, although candidates did recognise positive impacts for workers too. Weaker responses tended to list simple ideas, thus scoring at Level 1, rather than attempting to describe impacts more fully, especially when referring to impacts on the natural environment.

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simple points, sometimes in bullet points, not all of which were relevant. Many candidates included unnecessary general introductions in some questions with irrelevant information about the topic being tested. In some answers where case studies contained developed ideas, they tended to be generic developments with little place detail to support them. To enable access to the higher levels, candidates need to include place detail related to the chosen example.

The following comments on individual questions will focus on candidates' strengths and weaknesses and are intended to help centres better prepare their candidates for future examinations.

Comments on specific questions

Question 1

(a) (i) Most candidates were able to accurately place the words provided into the formula. A minority put immigration and emigration the wrong way round, and even fewer put death and birth rates the wrong way round.

(ii) Candidates generally performed well on this question, with the majority accurately describing at least one difference between population growth rates in Africa and South America, typically that in general they are higher in Africa. Although the question clearly stated that statistics are not to be used, a significant number of candidates did. Some even referred to colours on the map, although in many cases they also included appropriate comments, allowing them to access the marks. A common error was to write statements about just one of the continents without making any comparisons. Another common error was to attempt to give reasons for the different growth rates rather than simply describe them.

(iii) Most candidates demonstrated their confidence in using the map provided, with the majority completing the ranking correctly. Incorrect responses usually reversed China and Spain.

(iv) This question discriminated well and there were many high-quality answers. The lack of workforce and tax issues were frequently identified as well as the various economic and social costs of an ageing population, which is likely to be the result of population decline. Generally, candidates effectively explained their ideas in sufficient detail through linking or elaborating. A common error was to write about the causes of population decline rather than the problems caused by it. Candidates should give themselves time to read and understand the questions fully before answering.

(b) (i) Candidates were mostly able to identify three problems which people living in a country with a high population growth rate might encounter. Most responses were accurate and appropriate, concentrating on pressure exerted on employment or specified services and resources. The use of general vocabulary, for example words such as 'pollution', 'overcrowding', 'services' or 'infrastructure', rather than being more specific, often prevented some candidates from achieving full marks.

(ii) This was another question which discriminated well. Many candidates scored high marks by writing in detail about appropriate policies and strategies. Many of these suggestions were based on anti-natal policies introduced by countries such as China, whilst many also referred to significant issues such as female emancipation, contraception and abortion. High scoring answers showed both breadth and depth, with points often developed or linked. Weaker responses tended to focus on one or two simple ideas.

(c) Many candidates produced very strong responses to this question by describing a range of economic and cultural benefits of migration to a named country. Weaker answers consisted of simple descriptive lists, often in bullet points, or irrelevant general background, including the causes of migration. Candidates could either discuss the benefits of migration on the source or the host country; most chose to focus on the host country. Mexican migration to the USA was a very popular example, as were examples such as the UK and Qatar. Many candidates achieved at least Level 2 as they were able to describe a number of benefits in some detail, usually focusing on workforce and culture. The strongest answers, which gained Level 3, demonstrated a clear understanding of a wide range of benefits, which were clearly linked to places within the country or appropriate specific data. Many answers included statistics, but they were often included in

isolation. Candidates should remember to accompany statistics with relevant context within a case study.

Question 2

(a) (i) Most answers showed an understanding of the word 'rural', explaining that it is countryside, but often gave no definition of the word 'settlement' by reference to it being an area or place where people lived.

(ii) Answers varied in quality. The most popular responses were 'grocer', 'post office' and 'church'. Vague examples such as 'shop' needed more precision for credit. Some candidates gave answers of jobs, such as 'farming', or goods, such as 'milk', which indicated a misunderstanding of the word 'services'.

(iii) Most candidates scored at least one mark by referring to the population being small. Whilst a minority of candidates gained further marks for reference to other mark scheme ideas, especially those relating to the viability of higher order services, few gained full marks. There was very little accurate use of terms such as threshold population and sphere of influence.

(iv) Many candidates referred to roads and/or the stretch of water shown in the photograph and gave the reason for the growth of the settlement related to access or water supply. Common errors included reference in vague terms to scenery, calm/quiet atmosphere, unpolluted areas and migration.

(b) (i) Many candidates recognised that the settlement pattern for X is dispersed but that Y is nucleated or explained that in X the buildings are scattered, whereas in Y the buildings are very close together in a central area.

(ii) Most candidates recognised the pattern as being linear and the more perceptive were able to suggest a variety of reasons for this, such as the settlement developing alongside a river and road, and develop their ideas by referring to access to water and opportunities for trade. Some candidates recognised that the land was flat and therefore easier to build on. Weaker candidates gave only one or two simple ideas, mentioning the road or river or referring to flat land.

(c) Candidates used a variety of urban areas, including New York, London and Bangkok. Only a small number were able to make developed statements which described the impacts of urban growth on the rural areas. Instead, many made simple statements which achieved Level 1 only, such as air pollution, noise from the urban area, increased traffic and people being forced to migrate. These points could have been developed: for example, air pollution is increased in the rural area by the increase in vehicles which emit gases such as carbon dioxide. Many candidates wrote lengthy introductions, including detailed locational information, reasons for the urban growth and impacts on the urban area. Such detail was not relevant to the question and did not receive credit.

Question 3

(a) (i) Just over half of the candidates were able to read the correct answer from the graph. Some candidates made the error of reading the temperature instead, but most incorrect answers were due to inaccuracy of reading and using the scale provided.

(ii) Many candidates found this question challenging and few scored marks. Whilst the question was testing the reading of the graph the essential requirement was a familiarity with the phrase 'annual range of temperature'. Those candidates who knew that this was calculated by subtracting the lowest from the highest monthly average scored two marks by subtracting 24.5 from 26. Many candidates attempted to calculate the mean annual rainfall, and some candidates used the wrong figures, in this case the rainfall figures.

(iii) Many candidates scored three marks for identifying features **X**, **Y** and **Z**. Other candidates simply guessed and gave incorrect answers.

(iv) Many candidates observed that there is high rainfall and/or high temperature all year round, as indicated by Fig. 3.1. Some also referred to high amounts of sunlight enabling photosynthesis and rapid/continuous growth. Weaker answers showed some knowledge but often used terms such as 'optimum' or 'adequate' to describe rainfall or temperature rather than being more precise. As the

question instructed candidates to use Fig. 3.1 only, any reference to factors other than climate were not relevant (e.g. soils, fauna).

(b) (i) Most candidates interpreted the divided bars and compared South America and Africa effectively. Full marks were frequently awarded.

(ii) Stronger candidates suggested a variety of impacts of deforestation on people who live in the rainforests, with many references to ideas such as homes being destroyed, loss of food sources, loss of medicinal plants and loss of culture as people are forced to migrate from their ancestral lands. Such answers often showed both breadth and depth, with some points being effectively developed or linked. Weaker responses tended to focus on one or two simple correct ideas, though some needed elaboration in order for the impact on people to be clear (e.g. flooding, soil erosion, loss of vegetation). A common error was to refer to impacts on the natural environment, locally and globally. These ideas were not relevant to this question.

(c) The impact of deforestation on the local natural environment was well understood by many candidates. Examples chosen ranged from the Amazon or specific parts of countries such as Ecuador, to parts of Southeast Asia such as Borneo and named parts of countries such as Malaysia. Simple ideas at Level 1 tended to relate to loss of wildlife, although most candidates were able to link or develop ideas in order to enter Level 2 (e.g. 'destruction of habitats has led to extinction of species'). Reference to named species, such as the orangutan in Borneo, was a way in which some candidates were able to add place specific detail, but many otherwise good answers did not achieve the highest level as they lacked this element. A common error was to refer to global issues (e.g. global warming, rising sea levels) rather than focusing on the local natural environment which was specified in the question. Similarly, a few candidates included references to impacts on people (e.g. decline in tourism) which were also not relevant.

Question 4

(a) (i) The majority of candidates correctly identified volcano **B** as a shield volcano. A strato-volcano was the most common incorrect answer.

(ii) The vent was defined well with candidates recognising that this was the opening for the magma to escape. A common error was to define the crater and not make the link that the magma came through an opening or tube from the magma chamber.

Fewer candidates achieved the mark for the magma chamber definition. Common responses referred to the magma chamber as 'the place where magma is stored'. Although the storage part of their answer was correct, there was no credit for simply repeating magma; molten rock had to be referred to. Candidates should avoid simply repeating words from the question when terms have to be defined.

(iii) This question was mostly well answered. Responses needed to be comparative; some candidates achieving this by the use of statistics and others by using words such as 'wider', 'higher' and 'steeper'. The most common error was in the 'height' section as volcano **A** looked much taller than **B** at a first glance. However, when looking at the scale it is clear that volcano **B** is much higher.

(iv) This was generally well answered with many candidates scoring high marks. All mark scheme ideas were seen, with the most frequent being fertile soil, employment in tourism and geothermal power. It is important that candidates do not simply list single words such as 'farming', 'tourism' or 'energy'. They should explain how, for example, tourism benefits the people living in the area and what type of energy can be generated. Some candidates referred to scientists being able to study the volcano, but this was not valid as it is not a benefit to 'people living in the area'. Common misconceptions from weaker answers were that that people live near volcanoes as land and housing is cheap and that they make the weather warm.

(b) (i) This was well answered by many candidates who showed very good understanding of the processes occurring at divergent boundaries, such as the one shown on Fig. 4.2. The resource was well used with many candidates referring to the plate boundaries and the idea of divergent movement enabling magma to rise to fill the gap.

A few candidates made the error of describing destructive margin processes, whilst another error was to state that the 'plate boundaries' moved.

(ii) This question was mostly well answered, and all mark scheme ideas were seen. As the question asked for problems these could refer to either the natural environment or people. However, simple lists of hazards (e.g. lava, ash, lahars, pyroclastic flow) were insufficient as candidates needed to indicate what specific problems they caused. The most common answers referred to damage to homes which then led to evacuation or homelessness, destruction of crops, damage to roads, death, atmospheric pollution disrupting flights and unemployment due to damage to workplaces. Whilst high-quality answers included a number of points, some being developed, weaker responses focused on a limited range of simple ideas.

(c) There were some excellent responses to this case study question. The range of examples was varied and included Montserrat, Mount Sinabung, Mount Etna, Mount St Helen's and Mount Vesuvius as well as reference to various volcanoes in Iceland. Almost all candidates understood that they needed to write about reducing problems caused by volcanic eruptions and there were a lot of well thought out ideas included, such as diversion channels, areas being evacuated, monitoring taking place, wearing face masks and education relating to how to react and respond. Often these points were developed or linked and as a result reached Level 2. However, many candidates spent too much time setting the scene by describing an eruption in detail and writing about the devastation caused, e.g. loss of lives, damage to the environment, etc. This may have addressed the required place specific element but prevented candidates from answering the question fully.

Question 5

(a) (i) This was well answered with most candidates stating the correct percentage.

(ii) A number of candidates did not attempt this question. Whilst there were a significant number of carefully constructed and fully correct pie charts which scored both marks, many candidates gained only one of the two marks. The most common reason for this was the two uses of water being in the wrong order. Other errors made were not drawing the dividing line in a sufficiently accurate position at 32% and not using the correct shading for each section.

(iii) This was generally well answered with candidates interpreting the pie charts accurately and comparing the use of water in Malawi and the UK. Many used comparative ideas, such as 'a greater percentage of water is used for agriculture in Malawi than in the UK', whilst others compared the greatest and least percentage use in the two countries. Both methods were acceptable although those who simply referred to one country only did not gain marks. Another error seen was to answer simply by using statistics, despite the instruction not to do so.

(iv) Weaker responses often simply repeated the idea of a lack of clean water without any explanation as to why this was the case, other than unqualified references to poverty or contamination of supplies. Other candidates were able to qualify their reference to poverty (e.g. many cannot afford a house tap, well or connecting pipework). More perceptive candidates also included clear reasoning, such as the use of large amounts of water for agriculture (thus a shortage for other uses), the lack of purification plants, lack of investment in rural areas and a general lack of government investment in various elements of the water supply infrastructure. Few candidates referred to the lack of reservoirs being a factor, resulting in the country potentially suffering from drought/dry seasons. Some recognised Malawi is a landlocked country, but this was not relevant as, even if it was by the sea, they would be unlikely to afford desalination plants.

(b) (i) Many candidates answered clearly describing the three methods of water supply and scoring high marks. Many others simply listed the sources (i.e. a river, a tank and a well) without making any attempt to describe them (e.g. water from underground collected from a well by using a bucket). Candidates need to pay attention command words, in this case 'describe'. Some candidates wrote about the quality of the water supply shown in the sources which was not relevant.

(ii) There were many strong answers to this question scoring high marks. All mark scheme ideas were seen. Higher scoring answers often made several points, developing some for additional credit. Weaker responses tended to make just one or two simple points, typically the idea of water being stored so that it was available for future use rather than being wasted. Some candidates also referred to multiple uses such as the generation of HEP, along with the ability to reduce flood risk in addition to water supply. This was considered valid as it makes the building of reservoirs more

financially viable. Common misconceptions included references to building a dam being easy and low cost.

(c) Various case studies were used in response to this question. Examples included Iceland, China, UK, Germany, Switzerland, Zimbabwe, Nigeria and Kenya. Energy types varied according to the country but there were many references to gas, oil, HEP, solar power, geothermal power and wind power. High scoring answers developed references to each form of power by explaining how it is supplied, adding place detail in some cases. Weaker candidates tended to simply list the energy sources and so scored within Level 1. Many candidates spent too long writing an introduction on the country and its need for energy, leaving themselves with less time to develop their ideas. Another common error was to include irrelevant details about the advantages and disadvantages of various renewable and non-renewable energy sources, along with their impacts on the environment.

Question 6

(a) (i) The majority of candidates answered correctly with farmer/agriculture and miner/mining being the most popular answers. The industry or the type of employment were both accepted.

(ii) Some candidates found reading a triangular graph challenging and gave incorrect values. A significant number of candidates did get both values correct but it was also quite common for candidates to get the value for tertiary industry correct but not secondary industry.

(iii) This was generally well answered although some candidates did use statistics in their answers despite the instruction not to do so. Typically, candidates made accurate comparisons of primary and tertiary employment in LEDCs and MEDCs. Many stated, however, that MEDCs have more employment in secondary industries rather than using the graph to identify that they are in fact very similar or only slightly larger values.

(iv) This was generally well answered. Many candidates correctly stated that primary employment would be likely to decrease and justified this assertion by reference to mechanisation of farming or the exhaustion of raw materials. Many also suggested that tertiary employment would increase in importance, with references to increased education/skills or an increase in the provision of services as disposable income increases. Some also stated that there may be a rise (or fall) in secondary employment though reasons for this tended to be less secure, with weak responses attributing it to nothing more than a fall in primary employment. A few candidates referred to industrialisation, particularly the role of TNCs. Weaker candidates tended to suggest trends, which were usually correct, but offered no reasoning.

(b) (i) The majority of candidates answered this correctly. The most common error was to transpose life expectancy and number of tourists.

(ii) Many candidates answered this question very effectively and gained full marks. Whilst weaker responses tended to refer generally to indicators of development, showing little or no specific knowledge about HDI, stronger candidates knew that it was a composite index using multiple indicators and were able to express this clearly. They also identified that there was a measure of health/life expectancy and education although knowledge of the economic aspect was not as secure. Many candidates used GDP or GNP instead of GNI or used simple phrases such as 'the money the country has' or 'how rich a country is'. There were also candidates who wrongly referred to literacy rates and birth/death rates as part of the HDI indicator. Examples of very good responses also included reference to the scale of 0 – 1, indicating this this enabled comparison between countries and changes over time.

(c) There was a wide range of responses to this question in terms of examples used, content and levels of response. Most candidates used suitable examples of TNCs with Apple, McDonalds, Tata, Nike and Walmart being popular. All of these produce physical products for sale and the best answers described where they were located, where the goods were made, where raw materials were sourced from and how the products were distributed to markets. There were some excellent details provided including statistics, although a few candidates strayed into the history of the company, which was not always relevant. It was common for candidates to reach a Level 1 response in their initial descriptions of the TNC by commenting on their home base and the fact that they manufactured or traded in many different countries globally. However, it became evident in many responses that candidates then were writing about the impacts of TNCs rather than their

features. There were many answers that focused on how the TNC brought benefits and disadvantages to LEDCs which were not relevant. Where candidates retained the correct focus, they generally developed their descriptions by reference to different elements of TNCs being located in different parts of the world. Many wrote about production being in LEDCs as the cost of labour was lower and that finished goods were then shipped to other countries for sale. They were also secure in their understanding that much of the research and development took place in the 'home nation' and that wages were higher in these jobs. Given sufficient developed ideas candidates typically were able to access Level 3 because of place specific references within their answers. Candidates must read questions carefully when writing about TNCs and not answer the question that they assume it is. Features of TNCs are clear and very different from effects of TNCs.

GEOGRAPHY

Paper 0460/13
Geographical Themes

Key messages

To perform well on this style of paper candidates should:

- Follow the examination rubric correctly, answering three questions, one from each section.
- Answer the questions they choose in the spaces provided.
- Be familiar with command words used in questions.
- Identify words which indicate the focus and context of each question, ensuring that irrelevant material is not included.
- Use and interpret a range of different types of graphs to support ideas expressed in answers.
- Interpret photographs, diagrams, graphs and maps carefully, referring to relevant evidence in them.
- Learn the meanings of geographical words and phrases to define and accurately use them.
- Use comparative words to describe differences or compare features shown in source material.
- Write answers of an appropriate length by considering the mark allocations and space provided in the answer booklet.
- Write clearly and precisely.
- Develop ideas and/or link them to others when extended writing is required in questions worth five or more marks.
- Ensure that answers are entirely based on the provided source material when this is a requirement of the question.
- Be able to describe a distribution from a map and describe the location of a specific feature.
- Learn a suitable range of case studies, including relevant place specific information, and choose them with care to fit the questions selected.

General comments

Many candidates performed well across the paper, displaying excellent geographical knowledge and understanding and writing answers of a consistently high quality. Whilst other candidates were not as consistent, most were able to make a genuine attempt at many parts of their chosen questions. The paper achieved widespread differentiation, enabling all candidates to show what they knew, understood and could do.

There were a very small number of candidates that made rubric errors. In some cases, all six questions were answered, whereas in other cases candidates tended to answer three or four questions from the six, selecting two from the same section rather than one from each section.

The presentation of answers from candidates was generally acceptable and answers were usually included an appropriate amount of detail. Occasionally answers worth a small number of marks were excessively long, mainly due to the inclusion of irrelevant material, whilst some other answers to questions worth more marks were too brief. Most candidates, however, were guided by the space provided and mark allocations, the best responses being concise, yet sufficiently detailed and accurate. Some candidates made use of the continuation sheets at the back of the question-and-answer booklet. When using these extra pages, it is vital that candidates indicate that the answer is continued in the main body of the answer and clearly include the number of the question on the extra page(s).

Questions 1, 3 and 5 were the most popular questions. There were good answers seen to most questions, including those requiring extended writing, particular the **part (c)** questions on river flooding, impacts of economic activity and water resource management. The strongest answers from the most perceptive candidates were well focused, with developed or linked ideas. Weaker responses were typically poorly

focused with brief lists of simple points, sometimes in bullet points, not all of which were relevant. Many candidates included unnecessary general introductions in some questions with irrelevant information about the topic being tested. In some answers where case studies contained developed ideas, they tended to be generic developments with little place detail to support them. To enable access to the higher levels, candidates need to include place detail related to the chosen example.

The following comments on individual questions will focus upon candidates' strengths and weaknesses and are intended to help centres better prepare their candidates for future examinations.

Comments on specific questions

Question 1

(a) (i) Most candidates put the words in the correct order.

(ii) Most candidates gained two marks by identifying a country with a large area and untapped resources with a relatively small population such as Australia, Russia or Canada and a country with a smaller area with a relatively high population, often in Africa or Asia, such as Nigeria, India and China.

(iii) Few candidates addressed the key term in the question, which was 'over-populated', and so gained few marks here, unless they mentioned rapid population growth, high immigration/net migration and/or shortage of resources. Most answers tended to incorrectly focus upon the causes of rapid population growth such as lack of contraception and high infant mortality.

(iv) Where candidates gave two developed points about a resource which was lacking and how that would be a problem for the population of an overpopulated country or area they scored full marks. Good answers were seen such as traffic congestion leading to air pollution and unemployment leading to poverty. Weaker candidates tended to list a number of simple statements such as lack of water, food, schools, hospitals and housing but only scored two marks since these ideas were not developed in any way.

(b) (i) Most candidates gained three marks by ranking the population and area figures already in the table and accurately calculating the population density by dividing the population by the area of each island. Other candidates made a significant number of errors in their answers.

(ii) Most candidates understood to some extent that the question required them to explain the population-resource balance in terms of why some areas of high density may not be over-populated. Many candidates, however, began their response with an irrelevant explanation about how populations were not evenly spread across countries and that areas with low and high population densities would balance each other out. Where the candidate had understood the premise of the question and explained why, despite the high density, countries could have sufficient resources for all, their answers gained credit. Good answers started with the basic provision of sufficient food/water but then went on to describe the availability of other raw materials and energy sources, housing or the provision of public services such as education and healthcare. Few candidates developed their answers to explain that adequate water could be provided by dams or water piped to homes, instead gaining marks by referring to a range of resources.

(c) Some candidates misunderstood this question and answered poorly with many gaining either no credit or only giving one basic idea Level 1 idea. Most candidates were able to state an appropriate country or area with a low population density. Common errors were to describe at length irrelevant reasons for the higher density found in other areas of the country or alternatively consider the reasons for low birth and population growth rates such as availability of contraception. Better answers considered climatic or relief factors which would lead to population being repelled such as deserts or high mountains. At times little explanation was given as to how these factors made it difficult to live in such areas, such as, for example, the impossibility of farming or finding a water supply. Candidates should consider exemplars of high and low population densities in named areas, e.g. in India where the sparse/low population density of the Himalayas and/or Thar Desert could be contrasted with the Ganges valley and delta and the port city of Kolkata.

Question 2

(a) (i) This question was usually well answered. Some candidates confused internal migration with international migration.

(ii) Most candidates were able to put the provinces of Italy in the correct rank order.

(iii) Many candidates were able to correctly identify either push or pull factors which cause high rates of negative net migration. Some candidates appeared to misread the question and instead gave the negative impacts of migration on the migrants, such as racial tension and difficulty finding jobs.

(iv) This question was not well answered overall. Candidates needed to read the question carefully, as they needed to consider negative impacts on the places of origin of the migrants, such as the loss of working population and less food being produced, rather than the negative impacts on the place of destination, such as pressure on housing.

(b) (i) Candidates were able to analyse the pie graphs to clearly describe differences between the reasons for migration. A clear written comparison was required using words; a few candidates gave statistics, even though the question stem stated they should not do this.

(ii) This question was usually well answered. The main errors were where candidates failed to address the question in full. The question stem asked how far candidates agreed with the idea that rural to urban migration improves living standards for migrants, and so as well as the positive impacts which were usually considered, the answer also needed to consider at least one negative factor to gain full marks.

(c) This question was not well answered overall. Candidates needed to read the question, which focused on improvements to living standards, carefully. Candidates should have considered strategies to reduce the negative impacts of urbanisation, e.g. self-help schemes, site and services schemes or the building of low-cost local authority housing.

Question 3

(a) (i) Most candidates correctly named rainfall/precipitation.

(ii) Many candidates scored both marks here with transpiration and evaporation being the most common correct responses. Groundwater flow was the most common incorrect answer.

(iii) Candidates who had a good knowledge of water cycle terminology scored full marks. Many other candidates found it challenging to name the processes. Throughwater flow was a common incorrect answer for label Z.

(iv) Many candidates gave good responses, identifying a number of factors from the mark scheme and gaining high marks. Some candidates went beyond the simple identification of the reasons, explaining how the factors influenced surface run off. Whilst impressive, such development could not be credited as it was a four-mark question which required the identification of four different factors.

(b) (i) Many candidates only gained one or two marks in response to this question. They often restricted their answers to what they could see in the image, which in this case at times led to irrelevant ideas such as rocky, valley or mountainous. The question asked candidates to suggest reasons why the river may flood, so whilst the steep slopes are relevant, other relevant ideas such as heavy rain or snow melt were not seen as often as expected.

(ii) This question was generally well answered with many candidates gaining high marks by referring to a range of appropriate ideas some of which were developed. Weaker candidates usually gave a more limited number of valid but simple points.

(c) There were some excellent responses from candidates that explained the flood reduction strategies fully and clearly, including place detail, having chosen a river with which they were familiar. Most candidates understood that they had to write about strategies to reduce the problems caused by floods though a small number simply wrote about the problems caused by flooding which gained no credit. Weaker responses tended to simply state Level 1 ideas, with references to dams, tree planting and riverbanks or they described approaches such as not living in flood plains, warnings and evacuation. Developed responses contained a range of well explained ideas, such as

afforestation increasing interception or reducing overland flow, dredging increasing the capacity of the river channel, or dams allowing the control of the volume of water flowing in the river.

Question 4

(a) (i) Candidates found this question challenging. The most common answer was the reversal, south-west, which was incorrect. Candidates needed to be aware that the prevailing wind direction was indicated by a large arrow on Fig. 4.1.

(ii) Many candidates gained both marks for identifying a similarity and a difference and all mark scheme ideas were frequently seen. The most common error was in the differences with some simply writing about one of the deserts (e.g. 'Sonoran Desert is partly in Mexico') without referring to the Mojave. This meant that they did not give a comparative statement.

(iii) This question was generally well answered with most candidates correctly identifying 'dry/arid' and many others referring to the high diurnal temperature range. Many answers also gained the 'hot' mark, though this was not mentioned by some, although they did tend to include reference to hot daytime temperatures within the diurnal range idea. Reference to seasonal variation of temperature was not common; in fact, significant numbers incorrectly used phrases like 'hot all year round'. Whilst most candidates understood that they had to write about climate, some included references to other features of deserts. Some referred to high air pressure which is an explanation and not a climatic characteristic.

(iv) This proved challenging for many candidates whose answers displayed numerous misconceptions. Few candidates could explain how the features shown on the map, such as the prevailing winds, cold ocean current and the Tropic of Cancer resulted in a hot desert climate. Many mentioned these features but very few showed an understanding of how and why they resulted in desert areas with low amounts of precipitation. The most common correct answers referred to the location of the deserts in relation to the prevailing winds, although this concept was often poorly understood. Only a very small minority of answers correctly explained the impact of the cold ocean current, with many incorrectly referring to this as an air current. A few candidates associated the Tropic of Cancer with high pressure and descending air.

(b) (i) This was generally poorly answered by many candidates who did not use the photograph effectively to describe what they could see. References to the mountains and the loose rocks (typically referred to as 'sand') were the most common correct responses with relatively few candidates using words like 'flatter land/lower slopes' to describe where the vegetation was. Many references to the sky were seen despite the use of the word 'landscape' in the question.

(ii) There were many good answers to this question which demonstrated knowledge and understanding. All mark scheme ideas were seen with answers describing a number of relevant features of desert vegetation, many going on to explain how that enabled them to survive in the hot and dry conditions.

(c) Some excellent answers were seen in response to this question. Most candidates selected Amazonia though a significant minority selected a south-east Asian example, some candidates choosing Malaysia. The focus of the question was on vegetation, which most candidates correctly wrote about. A few incorrectly focused on climate or fauna and some wrote about deforestation which gained no credit. Good answers wrote about specific features, such as buttress roots, lianas, drip tip leaves etc., explaining in each case how the characteristics/adaptations suited the equatorial climate. Weaker candidates described the vegetation in general terms, e.g. high variety, dense and layered, but did not develop their answers to explain how these features allowed the vegetation to adapt to the climate. Some high-quality answers lacked sufficient place specific detail.

Question 5

(a) (i) Most candidates answered this accurately.

(ii) The majority of candidates stated that they both increase and that the carbon dioxide fluctuates but temperature is more constant.

(iii) This question was generally well answered. The most frequent answers were fossil fuels, more cars, industry and deforestation.

(iv) This question was generally less well answered, with little understanding shown and some confusion with the ozone layer. Many candidates did not explain the process fully using the steps described in the mark scheme and often gained one or two marks only for referring to the fact that the heat is trapped and/or that this leads to a rise in global temperature.

(b) (i) There was a mixed response to this question with some candidates explaining what had led to the loss of species, more drought and rising sea levels, rather than describing a problem which was likely to be caused by each of these factors. Good answers showed a detailed understanding of the impacts of loss of species, particularly on food chains and on biodiversity. Droughts were usually linked to a more limited food supply, whilst fewer answers considered the impacts of rising sea levels to good effect, often referring to flooding but not linking this to coastal areas.

(ii) Good answers showed a depth of understanding of the difficulties involved in reducing global warming, referring to increasing population, the dependence on fossil fuels and reliance of the population on activities such as using cars, and the use of electrical appliances, as well as considering the lack of awareness or acceptance of global warming and the difficulties involved in securing global cooperation. Simpler answers tended to consider the growing population but then repeated answers to **Question (a)(iii)**, such as more cars, without explaining why there are more cars (e.g. the fact that people rely on them).

(c) Some weaker answers focused on global warming which did not gain credit as the question was about the local natural environment. Tourism was a popular choice of activity and worked well, especially where it was linked to impacts on a small island or small area. Examples such as the impacts of manufacturing industry in areas such as the Pearl River Delta also worked well, as did local examples used by candidates. Answers were sometimes limited by a lack of development: for example, air pollution, water pollution and deforestation were often mentioned as different and valid Level 1 ideas but these needed to be developed further with different ideas, such as air pollution leading to acidification of water, water pollution negatively affecting food chains, or deforestation causing a lack of habitat.

Question 6

(a) (i) This was answered well and most candidates read the key and the scale correctly.

(ii) Candidates generally completed the divided bar graph well, with the dividing line correctly drawn at 36% but occasionally the line was drawn at 76%. It is important that candidates looked carefully at the order in which the other bars were completed which meant that the shading should have been industry and then agriculture.

(iii) This question was very well answered. Comparative statements were made and three different points were often referred to. Very few candidates referred to statistics and so followed the instructions correctly. The correct countries were referred to in nearly all cases.

(iv) This was a challenging question for candidates. Common correct answers referred to the fact that MEDCs have dams and reservoirs, were less likely to suffer from droughts and that water was treated through desalination and filtered water.

(b) (i) There were some good answers seen in response to this question. Common correct answers referred to litter getting into the river, industrial waste and domestic waste. A common error was to misread causes for consequences and no credit could be awarded for this. Two common incorrect answers referred to the fact that rivers were not cleaned and that people were not educated about the consequences of river pollution.

(ii) Most candidates correctly referred to both people and the local natural environment. In terms of human impact, candidates often referred to named waterborne diseases, the smell that would exist, the visual impact and the lack of drinking water. In terms of the natural environment, reference was made to fish being killed, habitat damaged and the impact on the food chain.

(c) This question was very well answered. There were often three developed statements made with place specific information so seven marks were awarded quite frequently. The common examples referred to Singapore and how water is being managed there as well as the Lesotho water project. Candidates answered the question directly and succinctly and generally avoided including

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irrelevant points that may well have been useful for place specific detail but did not address the question. Reference was made to moving water between different areas, importing water, desalination, fines given to those who caused water pollution and the use of dams and reservoirs to collect and store water and distribute when required.

GEOGRAPHY

Paper 0460/21
Geographical Skills

Key messages

- Paper 21 is a skills paper and candidates are required to use the resources within the questions, including maps, diagrams, graphs, field sketches, choropleth maps and photographs.
- Candidates must read the questions carefully and identify the command word(s) in order to write what is required.
- Candidates should have a thorough understanding of geographical terminology and be able to use this in their answers. Language used should be precise and appropriate; vague terms such as *quality of life*, *resources* and *infrastructure* will not be credited.
- Many candidates do not understand the concept of an overall pattern when looking at choropleth maps. It is important that they do not look at every single aspect of the map but pick out key features, usually informed by the number of marks available.
- Candidates should not rewrite the question in their response. They should use the time and space available on the answer itself.
- If the additional pages are used, candidates must clearly state the question number(s) their response relates to.
- Candidates are advised to remember the importance of legibility in presenting their answers. Handwriting should be clear.

General comments

This proved to be an accessible paper. Most candidates attempted to answer every question and the no response rate was generally low. There were no noticeable timing issues. Where candidates scored lower marks, it was usually due to a lack of knowledge and understanding of certain areas of the syllabus, although failing to identify the command word, misuse of geographical terminology and unclear responses also contributed. Mapwork skills continue to improve but many candidates would have benefited from practice with grid references, distances and compass bearings.

Comments on specific questions

Question 1

(a) Candidates demonstrated sound map skills and were able to interpret the 1:50 000 Swedish map and its key effectively. Feature **A** was *parish church*, feature **B** was the *river (Lillian)* and feature **C** was a *hiking trail*. The type of road at **D** was a *private road with barrier*. The land use at **E** was *marsh/peat cutting*. The height above sea level of the spot height at **F** was 27 m.

(b) Four possible six-figure grid references were given for the road junction labelled **G**. The correct answer was 275793 and the majority of candidates gained a mark.

(c) This question was worth five marks and required extended writing. It focused on the settlement of Kungsbacka and asked for reasons for its growth. There was a great deal of map evidence that could be used to answer this question and overall, it was answered well. The majority of candidates explained how each reason contributed to the growth, which was not necessary for the 'suggest' command word. The most common answers were *river*, *coastal/marina*, *motorway*, *railway*, *forest*, *arable land* and *industrial area*. Most candidates recognised that there were roads but sometimes this was not quantified as *many roads* or identified as a *road junction*. The land is not flat, as many suggested, it is *gently sloped/flatter*. Few identified that the area is *lowland/under 35 m* or a *valley floor*.

(d) A small number of candidates did not understand the concept of either a service or locals. Those that did gained marks for *church* (parish/other but a maximum of one mark), *sports ground*, *football ground*, *trotting track*, *marina*, *railway station*, *cemetery* and *golf course*. It is worth noting that the key needs reading alongside the map itself, so sports centre and port were not accepted as they were not listed in the key.

(e) The river Kungsbackaån is the main river flowing through the map extract. This question asked candidates to describe its features and was worth three marks. It was evident that some candidates lacked knowledge on the topic of rivers and therefore could not use geographical terminology to identify the features. The best answers took an overview of the river by stating that it is *flowing south*, has *tributaries/confluences* and has a *variable width*, before looking at specific characteristics along its course such as *meanders (in north)* and *straight (in south)*. Other creditable points were that the river is *bridged* and has its *mouth at Svinholmen*.

(f) The response to the distance along the railway line between the two stations in **part (i)** was 3.1 km and answers between 3.0 and 3.2 km were credited. A number of candidates gave extreme answers of thousands of kilometres, not understanding how to use the scale. The compass bearing in **part (ii)** was also often misunderstood and a large proportion gave the answer as a compass direction. The bearing was 201° and answers between 200 and 203° were credited.

Question 2

(a) This question was based on the global distribution of car production and utilised a choropleth map. The syllabus states that candidates are not required to have any place specific knowledge for this paper but they are expected to know the location of continents. Therefore, when **part (i)** asks for a description of the global distribution of car production no credit was given for named countries, only continents. More than half the candidates referenced at least one country (usually China), with many listing upwards of five. The overall distribution is *uneven*, although relatively few identified this. Creditable statements for each continent were *highest in (east) Asia*, *high in (central) North America*, *high/second highest/throughout Europe*, *higher in western Europe than eastern Europe*, *in parts of South America*, *lowest/few countries in Africa* and *low in Oceania*. It is imperative that candidates look for an overall distribution rather than intricacies. **Part (ii)** was looking for a reason for the global distribution of car production and responses were mixed. Stating that MEDCs produce cars and LEDCs do not was not sufficient for the mark, however, saying that *wealthy countries produce cars* was creditable. Other popular correct answers were *in areas with high levels of technology*, *coastal areas* and where there is *cheap labour*. Infrequent but good answers included *where demand is high*, *near component suppliers*, *in areas with high levels of education* and *investment by TNCs*.

(b) Candidates were required to complete a bar graph in **part (i)** to show that Germany produced 5.6 million cars. Many candidates drew without using a ruler and HB pencil, therefore the line was inaccurate and unclear. The front page of the question paper states that candidates will need a ruler. Fig 2.3 for **part (ii)** was a photograph of a car factory in Germany. The question asked for three reasons for the location of the factory using the photograph alone. This was answered very well and it was rare for candidates to write something not evident in the image. The car factory is on *flat land*, *in a large area with room to expand*. There is a *road network/many roads/main roads/motorway* and *housing for the workforce*. It is also *near other industry with pleasant surroundings*. There was some confusion as to the settlement, how near or far it was and whether it was a village or a CBD. However, this did not stop most candidates achieving full marks.

Question 3

(a) This question was based on the topic of coasts and featured a photograph of a classic coastal landscape in France. Accompanying this was a student's field sketch of the area. Candidates were asked to label four coastal features on the sketch but some labelled fewer than four and some labelled more. It was important that an arrow was used to show exactly what was being labelled to avoid ambiguity. The most popular answers were *headland/cliff*, *arch* and *stack*. *Stump* was not accepted. There was some confusion over the *beach*, with lots incorrectly labelling the beach as a wave-cut platform. There was evidence of a *wave-cut platform* but it was at the base of the arch and in the shallow water, which no one correctly located. A handful of candidates identified the *cracks*. The following could also have been credited but there were no candidates who labelled them: *jagged/rough rock*, *loose rock* and *high tide line*. This question had the highest no response

rate on the paper so it is important candidates read the entire paper, not just where answer lines are allocated.

(b) To a certain extent, if candidates did not correctly identify the arch in **part (a)** then they may have had difficulty with suggesting how and why the feature would change in the future. Despite this, most did have some knowledge of coastal process although many lost marks through not refining their answer. Marks were only awarded for what will happen to the arch in the future, yet over half of candidates recited a textbook style answer of how a crack turns into a cave which then turns into an arch. As these processes precede what the question was asking some marks were not achieved. The 'how' marks were for the *arch collapsing and leaving behind a stack*. There was a one-mark reserve for 'how'. The 'why' marks were for *wave erosion, a named erosional process, weathering* which takes place *along lines of weakness* and a *loss of support*.

Question 4

(a) This question was about the employment structure in Tanzania, Mexico and the Netherlands. In **part (i)** candidates had to state the percentage of Mexico's employment in the tertiary sector. As the primary percentage was given as 12% and the secondary as 26%, the calculation was 100–38 to give an answer of 62%. **Part (ii)** required candidates to complete the pie graph for the Netherlands. It is imperative that candidates complete the pie graph in the order given so that it is comparable to the examples. In this case, the primary sector must be drawn first, starting from 0°, followed by the secondary sector. Both parts must then be coloured in accurately using the key. The correct line was drawn at 7° and answers between 6 and 8° were credited. As with any question where candidates have to complete a graph, a ruler and HB pencil should be used to ensure accuracy. **Part (iii)** was answered well with most candidates recognising that *the Netherlands has a high proportion of people working in the tertiary industry*. Lifting the statistic of 82% from the pie chart and not qualifying it as 'high' resulted in no marks. In **part (iv)** candidates were given four job roles and they had to select that a *biotechnician* was an example of a quaternary industry.

(b) This question was not answered particularly well and there was a vast array of answers given. It seemed that some candidates confused themselves and overcomplicated what could have been a straightforward question. As candidates do not need any place specific knowledge for this paper, they could ignore the reference to Tanzania and address the question as why some countries have a large amount of primary industry. The main reason is (*subsistence*) *agriculture* and the fact that *there is land available to farm*, although this was not always recognised. Reference to *mining/amount of minerals* was also creditable. Another mark could be gained for the *demand for food/minerals for export* although this was very rarely given. Few candidates mentioned the *lack of industrialisation/factories/mechanisation* or the *lack of investment by TNCs/government*. Where the latter was written it usually had to be extracted from the answer. By far the most awarded mark was for having a *lack of education*. Credit was not given for saying primary jobs are easy, as this simply isn't true.

Question 5

(a) This question was about the total precipitation over 24 hours in Germany during a flooding event. The data was shown on a choropleth map which also labelled six German cities and the surrounding seas. Candidates were asked to describe the pattern of precipitation which meant they needed to look at overall trends. The map very clearly showed a large variation in rainfall across the country so the first mark was for *uneven*, although again relatively few identified this. There was then a noticeable divide between east and west Germany, as rainfall was *low(est) in the (north-)east/in Berlin* and *high(est) in the west/in Cologne*. A maximum of two marks could be given for describing where rainfall was *moderate: in the south(-west), in the northwest or along the coast/North Sea/Baltic Sea*. These were not common answers. A final mark could be gained for stating that *rainfall is mostly low* but only one script was seen with this response. Candidates did not gain marks for describing the rainfall in every named city, as with the exception of Berlin and Cologne this data did not contribute to the overall trends.

(b) **Part (i)** differentiated well between candidates. Candidates were presented with a diagrammatic cross-section of a region south of Cologne that experienced severe flooding. Using the diagram, candidates had to explain why this region experienced this flooding. The diagram contained four labels which were intended to prompt candidates and also had features which could be inferred such as steep slopes and few trees. Credit was only given where correct geographical terminology

from the water cycle was used, which was used very well by some but others demonstrated no knowledge at all of the water cycle. Marks were awarded for *steep slopes increase/quicken run-off/shorten time to the river* and the *few trees limit interception*. Creditable factors related to the surface materials were *impermeable rocks reduce infiltration/percolation/quicken run-off/shorten time to the river* and *shallow soils become saturated/cannot absorb water/limit infiltration*. Candidates could also focus on the *narrowness of the river channel which cannot hold the discharge* or the *floodplain which cannot hold the flood waters*. In part (ii) candidates had to suggest two ways to manage river flooding and there were some good answers. However, too many drew impractical suggestions linked to **part (i)** such as remove the impermeable rock and fill the area with soil. *Afforestation, dams and constructing levees* were the most common correct answers, followed by *embankments*. *Straightening* was seen sometimes but *manmade lakes* were rarely mentioned. *Dredging/channel deepening* was acceptable but not channel widening.

Question 6

(a) This question presented three separate line graphs showing the population structure of Argentina, Bulgaria and Mali. Each had a fixed x-axis but a variable scale on the y-axis. Candidates were required to interpret these graphs to state *Bulgaria has an overall population decline, Mali has the fastest population growth, Mali has the smallest population in 1950, Argentina has the largest population in 2000 and Bulgaria has a decreasing birth rate*. Many candidates gained all five marks and those that didn't tended to gain only two or three marks. The most challenging interpretation was the fastest population growth, where some candidates did not allow for the variable scale.

(b) Most candidates were able to correctly read the answer of *40 million* people aged 64 and below in Argentina.

(c) Neither part of this question was answered well. Instead of suggesting the problems caused by the population structures, a high proportion of candidates just stated what the population structure was ageing for Bulgaria and youthful for Mali. This did not answer the question. In **part (i)**, where candidates did gain a mark, it was usually for *shortage of workers*. Other creditworthy problems were *workers taxes to increase, government to receive less taxes, health provision/care for the elderly needed*. Nobody stated the *underuse of resources* or *less military*. The *large number of young to feed/educate, small number of economically active and future unemployment* were creditable in **part (ii)**.

GEOGRAPHY

Paper 0460/22
Geographical Skills

Key messages

- Candidates approached this paper positively and in most cases this effort was effectively directed. The level of use of appropriate geographical terminology often distinguished between the candidates, for instance in **Questions 3(a) and (b)**. The more concise and focused answers tended to score more marks.
- Candidates should be reminded to take special note of emboldened words in any questions, for example instructions for the number of ticks in tick box answers, such as for **Questions 1(f) and 5(a)**.
- More practice on distance calculations, compass directions (16-point compass), and compass bearings would be beneficial.
- When candidates refer to words such as pollution and infrastructure, they should qualify what they mean. For example, air or water pollution and transport or tourism infrastructure. The use of the word 'better' should be avoided, e.g. 'better climate' in response to **Question 2(c)** where 'better' meant 'warmer'.
- Candidates should study the key words and instructions in each question carefully. For example, in **Question 1(g)** candidates were asked to 'Describe the natural features of the west coast...'. Some candidates instead described the human features as well as the area inland.
- When quoting information from graphs it is important to be specific, for instance quoting actual months from climate graphs such as **Figure 4.1**. It is also important that candidates take extra care when using data from line-graphs such as **Figure 5.2** for **Question 5(b)(i)**, where the years, number of deaths and magnitudes were often incorrectly stated.
- When using a diagram or figure such as **Figure 6.2**, candidates should avoid quoting the same words that are used on the diagram for their answer. These should have been elaborated on to answer **Question 6(c)**. For instance, the provision of sewage system links would mean a better level of sanitation.
- There was some lack of comprehension of terms used in questions, for example 'package holiday' and 'run down' in **Question 2(c)**.
- If candidates write on the additional space available at the end of the answer booklet, they should make sure that the answers have the question number and part written accurately. In addition, they should write 'Continued on extra pages' at the end of the first part of their answer. Candidates should use the additional pages to continue their answer rather than writing underneath a different question on the same page of the answer booklet as the original answer.

General comments

Most candidates made good use of geographical terminology and demonstrated their geographical skills in interpreting maps, graphs, diagrams and photographs. The general standard of mapwork skills was good.

Generally, candidates performed equally well across all the questions, with **Question parts 1(a) 1(b)** and **Question 2(b)** being done particularly well. **Question parts 1(c)(ii), 5(a)(ii)** and **6(a)(ii)** appeared more challenging for candidates.

Mostly good use was made of English grammar to convey geographical ideas, but there were issues with a minority of candidates' writing which could have been clearer.

Comments on specific questions

Question 1

(a) Most candidates scored well on this question, finding and identifying features on the map from **Figure 1.1** using the key. Feature **A** was a parking area, the type of road at **B** was a secondary road (the D26), feature **C** was a water tower, and the height above sea level at point **D** was 5 metres.

(b) The majority of candidates identified the correct grid reference, 370832, for point **D** from the four alternatives in the tick box. A small minority selected the third option, which incorrectly had the northings before the eastings.

(c) **Part C** was found to be more challenging. In (i) many correctly measured the straight-line distance from the museum at le Château-d'Oléron to the museum at Saint-Trojan-les-Bains within the tolerance of 4400 to 4900 metres. Some added some zeros on the end of their answer suggesting a difficulty in converting the kilometres in the scale line to metres. In (ii) the compass direction between the two points from the museum at le Château-d'Oléron was south-south-west, not south-west as stated by most candidates. It was clear that not all the candidature were familiar with the sixteen-point compass. They could have also used the North arrow present next to the scale line to help judge the direction. In (iii), the compass bearing between these points from the museum at le Château-d'Oléron was 199°, with a tolerance of 196 – 201° allowed. This was answered better than part (ii), although some responses were incorrect by a wide margin.

(d) This question was well answered by many candidates who stated three appropriate activities with evidence drawn from observing the map. The three most common correct answers were camping at the campsites, horse-riding at the horseback riding centre and yachting or sailing using the yachting harbour. Some candidates took evidence from the whole map and not the designated area; surfing, nautical sports and paragliding fell into this category and were therefore not credited. This indicates the importance of using the map key in conjunction with map observation instead of simply relying on the former. Some weaker responses stated the evidence as the activity: for example, the museum, rather than visiting a museum.

(e) In part (i) many candidates gave the right answer as wood or brushwood. Some weaker responses suggested the main land-use along the section was a 'cycle track or trail' and also 'roads'. Whilst they were clearly in the right area, these responses suggested a lack of understanding of the term 'land-use'. Those who stated 'forest' gave the impression that they had recognised the land-use as being green in colour but did not check this with the key. The most common response to part (ii) was 20 m which was within the tolerance of 19 – 23 metres and could be derived from **Figure 1.2**. However, 10 m was often seen; this seemed to relate to a spot height which was not far enough east on the cross-section to be the highest point.

(f) When analysing the distribution of settlements on the map many candidates correctly recognised that they were 'mostly in the north' and that there was 'more along the coast'. A smaller number stated that they were 'mostly in the east' which was also true. An almost equal number ticked the box for 'linked by main roads' but in fact the main settlements were linked by secondary roads, of which the main one was the D26. That they were 'evenly distributed' and that they were 'mostly on high land' was dismissed by the majority of candidates.

(g) Those candidates who did well focused on the key words in the question and limited their answer to the natural features of the whole length of the coastal area on the west side. The best answers tended to be concise and mentioned features such sand dunes, rocks (especially in the north), the beach and the presence of a spit. Some stated that the coast was flat and low lying and others suggested that the beach was long or extended along the whole length of the coast. It was also recognised that there was a greater area of wet sand rather than dry. Whilst there was discussion involving dry and wet sand amongst the weaker responses, it was often inaccurate. Many candidates did not recognise that these comprised a beach. Some also misread the question and compared just two grid squares, which somewhat limited their responses. Some also referred to physical features which do not exist such as headlands, cliffs and a bay, while others mentioned vegetation, brushwood, and marsh. Those candidates who focused solely on human features such as roads, surfing spots and other tourist activities were not credited.

Question 2

(a) Many candidates scored the one mark available for each of **Questions (a)(i)** and **(a)(ii)**. In (a)(i), the answer was 17.5 million, but there was a tolerance of two million either side of this. In (a)(ii) 45

years was the only creditworthy answer, since the peak was in 1955 and the decline in numbers continued until the graph ended in the year 2000. 35 years and 44 years were common errors.

(b) The four factors required to explain the rise in tourist numbers were readily identified from **Figure 2.1**, and the majority of candidates scored the two marks available. It started when the wealthy began coming to the beach and went sea bathing. It was expected that these factors should indicate a change leading to an increase, so that facilities like the tower, pier and theme park opening could be credited as well as the railway link to UK cities being built. The introduction of employment laws giving workers annual holidays and holidays with pay acted as further catalysts for tourist growth.

(c) This question required candidates to explain the impact of the growth of package holidays on a UK tourist resort. The better responses stated how package holidays being cheaper meant that more people could afford to travel to other destinations in other countries. This was aided by the cheaper air fares being made available. People wanted to experience somewhere different or more exotic and thus access to somewhere warmer than the UK aided this attraction. Some candidates also suggested that package holidays offered more activities than the resort. It was also suggested that booking 'a package' was a lot easier. Weaker responses tended to not develop their answers beyond 'cheap air transport to countries with a warmer climate', and some thought that the package holidays were to a UK resort which caused overcrowding, thus discussing the negative impacts of package holidays for no credit. A few candidates did not understand the term 'package holiday'.

The second part of the question required an explanation of why the resort becoming run down resulted in a decline in the number of visitors. Many candidates received credit for recognising that as a result the resort had become dated or lost its appeal to visitors. This was further exacerbated by the fact it had become popular with young party goers who put other groups of tourists such as families or older people, off coming to the resort due to its bad reputation or the amount of noise pollution. A few others suggested that the facilities offered had become broken and with less money coming in (due to fewer tourists), there was no maintenance and a lack of new facilities. Weaker responses tended not to go beyond the wording in the resource and did not explain the effect of being popular with young party goers, for instance. There was some repetition of similar ideas in both sections of the question and some responses were unable to demonstrate an understanding of the term 'run down'.

Question 3

(a) This question was generally answered well, despite few candidates recognising **Figure 3.1** as being a photograph of a tea plantation. This did not mean, however, that they could not give four pieces of evidence to suggest this was a commercial farm. The best responses were those that were succinct. Most identified the large area of land devoted to crops and that it was intensive with every part of the land being used. Many also identified the terraces on the steeper slopes. The use of machinery such as the tractor was also identified, as was the organised nature of the farm, with the crops planted in rows. Some recognised it as monoculture but others suggested incorrectly that there were lots of different crops. Few candidates referred to most of the farm being flat and there was a tendency for some weaker responses to refer to what was not in the photograph such as the lack of workers, and the absence of houses. A common and incorrect emphasis was on the presence of roads and the gaps between the rows of crops rather than the crops themselves.

(b) The second photograph of an agricultural area in a tropical country, **Figure 3.2**, resulted in some long accounts to describe the features of the farm. These varied in quality, with the better ones distinguished by their appropriate use of geographical terminology. They correctly identified the type of farming as subsistence, as well as being either mixed or pastoral. The livestock were named, and the status of the buildings was stated, to include a barn or shelter for the animals, made of metal sheets and thatch or straw. The farm was often recognised as small scale but there seemed a lack of certainty about which crops were grown, if any. Although there was quite a lot of comment on the vegetation and trees, few candidates referred to it as jungle, or lush, and the palm trees were rarely identified. These would have been credited. The fact the vegetation surrounded the houses was often commented upon but not credited. Although many referred to the grass or grazing land, they seldom noted that the land was fallow and overgrown. Some weaker responses also concentrated on the proximity to houses or roads which did not gain credit. If they mentioned that there were dirt or earth tracks or paths present, this would have been appropriate.

Question 4

(a) (i) This question was well answered with most candidates selecting the correct tick box of 258 mm. The answer could have been estimated since the nearest values either side were over 100 mm away from this total. There were, however, many examples of candidates writing the monthly totals down and adding them up on the examination paper.

(ii) The best responses were from candidates who were able to identify the most striking patterns from the climate graph (**Figure 4.1**), for example the highest and lowest period of rainfall or the largest drop. Many identified that the highest period of rainfall was from December to February or in winter, whilst the lowest period was from April to June. Alternatively, the highest rainfall was in February and the lowest in June. Some candidates were able to provide an overview, stating that the rainfall pattern was uneven or fluctuated throughout the whole year. Many responses were not specific enough with names of actual months lacking, for example, 'There was an increase followed by a decrease and then an increase', or 'In the first few months the rainfall was highest'. Increase and decrease were frequently used terms, but rarely with any qualification, for instance, 'A rapid increase in July' or 'A steady decrease from August to November' would have both gained credit. A common error was to mix up the temperature line and the rainfall bars, or to link temperature and rainfall. There were also a limited number of month-to-month accounts which gained no credit. Very few candidates pointed out that there were two peaks to the rainfall, or that there was rainfall in every month.

(b) This question was well answered with candidates using their own knowledge and **Figure 4.2** as a prompt. Technical terms were used well and the best responses avoided the repetition of 'prevents water loss' explanations by choosing adaptions with different purposes. A common response was to refer to cactus having spines instead of leaves to reduce transpiration and then to refer to the possession of long roots to reach groundwater. Some candidates also referred to large or fleshy bodies or stem to store water for use in dry periods. Two adaptions which were evident in **Figure 4.2** were that many of the plants were low growing to avoid exposure to the intense heat, and that much of the vegetation seemed dead, staying dormant until the rains arrived when they would shoot and flower. Some responses gave explanations but did not state the adaption or gave it too vaguely, for instance reference to plants storing water without saying how this was achieved. A common error was to refer to plants having thorns to deter predators, which was not an adaption to climate.

Question 5

(a) Most candidates selected the correct three statements about the location of the largest magnitude earthquakes in 2022 from **Figure 5.1**. They were that 'Most earthquakes occur on or near to the coast', 'The Atlantic and Indian Oceans each have one earthquake' and 'The biggest concentration of earthquakes is in the South Pacific Ocean'.

(b) (i) Many candidates found this question challenging and few achieved two marks although some good responses were seen. Any statement or accurate data which supported a weak relationship, or why the positive relationship between the magnitude and number of deaths was far from perfect, was credited. Many candidates made good data choices from **Figure 5.2**. The best answers tended to focus on the outcomes of the two strongest earthquakes, or compared 2010 with 2011, or compared the outcomes of the two earthquakes with a magnitude of 7.0. General statements such as 'The number of deaths and magnitude both fluctuate', or 'Many years have no deaths, but the magnitude varies', were also credited. Many candidates tried to prove a strong relationship rather than saying why it was weak. Others did not study the graph carefully enough and quoted incorrect figures despite the tolerance afforded.

(ii) Candidates who focused on the wording in the question stem did well on this question. Many stated that earthquakes often occurred in the sea or away from large centres of population. Some also referred to those earthquakes with a deeper focus, causing no deaths. Reference to strong construction methods or earthquake proofing were also relevant. In the latter case, the term infrastructure was often used instead of buildings and was not credited, since it was considered too vague. Too often candidates focused on prediction and evacuation drills as well as the degree of preparedness and medical back-up. There was a lack of understanding that there is little or no warning with an earthquake unlike a volcano.

(c) Most candidates recognised that it was convection that causes tectonic plate movement. The minority of incorrect responses ticked either conduction or radiation in equal measure.

Question 6

(a) (i) Candidates who studied **Figure 6.1** in detail identified 'no legal rights to land' as the correct answer. The question stem suggested that the residents faced the threat of being forcibly removed, and thus 'land liable to flooding' and 'unstable ground' were not credited.

(ii) Many candidates appeared to find the idea of what made up the squatter settlement environment challenging. However, there were many who suggested air, water or land pollution (litter) which were credited. A few candidates referred to the site itself suggesting sloping or steep land, although a lack of fertile soil was not credited. Others mentioned the poor state of the houses around them suggesting they were unstable or that they were too close to each other leaving a shortage of space. Weaker responses tended to repeat ideas from **Figure 6.1** or simply state pollution without any further elaboration.

(b) Many candidates recognised that people had no choice but to move to squatter settlements since they were unemployed and housing in the city was too expensive. Others referred to the increasing birth rate or increase in population as well as migration (regardless of source) as causes of squatter settlement growth. A few suggested that their family was already living there so they moved to join them. Weaker responses listed the perceived benefits of living in a squatter settlement, rather than the reasons why they could not live elsewhere. They also tended to lift ideas from **Figure 6.1**, for example 'a strong sense of community'.

(c) Stronger responses made clear the advantages and disadvantages of the self-build site-and-services scheme house compared with the previous squatter settlement in the CBD. They recognised the better provision of services such as schools which would lead to a better education for their children, and a water supply and sewage works which meant a better level of sanitation and a healthier environment. The presence of the police station meant a safer environment and a lower level of crime. Some suggested that employment opportunities might be improved with the presence of small-scale industry and other services. They also recognised that since they now owned their home legally, they did not run the risk of being thrown out. A range of points were made in response to possible disadvantages. These included the loss of the sense of community where they had come from, and the increased distance, and therefore transport costs, to commute to their job in the CBD. It was also pointed out that many migrants were still unable to pay for such a house in a site-and-services scheme as well as the materials. Further points were that the new residents might not have the skills to finish their houses themselves or might not be physically fit enough to carry out the work. In addition, some pointed out that the scheme had no provision for healthcare.

Weaker candidates found it challenging to make use of **Figure 6.2**, beyond directly lifting descriptions or single features. These included the statements on the left side of the map which were not elaborated. There were some brief but appropriate statements about the services for instance the closeness to shops from some candidates. Some candidates did not comprehend that the scheme was on the edge of the city, so made incorrect assumptions about proximity to the CBD. For disadvantages, many stated that you would be finishing the home yourself but did not expand on this, whilst others were concerned about proximity to the sewage station. Others thought that low-cost building materials meant that the houses themselves would be poor quality. The fact it would cost more for a Type E plot was mentioned but seldom developed, for example, by suggesting that it would reinforce inequalities.

GEOGRAPHY

Paper 0460/23
Geographical Skills

Key messages

- Candidates are encouraged to identify the command word(s) in questions to help them respond correctly.
- Questions with multiple marks allocated to them tend to require multiple points to be made in the answer. Further examples of the same idea will not gain additional marks.
- On short answers, such as the identification of features in **Question 1**, if the candidate changes their mind about the answer, they must delete anything that they do not want marked. If multiple possible answers appear on the line, the Examiner will only consider the first one written.
- Candidates should make their writing as clear as possible, especially when writing numbers.
- When an answer is carried over to the additional pages, label the continuation with the full question number, not the page number of the first part of the answer.
- Candidates should take care over the shading of graphs.
- When identifying map features, the symbols should always be compared against the map key. The extracts are taken from different countries and symbols can be used in different ways on different maps. There is no universal key, so it is important to use the key provided rather than make assumptions.

General comments

The mapwork question was very accessible, with only **Question 1(c)** and **Question 1(f)(i)** proving to be challenging. **Question 5** was high scoring and the high omission rate on **Question 5(a)(ii)** was likely to be largely due to candidates not reading the question carefully. **Question 4(a)(ii)** also had a high omission rate. Statistically **Question 3** was the most challenging, particularly **Question 3(a)(i)**, however there was a consistent omission rate across the whole question, and it appeared as though some candidates had turned over two pages and missed **Question 3** entirely. **Question 2** and **Question 6** both contained a mixture of difficult and more straightforward sections.

Comments on specific questions

Question 1

(a) The map extract was for Pont-l'Abbé, France, at a scale of 1:50 000. Fig. 1.1 guided candidates to a zone in the north-west corner of the map and showed features to be identified.

The type of road at **A** was a *secondary road*. Almost all candidates gave the correct answer.

The settlement at **B** was *Tréméoc*, or the alternative name *Tremeog*. Many candidates were very thorough and provided both names. Incorrect answers usually referred to the settlement shape, either nucleated or linear, and some simply put town or village.

Feature **C**, the *hiking trail*, was again correctly identified by many candidates.

The land use at **D** was a *lake*, which was listed in the key as 'perennial body of water'. Interpretation as *reservoir*, or *dam*, or simply *water storage* was acceptable but those who simply copied 'Plan du Moulin Neuf', from the label in the lake, did not score.

Feature **E** was a *chapel*. Again, there were many correct answers. A few candidates gave *church* as the answer, perhaps because they made that assumption from the symbol on Fig. 1.1 and did not confirm with the key.

The height above sea level at **F**, which was a spot height, was *52 metres*. Candidates mostly gave the correct answer here, despite there being a few other numbers nearby.

(b) The settlement pattern of Pont-l'Abbé was *nucleated*. There was some confusion on this, with suggestions of *linear* and *dispersed*, perhaps from candidates who were looking at the map area as a whole rather than the town. Other answers did not relate to the question and there was a high rate of no response.

(c) Candidates then had to describe the site of the settlement at Pont-l'Abbé. Many noted the water supply in the form of the *river/watercourse* or the body of *water/lake/reservoir* within the town. They also noted the many *roads* meeting here and some went into detail on this. Relatively few mentioned the *gentle slope, low land, nearby woodland* or the *harbour/anchorage*. Even fewer candidates noted the *defensive site*, the *bridging point* or the fact that the *tidal area of wet sand* put a limit on the ability to expand towards the east. Instead, they tended to fill the answer space with a list of human features from the prominent map symbols, such as *church, museum and tourist information centre*.

(d) Fig. 1.2 directed candidates to two 4 km^2 areas and they were provided with a table to complete in order to compare the features of the areas. The harbour and museum were in **area A** and the beacon in **area B**. Both areas contained a *notable site* and part of a *signposted hiking trail*. Neither area had a *golf course*. Candidates had to indicate their selection by placing a tick on each line of the table and many had done this entirely correctly, scoring 6 marks. A few placed 3 ticks on the rows for the *hiking trail* and the *notable site*, indicating that they were in both areas, but ticking the individual areas too.

(e) Although a number of candidates omitted **part (e)**, it was relatively straightforward to score 2 marks as the question encompassed both drainage and water features giving a wide range of possible answers. Most candidates mentioned the vast area of *wet sand*, usually pairing this with *watercourse/intermittent stream/tributary* for the second mark. Some noted the direction of *flow of the main river*, towards the *south or south-east*, and that it entered the sea at the *river mouth, estuary or delta*. Water features, such as the *harbour* or *water tower*, were also acceptable but relatively few took this line for their answer.

(f) Answers between *4.9 km* and *5.2 km* were accepted for the distance along the motorway, from the northern edge of the map to the junction with the main road. Those with an answer slightly too short at *4.8 km* had probably measured the straight-line distance, rather than following the road, but the majority of errors were due to giving an answer in metres.

For the six-figure grid reference of the junction between the motorway and main road, four alternatives were listed, and candidates simply had to select the correct answer, which was 099277. Many candidates had made the correct response.

Question 2

(a) This question made use of the five photographs of land-use zones in São Paulo which were printed in the Insert. Candidates were also given a diagram of an urban land-use model in Fig. 2.1. On this, five zones were labelled, and candidates had to match the photographs by adding the appropriate letter to each label. As an example, **A** had already been identified as a *squatter settlement*. **B** showed *poor-quality permanent housing*. **C** was *high-quality housing*. **D** was an *area of modern factories*. **E** was the *CBD*. A very high number of candidates were able to complete this task entirely correctly. The few that made errors often mixed-up **C** and **D** but usually still scored 2 marks.

(b) Candidates then had to suggest reasons for the location of the squatter settlements, the high-quality housing and the modern factories. This proved to be quite difficult with many candidates just giving generic descriptions or describing the photographs and the conditions in each area. The best responses were for factory location, but a valid point was needed in each section, so ideas for the factories were limited to three.

For squatter settlements, many mentioned that the land was cheap, but they did not say why. They needed to mention that the land was steep or hilly or simply unfavourable. Some did note the close

proximity to industry, while others pointed out that the location on the outskirts would be relatively unregulated.

For the high-quality housing, many simply described the photograph. However, a few noticed the position in relation to the CBD, so suggested that the land would be expensive, but that the location would have the advantage of being close to jobs or to shops and services. Some did not quite identify the expensive idea, as they were referring to the houses rather than the land. Others mentioned the proximity to the CBD but did not elaborate.

Many scored the majority of their marks, or their only marks, for modern factories, mentioning the large space, the flat land, the access to the CBD to supply goods and the access from the housing zones enabling recruitment of workers.

Question 3

(a) Fig. 3.1 was a sketch of a waterfall. Blank labels pointed to four features and candidates were asked to identify the four features by completing the labels. The top label was pointing to the layer of hard rock, but simply repeating this information did not score. The arrow ended near the edge and the base of the layer indicating overhang or cliff. The label below this pointed towards the soft rock but stopped short at the point where the soft rock had been eroded away forming an undercut or a cave. Some candidates completed these spaces with detailed annotations describing processes which did not always mention the features. Similarly with the label at bottom left they often described processes or the motion of the water, rather than mentioning the plunge pool. The label at bottom right was the most often correct. The word 'rock' was enough and descriptive answers usually included it. In this case 'hard rock' was an acceptable answer, though 'bed rock' was not. Some were confused between this diagram and others they had learnt for meanders or coasts. Particularly the undercut was identified as a wave-cut notch.

Given the difficulties that some candidates had with **part (i)**, it was good to see that many were still able to answer **part (ii)**, often in some detail. They had to suggest how the waterfall would change in the future and the mark scheme covered changes to the three main features as well as some more general ideas, such as retreat and formation of a gorge. Most mentioned that the soft rock would continue to erode resulting in the collapse of the overhang. Some also realised that the plunge pool would get deeper, but this was mentioned less frequently as the term plunge pool was not well known.

(b) Fig. 3.2 was a diagram of the upper course of a river valley and candidates were asked to describe the valley shape, gradient of the long profile and the channel width. It was possible to answer this with a few well-chosen words and many did this successfully. For the valley shape, most mentioned the *V-shape*, though some used alternatives such as *steep-sided*, *deep* or *narrow*. *Steep* was also a suitable description for the gradient of the long profile, though the idea of decreasing gradient along the upper course was also accepted, being consistent with the diagram. For channel width candidates needed to specify *narrow*, *thin* or *small* rather than a comparative term. Some lost marks as they did not focus on the upper course.

Question 4

(a) Fig. 4.1 was a weather map for India and candidates were first asked to complete the 1008 mb isobar line. This was straightforward, and those who attempted it almost always had a correct response. However, there were a good number that missed this question, along with **part (ii)**, and went straight on to the extended writing in **part (b)**.

Continuing on the map, the next task was to shade the area below 1000 mb. Again, there were many correct answers, though slightly fewer than for **part (i)**. The most common error was to miscount the isobars and draw another zone within the 1000 mb line. A few thought that the shading should only be on the land, so shaded as close as possible to 1000 mb within their criteria. A few appeared to be shading in relation to the 1010 mb line.

(b) The majority of the marks on this question were for comparing the weather conditions at New Delhi and Bengaluru, both of which were shown with a synoptic chart symbol. All the information was in the key and many candidates scored highly. They noted that New Delhi had *lower temperature*, *higher pressure*, *more wind* and *less cloud*. Each of these could be paired with the appropriate data for a second mark. As many candidates wrote about all four aspects, they scored 6 marks. Lower

scoring candidates tended to state the data for each location without comparison and thus only scored for wind direction: *NE* for Bengaluru and *SE* for New Delhi. Some began in this way, then brought in comparatives with the second location in a second paragraph. Data was generally quoted correctly, with just a few mistakes on wind speed or units, but could not be credited without the comparative statement.

Question 5

(a) Candidates were asked to compare the features of two volcanoes, Mount Fuji in Japan and Mauna Loa in Hawaii, USA. Fig. 5.1 provided cross-sections showing internal features, as well as dimensions of the volcanoes. Again, there was plenty of information and many candidates scored well, particularly as they paid attention to the command word to compare, more than they had in **Question 4(b)**. Many focused on the dimensions, noting that Mauna Loa was taller and wider, but that Mount Fuji was steeper. They compared the layering and its composition, the number and size of the vents and the size of the magma chamber. Many began by stating that Mauna Loa was a shield volcano while Mount Fuji was strato-volcano or composite. A few wrote about characteristics that could not be seen on Fig. 5.1, such as viscosity of the lava.

Candidates then had to take the data for the height of Mount Fuji, shown at 3800 metres on Fig. 5.1, to complete the graph in Fig. 5.2. Most had done this correctly. A small number misinterpreted the scale, so plotted at 3600 metres. A few looked at the wrong volcano on Fig. 5.1, so plotted the 9200 metres for Mauna Loa. The second mark was for the shading, which needed to be on the correct diagonal. Most had done this correctly, but some did need a little more care with their shading. There were quite a few candidates that did not attempt the question.

(b) Candidates were then asked to state two reasons why many people live near volcanoes. Many noted the fertile land for agriculture and the potential income or jobs from tourism. However simply stating tourism was not enough for the mark nor commenting on the beautiful view. Other less popular but nonetheless still valid points included mining, access to geothermal power or hot springs and the fact that people had always lived there and could not afford to leave. Some suggested that volcanic researchers would be living nearby, but this would not involve many people.

Question 6

(a) This question began with candidates being asked the meaning of the term renewable energy. Many stated that it would not run out and could be reused or replenished infinitely. Answers such as good for the environment or non-polluting were too vague. Some were muddled with non-renewable, while others tried to use the word renew, which did not really help with trying to explain what renewable meant. A few simply gave an example, which they often repeated in **part (ii)**.

In **part (ii)** candidates were asked to name a source of renewable energy, and many opted for *wind* or *solar*.

(b) Fig. 6.1 was a map of the world, with the countries shaded to indicate the proportion of their total energy produced from renewable sources. Candidates were asked to describe the variation in renewable energy production and the key pinpointed categories of low, moderate and high. Although country boundaries were shown, it was no advantage to be able to identify these, since continents were labelled. Apart from a general comment of uneven distribution varying from low to high, marks were available for relating low, moderate or high to the labels on the map, with the help of compass directions to indicate specific parts of continents where necessary. Many picked out the high levels along the equator or in Central Africa and scored the rest of their marks for the low levels in Asia, North Africa or Oceania. Some also correctly placed Europe in the moderate category. It was necessary to generalise with the map, rather than looking for exceptions, though generalising with the key, such as from low to moderate, was just a little too vague.

(c) Finally, candidates were asked to explain why some countries do not use renewable energy. Typically, they wrote about the unsuitability due to the limitations of cloud cover or lack of wind or water and financial issues with the available non-renewables being much cheaper and renewable being expensive to set up and then maintain. Other ideas seen less frequently were the inability of renewables to satisfy the demand for energy and the fact that they take up a lot of space and create visual and noise pollution. Most candidates scored some marks here but lack of detail about what was expensive or repetition of various reasons for unsuitability did limit some.

GEOGRAPHY

Paper 0460/03

Coursework

General comments

While this is a report for the June 2025 examination series, the comments made here will be of use to centres making their entries for the first time in November 2025 or during 2026.

The range of topics undertaken by centres was very similar to that in the previous June series. Please see the following table:

	topic
human	population and migration
	settlement and service provision
	tourism and recreation
	transport
	urban settlement and land-use
physical	coasts
	rivers
others*	weather and climate

*Includes conservation v development, vegetation, and waste management.

Human topics were more popular than physical, with both urban settlement and land-use and tourism being the most common. Please note that a very small number of centres elected to allocate completely different topics to each of their candidates. This makes group data collection either very difficult or impossible with only limited primary data likely to be collected by each individual. In this case, there is unlikely to be enough data for an in-depth analysis and this approach is therefore not recommended.

It is strongly recommended that centres read and take note of this report's content together with the *Moderator's Comments on school-based assessment of coursework* which each centre receives.

There is training available online for teachers who are new to the coursework option. There is also a Coursework Handbook available from the School Support Hub which includes examples of coursework which are annotated to show how they should be marked.

Every centre which entered candidates had the opportunity to conduct their fieldwork 'in the field' and therefore collect primary data. Secondary data can still be used for comparison purposes, for example past data collected by a former cohort. Otherwise, information from secondary sources can be used to provide a context for the study in the introduction, to demonstrate the theoretical basis of the study and the methodology and to aid explanation of the findings.

It is expected that primary data is collected as part of a group exercise and was collated by a teacher when candidates return to school. The complete data set(s) should then made available to all candidates for each to work on their own individual hypotheses. There remain some centres where candidates collect their data either individually or in small groups. In many cases this resulted in less data being collected, which was not sufficient for an in-depth analysis. For safety reasons Cambridge International Education does **not** endorse candidates being allowed to collect data on their own 'in the field'. Should a candidate need to add extra data for their own study to that which has already been collected as a group, it is expected that they are accompanied by an adult, especially when administering questionnaires or collecting data in urban or rural areas or collecting data on a river or along a beach.

While the data collection must be a collaborative exercise, individuality is the key to achieving the highest marks. Centres should avoid offering too much teacher guidance. Centres should also avoid candidates using the same computer-generated graphs in every study. Individuality can be enhanced by candidates researching their own background information and attempting at least one hypothesis which is not attempted by other candidates. In addition, candidates should be encouraged to take and use their own photographs as well as graphs, maps, and field sketches.

Key messages

- Some very good Geography was seen. The production of coursework is a positive experience for candidates. As one of the team of Moderators states: 'The majority of candidates have expended a huge amount of effort and have produced informative, engaging and well-presented pieces of coursework, in which they have taken a lot of pride. In addition, the marking was generally consistent and followed the assessment criteria very well'.
- Most centres demonstrated a very good grasp of their chosen topic, with candidates undertaking appropriate hypotheses. A clear understanding was demonstrated by most candidates of the 'Route to Geographical Enquiry', resulting in well organised studies containing the five sections outlined in the syllabus, often with an accurate table of contents. However, some centres' coursework was imbalanced, typically with a long *Introduction* and *Observation and Data Collection* section at the expense of *Analysis* which was relatively short. Some tables of contents contained page numbers, but these were not always accurate, or in others there were no page numbers.
- While a good understanding of geographical theory was demonstrated, it tended to be more focused where the hypotheses appeared first, and the theory could be utilised to justify the hypothesis. In the more successful studies, geographical models outlined in the introduction were also referred to in detail in the analysis and conclusion.
- The most successful conclusions were reached because of clear hypotheses laid out at the beginning of the enquiries. Two or three hypotheses are enough to ensure a sufficient depth of reasoning in the analysis. Many hypotheses and data collected on too many parameters often leads to a simplistic analysis or overlong enquiries which lose focus.
- It is important that enough primary data on any one parameter is collected to allow candidates to exhibit a depth of understanding in their analysis. Not all data collection exercises produced enough data to allow the identification of clear trends and anomalies, as well as the opportunity to perform statistical analysis.
- Data collection methods were well described and understood. Sampling procedures, however, were often inadequately described or understood and there was limited justification for the selection of data collection sites.
- All relevant primary numerical data that is used in the study should be included in tabular form. This was absent in some studies, despite the description of data collection methods.
- Some centres demonstrated an impressive range of data presentation methods. By contrast, in some other cases, a large number were rendered ineffective by the absence of correctly labelled axes (to include units). Line-graphs were often used inappropriately.
- All maps should have a scale and orientation, and those originally from secondary sources such as Google Maps must be clearly utilised. There was sometimes an overreliance on Google Maps which were not adapted for the purpose by the candidate.
- The inclusion of photographs considerably enhanced many enquiries. However, to be worthy of credit they must be well annotated as well as having a title. They should also be individual and not appear in other studies.
- The best responses gave well-reasoned explanations to support their findings. In weaker studies, reasons given were often too speculative and were not supported by one or more of secondary data, geographical theory, or personal observations.
- Most studies clearly confirmed or rejected their hypotheses in the concluding section. The strongest responses supported this up with key numerical data or reference to graphs and valid explanation.
- Evaluations were variable in quality, although most demonstrated that they understood some limitations of the study undertaken. More attention could be paid to what went well and why. Feasible suggestions for improvement or extension if the study were to be undertaken again tended to lack detail.
- References to shortcomings in the methodology should only be written in the evaluation and not in the data collection section.
- While most candidates adhered to the word limit of 2000 words, there were some submissions which were excessively long (up to 10 000 words) and lost focus. All candidates should declare a word count on their title page. Please remember that text placed in tables still counts towards the word limit.

- The majority of centres are to be complimented for the conscientious and detailed comments made on scripts and/or comments sheets attached to each piece of coursework. New centres should note that they are expected to justify how the marks were awarded. Phrases from the *Generic Mark Scheme for Coursework Assessment*, which was used by every centre, can be utilised for this.
- Generally, the marking by centres was accurate and there was agreement over the rank order of candidates. Where there were disparities, it was usually due to the undermarking of *Organisation and Presentation* and overmarking of the *Analysis and Conclusion*, and sometimes the *Knowledge with Understanding*, criteria. Any changes required usually occurred at the top and lower end of the mark distribution. It is important not to overmark candidates who do not collect any data but use only texts from the internet.

Comments on specific assessment criteria

Many of these comments are similar to those in previous examination series. It is hoped these will be of particular benefit to new centres as well as more established ones.

The criterion of *Knowledge with Understanding* tended to be assessed accurately. Where disparities occurred, it was often because the marker seemed to take only the candidate's introduction into account. This is largely the *Knowledge* element, but *Knowledge* can also be applied elsewhere, for instance for the explanation of trends and anomalies in the data. The level of *Understanding* can be demonstrated throughout the study. For instance, a judgement can be made on how well the theory has been applied such as in the provision of reasoned explanation in the *Analysis* or in how perceptive the candidate has been in stating the limitations of the study in the *Evaluation*. For example, the level of *Understanding* can be derived from comments on how well urban models, outlined at the start, fit the data. These can be highlighted by markers in their comments on the scripts.

Most enquiries were well organised with clearly stated aims and hypotheses and positive use of geographical terminology. These were often accompanied by the expected outcomes which were related to theory. Greater focus was achieved when candidates placed the theory after their hypotheses, rather than the other way round. Where the word count is exceeded, introductions are still too long. Many followed some initial aims with a prolonged background information section. There are some candidates who write all they know about rivers or include a generic section on the development of tourism, for instance, rather than carefully selecting their information to justify their hypotheses. Extended paragraphs about the history of the locality are often irrelevant, and a glossary of geographical terms is unnecessary, since many of the terms are not referred to in the later sections. Similarly, it is often not unnecessary to give detail on three urban models when only one is referred to in the later sections. On the other hand, some candidates tend to be far too brief in their use of theory; this was common in using Bradshaw's Model or the Butler Model, where once having scanned the diagram(s), only a few simple sentences (if any) were written to explain the relevance to the hypotheses. The stronger studies related these models directly to the study location with good comparisons to the data collected. In essence, the strongest responses were highly selective regarding their use of theory, but still able to provide appropriate detail while relating it to the study area.

The wording of the hypotheses is important. Nearly all of those that were stated were plausible and investigable. The simpler the wording, the more testable they seemed to be, for example, 'Blackpool conforms to the rejuvenation stage of the Butler Model', or 'The discharge of the River Harbourne, decreases downstream'. The most successful formula seemed to encourage candidates to use two core hypotheses and a third chosen by the candidate themselves. This resulted in a more focused study with greater evidence of individual work. The use of four or five hypotheses or a generic guiding question was usually associated with a superficial analysis. Furthermore, it is questionable whether some candidates understood the nature of a hypothesis. Some expressed their hypotheses as questions rather than statements, which often seemed to prevent a full exploration of the findings, with a brief 'yes' or 'no' in the concluding section.

Location maps placed in the introduction often required more detail. To be effective, scale and orientation is essential; writing 'not to scale' is not helpful. It is also expected that any map, from whatever source, is well utilised by the candidate. This is usually achieved by locating the sites of data collection with an appropriate key. The stronger examples are usually well annotated and possess clarity so that relevant detail is easily accessed. However, there are candidates who include a plethora of maps at different scales (e.g. world, regional and local) with little or no customisation to the area of study. More attention should also be paid to the quality of scanning since in many cases much of the detail, such as the scale, is illegible. This seems to be most common when Google Maps are downloaded. Some maps which were originally in colour but were downloaded in black and white meant that some features were difficult to identify.

The criterion *Observation and Collection of Data* was generally assessed well by the markers and very few adjustments had to be made. Indeed, the markers are in the best position to judge an individual candidate's contribution to a group data collection exercise.

A positive range of data collection methods were employed and carried out appropriately. It must be stressed that it is essential to collect enough data to ensure the opportunity for sufficient depth of understanding and detail to be demonstrated in the analysis. Not all centres managed to collect questionnaires from the recommended number of fifty respondents. Often this was because of single groups of three or four candidates working on their own and not as part of a larger class where data is pooled. There remained some surveys where a group asked questionnaires to only five people without their data being shared with the other groups. This lack of data inevitably leads to a very limited analysis.

For river studies, ten locations are ideal. While this might not always be achievable due to constraints of candidate safety or of time, in river studies there is a large number of different parameters that can be measured, thus generating many different hypotheses which help to make each candidate's coursework more individual. Where the number of sites is under six, a centre might consider measuring each site at three different cross sections, each a minimum of 100 m – 200 m apart. However, to show worthwhile trends in the parameters measured, individual sites should, at the very least, be several kilometres apart. Only three hypotheses should be chosen and thus this makes collection of data at six to ten different sites essential. With a group data collection exercise such as this, candidates should only describe methods of data collection which were used to answer their hypotheses.

Whilst more centres are encouraging candidates to refer to the sampling strategies that have been used, few included any depth of discussion, or indeed, their justification. This was particularly common for those undertaking questionnaires in urban environments. If respondents were accessed on an opportunity basis, then it needs to be stated and justified. Few centres explained their choice of data collection sites; for instance, stratified sampling to represent the three stages of a river, or systematic transects every x metres along a beach. This also applies to traffic surveys and pedestrian counts. Overall, it appears that methods of sampling are often not fully understood. On the other hand, the description of the use of equipment for data collection tend to be quite detailed and reflects a high level of understanding. More candidates are now linking their methods to their hypotheses which helps demonstrate their level of understanding. This is particularly the case where the data collection methodology is well set out in tabular form. However, many of these tables also include some evaluation of each data collection technique. Since all wordage in tables counts towards the overall word count, this is best left for the concluding section of each study.

The time given over to data collection is another issue, especially when the time available on the centre's timetable is limited. A surprising amount of data can be collected in a relatively short space of time when many candidates are divided into small groups to cover a large area, each coordinated to do similar activities at similar times, such as a pedestrian or traffic count. On return to the centre the data is then coordinated centrally and shared. Even so, centres that allocated more than half a day for data collection almost inevitably achieved much better results than those which attempted to collect data in one or two hours.

The use of secondary data can play a valuable role in supporting the findings of the primary data collection. Comparing data collected at the present with that collected on the same topic in the past would be an example. Where a centre is unable to collect primary data, then secondary numerical data such as from weather stations or censuses can be used. However, Cambridge International Education must be informed before the data is utilised. The use of secondary data does not extend to synthesising written information taken from the internet or textbooks and putting it together in essay format. This would not gain any credit for *Organisation and Collection of Data, Presentation of Data or Analysis*.

Centres should ensure that candidates include tables of the collected data. These are essential to prove the candidates took part in a fieldwork data collection exercise as well as for reference in the analysis. The strongest studies integrate these tables with the methods of presentation or analysis. Since it is likely that parts of the data will be referred to in the text of the study, candidates should avoid placing it in an appendix.

Organisation and Presentation was the criterion which resulted in the greatest disparity between markers and Moderators, especially at the lower end of the mark distribution. Some studies which scored higher marks were overmarked due to the lack of complex methods of data presentation and/or the absence of a location map which had either not been utilised by the candidate or did not possess both scale and orientation. Meanwhile, some lower scoring studies which used at least three different simple techniques or included one complex technique tended to be undermarked. These techniques must be effective in portraying the data; for instance, there were examples of line graphs used for discrete rather than continuous

data which meant they were inappropriate. Bar graphs were seen in many guises but only count as one technique. The same data presented in several different ways only counts as one technique. Only the three most complex and effective graphs should be considered by markers. If techniques are not effective then they cannot be credited at the top of the level; for example, a bar graph with a Y axis label missing or incomplete. Since the emphasis must be on positive marking when assessing the data presentation, only the three most complex and effective graphs should be considered by markers. Candidates clearly spent a lot of time on their data presentation and once again it was the criterion where, on average, candidates scored the most marks. If candidates use many more than three techniques (in addition to a location map) it means that their time could probably be used more effectively, for example on a more detailed analysis. Markers should note that a piece of coursework cannot reach the top of Level 3 for *Organisation and Presentation* without a well utilised map complete with scale and a north sign.

A list of simple and complex presentation techniques for reference by markers is found in the appendix to this document.

Most candidates followed the 'Route to Geographical Enquiry' and therefore produced studies with an appropriate structure; thus, little comment is required on the *Organisation*. A few neglected to write an evaluation or left this to comments on the methodology in the data collection section. It is expected that an evaluation should follow on from the Conclusion. Similarly, concluding comments are sometimes made after each hypothesis is dealt with in the *Analysis*. Again, a summary section entitled 'Conclusion' is still required. Most candidates integrate their graphs and diagrams with the text of the *Analysis*. This helps to ensure that they analyse the data shown by each graph/diagram/map in turn, making sure that none are redundant. Candidates should be discouraged from placing all their graphs together in one section, whether it is before the *Analysis* or in an appendix at the end. This also includes statistical tests.

Many candidates now provide a table of contents at the beginning of the study. This should contain page numbers for each section of the study, but for a significant number of studies these were inaccurate especially where amendments had been made. In some cases, the pages numbers were listed in an index of contents but there was no pagination. It is recommended that candidates should check this as one of the last jobs before submission of their work. More candidates included risk assessments which undoubtedly demonstrates their organisation. Few candidates mentioned a pilot study being carried out, prior to the main data collection exercise, which also would have added to the *Organisation*. In many cases questionnaires could be tested in advance at the school, and elements of microclimate, for instance, in the school grounds.

A wide range of appropriate techniques was demonstrated by the candidates. Some centres encouraged their candidates to produce graphs and maps which were more complex, and this was largely successful. Where this was not the case, there was still a reliance on basic bar charts, line graphs, pictographs, and pie charts. These techniques can often be located on maps at the sites studied to make the technique more complex. Scatter graphs with appropriate lines of best fit, divided and stacked bar graphs and radar graphs are other techniques used by candidates which have the appropriate level of complexity. Cross sections produced in river studies are considered a higher-level skill, although these must be carefully created to the same scale to facilitate ready comparison. This also applies to beach profiles. Field sketches were rarely seen, but the few that were drawn, tended to be clearly linked to one of the hypotheses and were very well annotated. However, despite being mentioned in their methodology, many candidates chose not to include them in their final study. Any produced during the fieldwork should be tidied up and suitably annotated to show evidence that can be referred to in the *Analysis*. Some centres encouraged their learners to make use of statistical techniques in their analysis. Spearman's Rank Correlation was the most common of these, although Analysis of Variance, Nearest Neighbour analysis and Chi-Squared were also seen. Centres are reminded that these can count as a complex presentation technique if the candidates demonstrate the complete working themselves and do not just rely on the press of a computer key for the result. On some occasions, the working for Spearman's Rank Correlation was incomplete; for example, the formula was not entirely filled out correctly with the data.

Many bar graphs, line graphs and scatter graphs were rendered ineffective by the lack of, or incomplete, labelling, particularly on the Y axis. Such labelling should include the name of the parameter along with the units of measurement. On some occasions, titles were also missing. Since most graphs are produced by using computer programmes, all centres should advise their candidates that having input the data, they should inspect the results carefully and make any necessary changes.

Some centres' candidates produced some very well annotated photographs, graphs, and maps. Anomalies on graphs, for instance, were highlighted by a circle leading to an arrow and relevant comment. However, in many studies photographs were submitted without annotations and were not referred to in the text. Many others had just a title and/or simple labels which would not count as complex. These served little purpose.

Centres should ensure that their candidates know exactly what is expected by annotations; a paragraph written underneath the photograph, for instance, does not count. Three appropriate annotations are expected on any one photograph for it to be complex.

It is best for the original hand-drawn graphs, field sketches, maps, and diagrams to be included in any study rather than being scanned in, albeit at an appropriate place. These become more difficult to read, especially when they are scanned in monochrome. Candidates are reminded that each graph or map should be drawn by themselves and not by one person in their original group, with the rest scanning it. Furthermore, since it is expected that individual initiative is demonstrated in the use of presentation techniques, it is important to avoid the same range of computer-generated graphs appearing in every study that a centre's candidates submit.

The *Analysis* was overmarked by a number of centres, especially at the top end of the mark distribution. The requirement for reasoned explanations at Level 3 was sometimes overlooked by markers when the reasons given were very short and tenuous. Some of the marker comments on the scripts revealed that the higher marks were being given for explanations which were not fully developed. The *Analysis* section is where candidates can really demonstrate their level of understanding. However, the depth of analysis can be severely limited by the lack of a sufficient amount of raw data on any one variable for interpretation purposes. Here, the onus is on the centre to make sure their candidates have enough data at their disposal to achieve their potential.

A clear improvement in the *Analysis* has been demonstrated over recent June sessions by many centres, with many candidates able to interpret rather than just describe their findings and provide clear links to their hypotheses. Nevertheless, the *Analysis* continues to be the lowest scoring criterion for many candidates, particularly in terms of the level of explanation. Most analyses consisted of description derived from graphs with all those presented being utilised. There was a clear effort to interpret the trends or patterns identified as well as identify anomalies. Few responses remained at Level 1, but most remained in Level 2 or the bottom of Level 3 due to a lack of viable or detailed explanation. There were some thorough descriptions with effective use of data as support, and the more able candidates used one or more of geographical theory, secondary data or personal observation to support their explanations. In addition, having identified anomalies, some used numerical values to show why they were anomalies, and explained them with reasons that were creditable. Some manipulated their data, producing averages, for instance. However, in general, explanation was speculative and although tenable and sometimes worthy of some credit, there was no clear proof. Some candidates who identified an anomaly put it down to candidate errors which were not substantiated. Phrases such as 'The reason might be/could be/may have been' were very common.

There was some valid use of statistical techniques, principally Spearman's Rank Correlation. Although scatter graphs with best fit lines were often used as a pre-cursor to the testing, there tended to be a lack of a full statistical analysis. Many candidates did not really explore the implications of what their statistical work indicated or display a clear understanding of the technique they had used. The correlation coefficient value itself was often interpreted in a limited way, especially when a correlation coefficient was computer generated, and no workings were shown. This lack of understanding also extended to tests for the level of significance. It is therefore important that centres make sure that their candidates not only understand how to use statistical testing, but also why they are using it.

The *Conclusion and Evaluation* was marked accurately apart from in some studies where there was a tendency for it to be overmarked, especially the higher scoring studies. In the latter, too much credit was given for accounts which lacked key data. The Level 3 statement in the Generic Mark Scheme for Coursework Assessment states that conclusions should be 'clearly related to evidence collected'. This evidence should be either examples of numerical data or stated characteristics shown on graphs, maps and tables which are clearly referenced; for example, 'On Fig. 5 it can be seen that...'. Some responses were given high marks even though they used this evidence very sparingly or not at all and generally lacked the expected depth of discussion and explanation.

Most candidates summarised their findings well, although many were rather brief. Some Moderators observed that the candidates that produced the strongest conclusions had very precise hypotheses. All the hypotheses tended to be either confirmed or rejected. The higher scoring responses quoted key data or referred to figures (graphs, maps, and statistical tests) used earlier in the study, as well as providing some explanations. But many other responses lacked the evidence to support their assertions, and explanation was rather superficial. Models or theory quoted in their introduction were often not mentioned. This particularly applied to the Butler Model or models of urban land use. Although Bradshaw was an exception, statements were still limited in many cases. Most common was the lack of key data which limited progression to the higher Level 3 marks. Some candidates introduced new ideas in their conclusions, and it was felt that

these would have been better in the *Analysis*. Some candidates chose to make simple conclusions after each section of their *Analysis*. These must be considered by markers, although a separate Conclusion section is still required. The latter can be a separate paragraph entitled 'Conclusion', after the analysis of each hypothesis in turn, but an Evaluation section at the end of the study would still be required.

As part of the *Evaluation*, markers are reminded that they should consider comments made in the methodology section, which usually refer to the effectiveness of the equipment used. Candidates tended to make some valid criticism of their data collection strategies, and many came up with one or more realistic improvements. Some suggested how their study could be extended and a few suggested how it might be used in future, for example, by planning authorities. Weaker responses tended to suggest generic improvements which needed some development, for example, 'We needed more time' or 'We should have sampled more sites'. Most of the evaluation concentrated on negative comments rather than stating what went well and why it was effective. The weaker responses seemed more likely to make positive comments, but these were rather superficial, for example, 'The group worked well together, and we were able to prove our hypotheses'. The *Evaluation* remains a good gauge of a candidate's level of understanding of the fieldwork undertaken. It should therefore also be considered by markers when assessing *Knowledge with Understanding*.

Administration

Centres are to be praised for the hard work of their markers and their accuracy in utilising the *Generic Mark Scheme for Coursework Assessment*. In nearly all centres it was applied consistently with the order of candidates largely remaining unchanged. This made applying adjustments relatively easy, and for some centres this meant there was no change. For those that were adjusted, this was not always across all of the mark distribution. There seemed to be a pattern of negative adjustments above 50 marks and positive ones for those below 37 marks. Some centres were a little harsh and a small positive adjustment was made. Those very few centres which a large negative adjustment applied were generally relatively new to the moderation process; the reasons are detailed in the document *Moderator's Comments on School-based Assessment of Coursework* which each centre receives.

Most centres were conscientious in their approach to adding comments to their candidates' scripts to justify the marks awarded. Those who added a cover sheet with some overall comments must also be thanked. These generally used the wording from the *Generic Mark Scheme for Coursework Assessment* and facilitated the smooth running of the moderation process. Very occasionally, it highlighted when a marker had misinterpreted the mark scheme. If centres have not done so in the past, it is expected that markers make these comments (in pencil) on the scripts for their next submission.

Please note that only one piece of coursework is required for each candidate. Where two different fieldwork exercises have been carried out, it is for the centre to ensure that only the one attaining the highest marks according to the *Generic Mark Scheme for Coursework Assessment* is sent to be moderated. The centre must also ensure that coursework based on different topics are of equal value in giving candidates the opportunity to achieve their full potential. A fair proportion of each should comprise the sample that is sent for moderation.

Please ensure you check the latest documentation from the School Support Hub to ascertain the exact number of scripts that you should send for your centre's sample. There were a small number of centres which did not send enough sample scripts, and this delayed the moderation process.

Almost all centres submitted their coursework samples to Cambridge International Education on time before the deadline, with the appropriate paperwork completed. The latter consisted of the Coursework Assessment Summary Form together with the MS1 Form or the Internally Assessed Marks Report. Please make sure that an Individual Candidate Record Card is attached to the front of each script and not sent in the overall package in one pile. In addition, please make sure that candidates are listed in candidate number order on the Coursework Assessment Summary Form.

Most of the paperwork was completed accurately and included with the sample. In almost all cases the sample included an appropriate number of scripts representing a fair cross section of the marks awarded (to include the top and bottom of the mark distribution). Just occasionally there may be many candidates on one particular mark; in this instance at least two scripts on this mark should be included in the sample. Where Cambridge International Education have requested the candidate numbers of the scripts to be sent, please adhere to this.

Please continue to double check the paperwork to make sure there are no mathematical errors. Some errors were detected in this session. Errors usually take place in one of the following instances:

- Where the addition of the assessment criteria marks on the Individual Candidate Record Card is incorrect and is subsequently transferred to the Coursework Assessment Summary Form and then to the MS1.
- Transcription errors from the Coursework Assessment Summary Forms to the MS1 Forms. This may occur where an internal moderation has taken place, and the candidate's original marks have been entered instead of the changed mark.

All centres should have their candidates' marks double checked before submission.

Where a centre has more than one marker, it is essential that an internal moderation takes place. There is evidence that these have been conscientiously carried out by most centres and marks changed accordingly. However, the change for an individual candidate is not always reflected in the change in marks for individual assessment criteria, only the overall total out of 60. This information is essential for the Moderator's job to be carried out effectively. There have been occasions when one marker's marks from a centre has differed markedly in standard from those of the other markers, and an internal moderation is the best way to resolve this problem. Where an internal moderation has resulted in no change of marks this should be stated on the Coursework Assessment Summary Form.

It is worth reiterating that where changes have been made due to an internal moderation:

- It is the marks resulting from the internal moderation that are entered on the MS1 Forms and not the original mark. This resulted in a number of errors during this exam session.
- Where a candidate's overall total mark has been changed, the individual marks for the assessment criteria on the Coursework Assessment Summary Form must also be changed, in order that they add up to the new total.

Appendix

Simple and complex presentation techniques.

Simple techniques = bar charts, pie charts, doughnut graphs, line graphs, scatter graphs, pictographs. Appropriate photographs on their own do not count, but with labels = a simple technique. Appropriate photograph(s) (with a title or description) and tables of data = Max. 2 marks in the absence of other techniques only in Level 1.

Complex techniques = located bars or pie charts, desire lines, flow lines, radar graphs, wind roses, river cross sections (need same scale), beach profiles (need same scale), bipolar graphs, isoline graphs (techniques must be effective), annotated photos (at least 3 appropriate/relevant annotations), well annotated line graph (for example, to show anomalies), a scatter graph with a line of best fit, compound/divided/stacked bar graphs and age/sex pyramids. Candidates may include a complete and well worked example of a statistical technique, for example, Spearman's Rank Correlation as complex. Any map, whether hand drawn or otherwise, can qualify as a complex technique if it is well annotated (at least 3 appropriate/original annotations). A well labelled field sketch can also be included here.

GEOGRAPHY

Paper 0460/41
Alternative to Coursework

Key messages

To perform well on this paper candidates should:

- When answering hypothesis questions that ask whether they agree or not, always give their opinion first before any supporting evidence. This will usually be 'Yes', 'No', or 'Partially/To some extent'. If questions ask for answers to support their decision with data, then statistics must be used from the resources referred to. Data is quantitative; evidence can be qualitative or quantitative. If candidates make an incorrect conclusion to the hypothesis, they will gain no credit for the decision, but they will be given credit for evidence which supports the correct decision.
- When giving figures in an answer, always give the units if they are not stated.
- Read questions carefully and identify the command word, e.g. 'Describe', 'Explain', 'Suggest'.
- When asked to compare or make judgements, use terms such as 'higher', 'lower', rather than just listing comparative statistics. The use of 'only' with statistics is not accepted as a comparative statement.
- If comparing statistics, note that it is important to use paired data rather than one set on its own.
- Check they are using the resources that a question refers to, e.g. 'Support your decision with evidence from Fig. 1.6 and Table 1.2'.
- Attempt all completion tasks on graphs, tables, or diagrams (not all the answers are on lines and in writing). Many candidates are missing out on marks by not attempting these questions.
- Consider the mark allocations. Examiners do not expect the candidate to be writing outside of the lines provided, so candidates should not write a paragraph when only two lines are given as this wastes time.
- If candidates need to write more than the lines allow, indicate this with a phrase such as '(continued on additional page)'.
- When completing graph work, use a dark-coloured pencil. They should use a ruler to draw lines. Candidates should always shade bar graphs and pie charts accurately. They should make sure their shading matches what is shown in the key.
- When they think you have finished, check that they have not missed a question out. Some questions might have been overlooked if they are on pages with a lot of graphs or maps. Candidates should make sure they have answered the questions on every page of the paper: this applies especially to questions where they are asked to complete tables, diagrams, graphs or maps.

General comments

Most candidates found this examination enabled them to demonstrate what they knew, understood, and could do. All candidates achieved marks on the practical questions, such as drawing and interpreting graphs and tables. Stronger responses also scored well on the more challenging sections requiring explanation and judgement, especially regarding hypotheses. Most candidates answered **Question 1** slightly more successfully than **Question 2**.

Most candidates who answer graph completion questions did so successfully, but some candidates omitted them. Some candidates wrote too much in some sub-sections and would have benefited from answering more succinctly. Several candidates did not attempt later questions.

Some candidates misunderstood or ignored command words, and some did not use appropriate fieldwork techniques and equipment. Those questions where candidates did not score well often related to their not having carefully read the question, for example **Question 1d(i)** where some candidates suggested ways to do a pedestrian count rather than focussing on the extract from the fieldwork notebook. **Question 2f** required candidates to suggest how to improve fieldwork methodology for a fieldwork task and **Question 1f** tested candidates' ability to describe a new fieldwork method to extend their work. These types of question are frequently included on this paper and are areas which centres should practise with candidates. However, it is

not good practice to simply develop a series of generic answers which may apply to all fieldwork, as such suggestions tend to be vague and not worth credit.

Although this is an Alternative to Coursework examination, candidates are expected to show that they know how fieldwork equipment is used and to understand appropriate fieldwork techniques, even if they have only limited opportunity for fieldwork within the centre. For example, **Questions 1b(i), 1d(i), 1d(ii), 2b9(i), 2b(ii), 2c, and 2e(i)** focused on specific equipment and techniques commonly used in fieldwork. Centres are encouraged to carry out basic fieldwork with their candidates, especially using simple techniques which can be done on the school site or in the local area.

Comments on specific questions

Question 1

(a) Many candidates used the photograph well to describe the urban area of Pudong. The most common answers focused on buildings being high or multi-storey or skyscrapers, buildings being close together, and modern or new. Some candidates also suggested that the buildings would be used for offices or apartments, which was accepted. The most common error was to include ideas about the sea or river which were not accepted as being relevant to the urban area. Weaker responses suggested ideas which were too vague such as commercial buildings, tourist area, and a developed area.

(b) (i) Most candidates were able to name random or systematic sampling as a suitable method. Stratified sampling was inappropriate for selecting buildings. Candidates who identified systematic sampling often gave a satisfactory description of using a regular pattern with a suitable illustration, e.g. every fifth building. Stronger responses identified random sampling described a methodology of using random numbers to choose the buildings. Weaker responses from candidates who chose random sampling often repeated 'at random' or 'randomly' in their description which did not gain further credit.

(ii) Many candidates found answering the question challenging. The strongest answers explained that a sampling technique would remove bias in selecting buildings and the sample would be representative of buildings in the area. Weaker responses suggested vague ideas such as sampling would be 'quick' or 'easy' but this did not explain how it would give reliable results.

(c) (i) Nearly all candidates attempted to complete the pie graph with very few omitting the question. Some candidates drew the segments accurately in the correct order and shaded them carefully. Weaker responses to the question made the error of drawing the segments in the wrong order which did not match the other four pie graphs, thus losing one mark. Candidates need to draw the segments accurately, using a protractor, in order to gain credit. Shading needs to be the same as the key, including the diagonal lines going in the right direction.

(ii) Most candidates completed the divided bar graph successfully. Some weaker responses plotted the dividing line inaccurately and some drew the segments in the wrong order, not following the order shown in the key.

(iii) Most candidates made the correct conclusion that hypothesis 1 was true. However, the ability of candidates to use data effectively to make comparisons varied. There were many ways to support the true decision, but they had to be comparative. The following statements illustrate appropriate answers: 'Residential is the main land use in Yuanshen Road but there is no residential land use in Lujiazui', 'There is more residential land use in Yanlord than Sunland', 'The main land use is residential in Yuanshen Road and the main land use is offices in Shangcheng Road'. One mark was reserved for a comparison of two percentages, e.g. 'Residential land use in Yanlord = 73% and in Lujiazui = 0%'. Some weaker responses simply answered through a series of percentage figures which only gained a maximum of one mark.

(d) (i) Many candidates effectively used the extract in Fig. 1.5 to identify three ways in which the method was reliable. Common answers included 'two candidates worked together in the count', 'different candidates counted vehicles and pedestrians', 'candidates used a clicker to count' and 'used the phone as a timer.' A minority of candidates either did not use the ideas in the extract or suggested other ways to do the count rather than identifying the good practice shown in the extract.

(ii) Most candidates chose the correct statement 'Counting starts and finishes at the same time in each area'. The most frequent incorrect statement was "Counting ends when the students have timed five minutes". This idea would not enable accurate comparison between the different areas.

(e) (i) Nearly all candidates correctly plotted the results for Sunland. A few candidates misread the scale when plotting 66 pedestrians. Very few candidates did not attempt to plot the figures.

(ii) Many candidates chose the correct conclusion to the hypothesis and stated that it was true for traffic but not pedestrians. Stronger responses illustrated this pattern with appropriate data for Lujiazui nearest the CBD and Sunland in the rural-urban fringe. Weaker answers did not give any data or were imprecise in locating the statistics, e.g. they used 'start' and 'end' which was not an acceptable alternative to named areas of Pudong.

(f) This question required candidates to describe a fieldwork methodology to investigate the quality of the environment. This proved to be a challenging question for some candidates with a significant no response rate. The strongest answers described a bi-polar or environmental quality survey which would be done by the students themselves and described the technique in a full and logical way. Candidates who described other methods tended to be vague in their descriptions. These methods included doing a questionnaire survey, measuring an aspect such as air pollution, or even counting litter. These methods were acceptable, but most candidates rarely scored full marks, usually gaining credit for how the people to be questioned were chosen or how the feature was measured.

Question 2

(a) Many candidates put the statements into the correct order to show how sand dunes are formed. The most common error was to confuse the order of the middle three statements E, B and A.

(b) (i) While many candidates correctly identified line C to mark out a transect, some chose line A which was a common error.

(ii) Many candidates, including those who named lines A or D in **part (i)**, recognised that their chosen transect line went across the beach and sand dunes for which they gained credit. Stronger candidates also stated that transect C was the shortest or most direct line to show the profile. Weaker candidates suggested that their transect line would be 'quicker' or 'easier' to mark out, or that the line would be 'vertical' or 'horizontal' which did not get credit.

(c) Stronger candidates explained clearly how to use the ranging poles and tape measure to divide the profile into sections and how to use the clinometer app to measure the angle of slope in each section. Weaker candidates gave vague answers about where to put the ranging poles and phone app.

(d) (i) Nearly all candidates completed the profile correctly by joining the three plots. A small number did not attempt the question.

(ii) Most candidates shaded the dunes correctly, but a few missed out sections of the dune troughs because they thought these were not part of the dunes. A significant minority of candidates did not shade in the sand dunes, including some candidates who had correctly completed the profile in **part (i)**.

(iii) Good answers to this question included both similarities and differences between the textbook and candidate profiles. Candidates included reference to similarities such as both profiles included an embryo, fore and main dune, and the main dune was the tallest in both profiles. They stated that the main difference was the absence of the old dune in the candidates' profile and that the embryo dune is taller than the fore dune in the student's profile while the fore dune is taller in the textbook profile. Some candidates did not make it clear which profile they were referring to or did not make the required comparisons between the two profiles. Weaker responses suggested that the heights of the dunes were different in the two profiles, but this was not credited as there is no height scale in the Figs. 2.3 and 2.4.

(e) (i) Many candidates found this question that required an accurate description of how to use a quadrat challenging. Stronger candidates gave precise answers about putting the quadrat on the ground or on the vegetation, then counting or estimating the number of squares which included each type of

vegetation and doing this task along the transect. Some candidates stated that the students would 'use the quadrat' but this was too vague. The most common error was in describing the task of how to use the quadrat. Many candidates wrote about counting plants or estimating the percentage of the quadrat covered by grass or bare soil which was not appropriate for this task.

(ii) A significant minority of candidates did not complete the kite diagram but those who did were generally successful. Stronger candidates drew both lines accurately and made sure that they produced a mirror image above and below the 0% line. Some candidates drew the lines accurately but did not complete the shading.

(iii) Most candidates agreed that the results supported the hypothesis. Stronger candidates supported their conclusion with evidence from the kite diagrams which showed how the vegetation changed inland from the sea. There were different ways to support the true decision, but they had to be comparative. The following statements illustrate appropriate answers: 'Reeds grow at 40m and marram grass grows at 160m', 'Reeds grow nearer to the sea than marram grass', 'Reeds grow between 20 and 60m from the sea and couch grass grows between 160 and 240m'. These statements were then supported by percentage statistics for another mark, e.g. 40% of the ground is covered by heather at 160m from the sea and 80% is covered by marram grass at 220m.' Some candidates made the mistake of only referring to one vegetation type, so they did not illustrate the change in vegetation type along the transect.

(f) The question was challenging for many candidates, and a significant minority did not attempt to answer. Many answers were vague and did not focus on specific fieldwork methods used in the study. Candidates wrote 'collect more data', 'repeat the fieldwork' and 'do more measurements and get the average'. Such answers are generic and were not credited. Better responses were more specific in their suggestions such as 'measure the vegetation cover at shorter distances or less than 20m' and 'get another candidate to check the measurements' or 'two candidates measure the angle and they compare their results'. A suggestion which was not accepted was to repeat the tasks on a different day as this was not valid for investigating the dune profile or the vegetation growing in them.

(g) (i) Many candidates gave two valid reasons for why sand dunes are important. The most common answers focused on their value in providing habitats and supporting flora and fauna. Their value as tourist attraction was another popular answer. Some candidates also recognised their value in reducing flooding or protecting land from erosion by the sea. Some candidates incorrectly suggested that sand dunes would protect the beach from erosion or protect areas from wind erosion.

(ii) This question proved challenging for many candidates and a number did not attempt it. Stronger candidates identified protection methods such as information signs, marked footpaths, closing off areas, and planting vegetation. Many candidates listed coastal protection measures such as revetments, sea wall, and rock armour which were not appropriate to protect sand dunes and were credited for one mark maximum. Another common error made by weaker candidates was to 'encourage people to keep off or protect the sand dunes' without suggesting how this could be done.

GEOGRAPHY

Paper 0460/42
Alternative to Coursework

Key messages

To perform well on this paper candidates should:

- When answering hypotheses questions that ask whether they agree or not, always give their opinion first before any supporting evidence. This will usually be 'Yes', 'No' or 'Partially/To some extent'. Candidates should make a clear decision and provide the data or evidence for their choice. Expressions such as 'might be true', 'could be false' and 'true and false' are too vague.
- Support the decision made with evidence. If they are provided with a decision about a hypothesis, such as in **Question 2(d)(i)** where candidates were told that the students decided the hypothesis was true, they should not then try to justify a different decision.
- Note that if evidence is asked for, this can include numbers and descriptive statements. If the question says, 'Support your decision with data', as in **Question 1(f)(iii)**, then they must use statistics.
- When giving figures in an answer, always give the units if they are not stated.
- Ensure that any numbers they write are clear. Writing must be legible; credit cannot be given if the answer cannot be read.
- When shading or completing graphs, use the same style as that provided in the question and use a sharp pencil to give a good dark image. Candidates should also check that they understand the scales used and the importance of any plots provided. If adding plots to a graph, use the same style as the plots already on the graph.
- When completing bar graphs, make sure their shading matches the key or other bars already completed.
- Use the exact figures from the table rather than make erroneous judgements from the graph if they need to refer to data from a table or graph.
- Read questions carefully and identify the command word.
- Check they are using the resources that the question refers to.
- Be careful with the use of terms such as 'majority' when the correct term would be 'highest' or 'most'. The 'majority' must be more than 50% of the statistics being described and is not a term that will be accepted if the data involved is less than 50%.
- When they think that they are finished, go back and check that all questions, including those where they are asked to complete tables, diagrams, graphs or maps, have been completed.
- Use the extra pages provided if they need to add extra work. It is important that candidates signal this by writing something like 'continued on page 15'. Candidates should also give the correct sub-section number to their extra work to enable it to be matched to their earlier answer.
- Ensure they have the correct equipment for the examination. In this case, a calculator and a ruler.

General comments

Most candidates found this examination enabled them to demonstrate what they knew, understood and could do.

For teachers preparing candidates for this Paper, most matters to consider relate to candidates misunderstanding or ignoring command words and to the importance of experiencing fieldwork – even if it is only in the school grounds or simulated in the classroom.

Where candidates did not score well, it was often related to them not fully reading the question or missing out straightforward graph completions.

Although this is an *Alternative to Coursework* examination, candidates are still be expected to show that they know about fieldwork equipment, how it is used and fieldwork techniques. Any fieldwork experience is beneficial, even if there is limited opportunity within the centre. Familiarity with maps, tables, sampling methods, measuring instruments and the various graphs and other refining techniques listed in the syllabus are also important for success in this examination. Sampling techniques remain an important part of fieldwork that can easily be taught and demonstrated within the classroom or school and yet they are often not performed well by many candidates. Questionnaires and sampling exercises can be carried out and demonstrated without leaving the school, e.g. sampling of candidates using random, systematic or stratified techniques or using internal questionnaires.

Comments on specific questions

Question 1

Question 1 focused on fieldwork using various weather instruments to collect data in a city. Candidates needed to know the features of a Stevenson Screen, a barometer, a traditional rain gauge, and a wind vane. They also needed to be able to look at weather data in tables and make judgements about relationships between atmospheric pressure, temperature and rainfall. Candidates needed to make decisions about two hypotheses as well as applying knowledge and understanding to support and justify the decisions with evidence. Completing a table, line graphs and a bar graph tested practical skills.

- (a)** The majority of candidates knew what the Stevenson Screen was and could identify features and explain why they were important. The strongest answers noted that it was painted white to reflect sunlight and prevent instruments being influenced by heat and that it was raised off the ground on legs or stilts between 1 – 1.5 metres to avoid it receiving ground radiation. It was not sufficient to simply say it was ‘above the ground’. A few answers thought the Stevenson Screen was raised to avoid floods or animal damage. Some candidates missed out on marks by describing site factors rather than the features such as it being placed on grass or away from obstacles; these were inappropriate. The question required physical features to be explained such as the vents/slats that allowed air flow in and out – not wind! Only a few referred to the sloping roof or that the Stevenson Screen was made of wood. References to the padlock were also irrelevant.
- (b)** Almost all candidates knew that the two instruments would be used outside the Stevenson Screen for one mark. The sunshine recorder and anemometer were seen frequently for two marks, although in some answers the sunshine recorder was often either omitted, or the instrument was called a sun dial or sun meter. The anemometer was usually listed for measuring wind speed though wind meter and wind vane were often incorrect answers.
- (c)** This was the least well-attempted question on the whole Paper. The question stem stated that the barometer was used to measure atmospheric pressure so the many candidates that gave the answer that the measuring hand measured ‘atmospheric pressure’ gained no mark. The measuring hand shown was measuring the current pressure or the pressure that existed at that moment. Credit was given for candidates who stated the current pressure was 1012 mb providing the units were present. Many candidates thought the moveable pointer showed what the weather was or would be rather than its correct use indicating the previous day’s pressure or if there is any change – rising or falling – compared with the existing pressure. A few candidates thought it measured temperature.
- (d) (i)** While most candidates plotted the two statistics correctly, many missed this out despite the straightforward plots. Any errors were mostly caused by misreading the lines using the horizontal scale for the atmospheric pressure figures of 1008 mb and 1012 mb. It was important candidates plotted with crosses as seen on the graph – a few chose to use dots. A sharper pencil would have benefitted some candidates.
- (ii)** Just over half of the candidates recognised that there was no trend, correlation or pattern or that data fluctuated on the graph leading to the correct decision that the hypothesis was incorrect or false. There were two marks for supporting these observations with data. The most common statistics used was where the highest atmospheric pressure of 1022 mb was seen at the lowest temperature of 4 °C; where the same pressure of 1017 mb had different temperatures of 5 °C, 6 °C or 7 °C; and where various examples of paired data showed where pressure increased but temperature stayed the same or decreased.

(e) (i) In answering this question, there was too much emphasis on site factors by some candidates; one mark was the maximum allowed for any site factor. The question was about how the candidates would use a traditional rain gauge to get daily rainfall measurements; a few wasted time writing about how the instrument worked. Leaving the gauge in the open/unobstructed were popular site factors. More relevant to the gauge's use were factors such as placing it in the ground (not underground!) to allow rain to collect in it and checking every 24 hours or each day at the same time by pouring the water into a measuring cylinder, measuring it in mm/ml, then emptying it out and resetting it for the next day. Most candidates did this well and scored 3 or 4 marks. The biggest error seen was by candidates who thought the gauge was put out when it rained and fetched in for measuring when the rain stopped.

(ii) This question was answered well by a significant majority of candidates who were aware that if the gauge was sited below trees, there would be inaccurate results due to the trees intercepting or blocking rain even if falling leaves blocked the gauge too. Both would give inaccurate and possibly reduced readings. A few candidates thought the trees and their roots would absorb water, but this would not affect rain falling into the gauge from above. There was also a popular view that placing the gauge close to a footpath might lead to it being tampered with, damaged or knocked over. It was not accepted though that rain could cause the gauge to be flooded as, if correctly raised above the ground, its contents would not be affected.

(f) (i) Almost all candidates correctly chose day 14 as the one with the highest rainfall amount recorded. A few gave day 9 which was the correct answer for the highest atmospheric pressure and not rainfall. A few gave the highest rainfall amount of 9.3 mm instead of the day this occurred.

(ii) A significant minority of candidates did not attempt the two plots; those that did plotted the point and bar well. To achieve the first mark a cross – not a dot – was needed at 1017 mb and the line needed completing with the other lines already drawn; not every candidate joined the points together. The second mark was for plotting a 4.1 mm rainfall bar for day 1; a few candidates misread the scale and plotted the 4.1 bar at 4.2 mm. Most plotted the bar correctly between 4.0 mm and 4.2 mm.

(iii) Most candidates recognised that the hypothesis was true, and that the highest rainfall took place at the lowest atmospheric pressure or vice versa. They supported this by giving statistics showing that pressure decreased when the rainfall increased, e.g. 1020 mb pressure with 0 mm rainfall compared with 1003 mb pressure and 9.3 mm rainfall. It was important that candidates gave two sets of paired data; one pair on its own cannot prove the hypothesis. A few stated the hypothesis was wrong but then gave data that proved there was a negative relationship.

(g) Many candidates did not attempt this question. Wind vanes are listed in the syllabus so candidates should have been able to suggest measuring the direction (not the speed) with a wind or weather vane, placing it on the top of a roof/building or at an unobstructed height and then observing the direction the arrow (not the vane) was pointing to which indicates which way the wind was coming from. More than half of the candidates did this well. The use of a windsock was also credited but throwing grass or leaves up in the air, observing a candidate's long hair blowing in the wind or the 'wet finger' test were not regarded as measuring equipment. A few candidates also discussed using a rain gauge which was not a requirement of the question.

Question 2

Question 2 was about students in Tokyo carrying out fieldwork in the city's Central Business District. Candidates needed to understand what features were found in a CBD, how to go about carrying out a pedestrian count in groups within a CBD and what a high-order service was with an example. They were also required to make one hypothesis decision and justify it and were told another hypothesis decision which they needed to provide supporting evidence for. They also needed to complete practical tasks including devising a recording sheet to record pedestrians and completing a map using a key.

(a) (i) Almost all candidates knew that CBD stood for 'Central Business District'.

(ii) Candidates were asked to describe three features of buildings found in a typical CBD. Most did this by referring to tall/multi-storey/skyscrapers that were packed together along with an example of a CBD land-use such as shops, offices or apartments/flats. A few answers did not describe the

buildings but instead listed characteristics such as the buildings were expensive/attractive or gave vague ideas such as large/big. Weak land-uses which were not credited included supermarkets and housing which are not restricted to CBDs.

(b) (i) Candidates tended to employ two routes in answering this question. Some reasoned that the teacher had split the candidates into groups of three so that they could divide the work along each road into five different sites thereby obtaining more data and covering more area. Others focused on the teacher deciding to have groups of three rather than two or individuals – answers here focused on safety issues and being able to divide the task into three or have all three carry out the same counting task and take an average. Either approach was acceptable for credit though some answers focused too much on safety. Weak answers referred to small groups being more accurate and reliable with fewer errors.

(ii) The recording sheets created ranged from simple sheets to very complex charts. Most candidates did well and were awarded 2 or 3 marks here providing the sheet included a column for distance from the CBD/Sites along a road, a column for the number of pedestrians and a space for tallying. A few candidates drew graphs rather than recording sheets; others added in actual numbers in the tally spaces.

(iii) Candidates seemed unsure as to how they would carry out a pedestrian count and a few even referred to traffic in the answer. Several suggested splitting into groups and choosing sites but the groups and the Site locations had already been created and referred to in **Question 2(b)(i)** and **Question 2(b)(ii)** so those answers were not credited. The best answers referred to dividing the work into three different tasks and counting the pedestrians for between 5 and 15 minutes at the same time at each Site. A few suggested 30 seconds or even an hour; both of these were unrealistic extremes of measuring spans. Equipment such as using a timer/watch/phone to time the count and a tally/counter to count the number were mentioned. Some suggested all the candidates could count for the same time and take an average which was acceptable; however, it was not appropriate to keep repeating the count, for example every five minutes, and take an average as they would be measuring different numbers of pedestrians over time so an average would be invalid. Many candidates thought that systematic or random sampling would be an effective way of counting pedestrians which was incorrect. A few suggested using cameras or carrying out questionnaires; neither of which were appropriate.

(iv) Almost all candidates made the correct choice that the hypothesis was ‘true for some roads’. A few then referred to ‘some roads’ that supported it and ‘some roads’ that did not without identifying which roads they meant. To support their decision the candidates should have picked a road that supported the hypothesis and then provided supporting data taken from the centre of the CBD to the edge, e.g. ‘On Road 3 the number of pedestrians decreased from 388 to 25’. A similar answer would support either Roads 5 or 7 which did not support the hypothesis. It was important candidates used terms such as ‘increased/decreased’ when describing the data changes; too many simply said that ‘In Road 3 it went from 388 to 25’ or ‘In Road 5 it goes from 165 to 197’ without describing the change in line with the ‘decrease’ and ‘increase’ referred to in the hypothesis.

(c) (i) This question was not answered well. Very few candidates could suggest an advantage of counting the storeys other than vague answers such as it would be ‘easy’ and ‘quick’. A few stated that no equipment was needed and most storeys were usually the same height and that it was the best solution as it would be difficult to measure the exact height though few said why. Most gained a mark for the main disadvantage that storeys could be different heights and the fact a candidate selected only five buildings could lead to bias as well as providing an unrepresentative small sample. Few candidates perceived that building heights are usually higher than the storeys and towers/spires and pitched roofs could not be counted as storeys but were part of the height. Only a small number suggested that it would be hard to count the storeys from street level; indeed, the idea that it might not have been possible to see the whole building would have been a valid answer.

(ii) Two thirds of candidates correctly identified that a floor guide on a map is a ‘secondary’ source of data. The most common incorrect answer was ‘systematic’.

(iii) The majority of candidates correctly completed the map. A few candidates chose incorrect shading, and a significant minority did not attempt it. Candidates must ensure that they check carefully if a question requires them to complete a map shading or graph.

(d) (i) Candidates needed to recognise that, at the CBD's centre, the height on Road 3 was >16 storeys and that it decreased to 4 – 8 storeys at the edge. There was no requirement to refer to the distance, just the change in the number of storeys so most candidates gained the mark. Those that did not usually just stated that the storeys decreased or ignored Road 3 and used the key to state that the storeys were <4 on the edge. Candidates needed to look at Road 3 on Fig. 2.2, the map to which they were referred. Some ignored the Road 3 reference in the question and described changes on a different road often Road 8.

(ii) Most candidates answered this question correctly to gain 2 marks. The majority of correct answers chose Road 5 though Road 6 was also correct. A reference to distance was required as well as the number of storeys and how they changed. In the case of Road 5 an acceptable answer would be that there were 13 – 16 storeys at 175 m/centre of the CBD and >16 storeys at 875 m/edge of the CBD. In the case of Road 6 the answer needed to recognise that there were >16 storeys at 175 m/the centre and also at 875 m/the edge so there was no change. Weak answers simply said that there were more storeys at the end of Road 5 or that there were the same number at the start and end of Road 6.

(e) (i) There was a mixed response to this question. Those candidates with a knowledge of high-order services usually mentioned that they were expensive, rarely purchased and had a high range or sphere of influence. Some candidates defined a low-order service and gave an example of this instead. It was important to note the question was about high-order services and not goods. For example, manufacturing cars is not a high order service but selling designer branded goods could be. Jewellery shops, airports, luxury car dealers, and 5-star hotels were common examples seen. Restaurants, supermarkets, and offices were examples that were deemed inappropriate.

(ii) Most candidates answered this question well and recognised that the majority of high-order services were located around the centre of the CBD and the station and that there were two on the edge of the CBD at the end of Roads 5 and 7. Those were the most seen descriptions for 2 marks; the additional mark was for a reference to a distance, e.g. Road 8 had three high-order services within 525 m of the centre.

GEOGRAPHY

Paper 0460/43
Alternative to Coursework

Key messages

To perform well on this paper candidates should:

- When answering hypothesis questions that ask whether they agree or not, always give their opinion first before any supporting evidence. This will usually be 'Yes', 'No', or 'Partially/To some extent'. If questions ask for answers to support their decision with data, then statistics must be used from the resources referred to. Data is quantitative; evidence can be qualitative or quantitative. If candidates make an incorrect conclusion to the hypothesis, they will gain no credit for the decision, but they will be given credit for evidence which supports the correct decision.
- When giving figures in an answer, always give the units if they are not stated.
- Read questions carefully and identify the command word, e.g. 'Describe', 'Explain', 'Suggest'.
- When asked to compare or make judgements, use terms such as 'higher', 'lower', rather than just listing comparative statistics. The use of 'only' with statistics is not accepted as a comparative statement.
- If comparing statistics, note that it is important to use paired data rather than one set on its own.
- Check they are using the resources that a question refers to, e.g. 'Support your decision with evidence from Fig. 1.3 and Table 1.4'.
- Attempt all completion tasks on graphs, tables, or diagrams (not all the answers are on lines and in writing). Many candidates are missing out on marks by not attempting these questions.
- Consider the mark allocations. Examiners do not expect the candidate to be writing outside of the lines provided, so candidates should not write a paragraph when only two lines are given as this wastes time.
- If candidates need to write more than the lines allow, indicate this with a phrase such as '(continued on additional page)'.
- When completing graph work, use a dark-coloured pencil. They should use a ruler to draw lines. Candidates should always shade bar graphs and pie charts accurately. They should make sure their shading matches what is shown in the key.
- When they think you have finished, check that they have not missed a question out. Some questions might have been overlooked if they are on pages with a lot of graphs or maps. Candidates should make sure they have answered the questions on every page of the paper: this applies especially to questions where they are asked to complete tables, diagrams, graphs or maps.

General comments

Most candidates found this examination enabled them to demonstrate what they knew, understood, and could do. All candidates achieved marks on the practical questions, such as drawing and interpreting graphs and tables. Stronger responses also scored well on the more challenging sections requiring explanation and judgement, especially regarding hypotheses. Most candidates answered **Question 1** more successfully than **Question 2**.

Some candidates write too much in some sub-sections. Candidates should be encouraged to answer more succinctly and give more thought to their answers. A significant number of candidates did not attempt later questions.

Some candidates misunderstood or ignored command words, and some did not use appropriate fieldwork techniques and equipment. Those questions where candidates did not score well often related to their not carefully reading the question, for example **Question 1d(i)** where some candidates did not see the importance of doing the environmental surveys at the same time, and **Question 2e(i)** where some candidates described differences between constructive and destructive waves which could not be identified on the diagrams. **Question 2f** required candidates to suggest how the fieldwork methods could be improved. This type of question is frequently included in this paper and is an area which centres should practise with

candidates. However, it is not good practice to simply develop a series of generic improvements or methodology which may apply to all fieldwork, as such suggestions tend to be vague and not worth credit.

Although this is an Alternative to Coursework examination, candidates are expected to show that they know how fieldwork equipment is used and to understand appropriate fieldwork techniques, even if they have only limited opportunity for fieldwork within the centre. For example, **Questions 1a(i), 1a(ii), 2b, 2c(i), 2c(ii)** and **2e(ii)** focused on specific equipment and techniques commonly used in fieldwork. Centres are encouraged to carry out basic fieldwork with their candidates, especially using simple techniques which can be done on the school site or in the local area.

Comments on specific questions

Question 1

(a) (i) Most candidates gave a simple correct response. They referred to only needing to interview visitors or to finding out whether the person they approached was a visitor or resident. Weaker responses were vague and did not mention tourists or visitors but just suitable people. Some candidates referred to hypothesis 2 which was not relevant to the visitor questionnaire.

(ii) Most candidates were able to name a sampling method: usually random or systematic. Good descriptions of systematic sampling included a statement about the regular pattern of choosing people followed by an example such as the fifth or tenth person. Many candidates who named random sampling repeated 'random' in their description which did not gain further credit. Better answers described in detail how to use random numbers to select the identified person. Candidates who named stratified sampling found it difficult to describe clearly how this method could be used and only scored one mark for suggesting that it should include a gender or age balance. Some weaker candidates did not understand 'sampling method' and wrote about interviewing people or using a questionnaire. Some candidates did not attempt the question.

(b) (i) Most candidates plotted the line at 97% and put the data in the correct order. Weaker candidates reversed the order of the segments or shaded the segments incorrectly. Some candidates did not attempt to complete the pie graph.

(ii) Many candidates scored two marks for stating that 'most visitors travelled between 101 and 150 km' and 'fewest visitors travelled more than 150 km'. Candidates who described the difference in terms of decrease or increase in numbers often scored one mark. An error made by weaker candidates was to repeat the numbers from the data table without interpreting them. The question required description of the variation, so statistics were not required. A few candidates wrote about longer or shorter distances which was too vague when precise distances were given in the table.

(iii) Some candidates correctly identified the pictogram as the best way to show methods of travel. Many candidates incorrectly chose histogram. This was not appropriate as a histogram shows grouped data (as illustrated in Fig. 1.3). Some candidates selected a scatter graph or triangular graph which were also not appropriate graphs to illustrate these figures.

(iv) Nearly all candidates drew the bar accurately. Some weaker candidates misinterpreted the vertical scale and drew the bar to 26.

(v) Most candidates correctly identified that Hypothesis 1 was incorrect. They usually followed this by stating that most visitors stayed for one day. Candidates generally supported their statement with accurate data, either that 61%, or 61 out of 100, or 61 stayed for one day and 39 stayed for longer than one day. Some candidates who wrote that '61 stayed for one day' did not gain the data mark, neither did those who used data from the individual categories rather than adding them up.

(c) (i) Nearly all candidates completed the divided bar graph accurately and shaded the two segments correctly. A few candidates wrongly reversed the order of the segments or plotted the dividing line inaccurately.

(ii) Many candidates misunderstood the question and wrote about possible faults with the data collection such as it did not identify when the data was collected. Candidates who answered correctly either identified a tourist season problem such as higher prices in shops or water shortage

or identified a non-tourist season problem such as seasonal unemployment or reduced spending. Some candidates incorrectly suggested a problem for tourists such as lack of accommodation.

- (iii) Nearly all candidates identified that the most important benefit of tourism was 'Tourism brings money into the area'. Some candidates chose 'Tourism creates jobs in the area' which was incorrect.
- (iv) Some candidates focused on the general idea that tourism brings both benefits and problems to the town or that the benefits outweigh the problems. To support this statement, candidates totalled data for very important benefits and very severe problems. Some candidates misunderstood that these figures related to answers not people; more perceptive candidates identified the correct relationship. Most candidates focused on individual benefits and problems brought by tourism. They needed to identify bringing jobs or money into the area as the main or important benefit and crowded streets or traffic congestion as the main or severe problem. Candidates also scored a data mark for comparative statistics of one main benefit and one severe problem. Weaker candidates did not include reference to the importance of benefits and problems and simply listed them from the data tables, which was not credited. Similarly, there was no credit for focussing on benefits and problems which were not important as these were irrelevant to the hypothesis.

(d) (i) The question was challenging for many candidates who wrote about why it was important to do an environmental quality survey but did not focus on doing the surveys in the two areas of the town 'at the same time'. Stronger candidates recognised that conditions would vary during the day, particularly due to traffic and pedestrian numbers changing. Some candidates gave impressive answers using terms such as 'doing the surveys at the same time removes control variables'.

(ii) Many candidates were successful and drew the lines accurately. Some candidates did not appear to be familiar with the technique of drawing a radar graph and some did not attempt the question.

(e) (i) Candidates could focus either on the causes of traffic congestion or the problems resulting from traffic congestion. Many candidates gained credit for stating that there would be more vehicles or traffic in the towns. Stronger candidates also stated that roads would be narrow and not built for so many vehicles. Various problems were referred to including air pollution, noise disturbing people, and increased traffic causing delay so that people were late for work or school. Weaker candidates repeated 'congestion' or said there would be delays without stating the impact.

(ii) Stronger candidates described how to reduce congestion through ways such as improving public transport, creating more parking spaces, restricting access to roads, using more traffic controls such as police, constructing footpaths or cycle lanes, and introducing cycle hire schemes. Weaker candidates suggested vague ideas which were not given credit such as 'encourage more people to walk or take the bus', 'build more roads', 'widen roads'. They also suggested 'introducing congestion charges or number plate schemes' which are impractical and unrealistic in a tourist town.

Question 2

(a) Most candidates were familiar with the importance of risk assessment before doing fieldwork. Some candidates gave inappropriate answers because they did not focus on how to reduce the risk of accident; answers such as 'wear waterproof clothes', 'apply sunblock' and 'take a mobile phone' were not credited. The most popular correct answers were to 'wear shoes or suitable footwear', 'keep away from cliffs', 'do not go into the sea' and 'avoid potential hazards such as slippery rocks and creatures found on the beach'.

(b) There was a large variation in the quality of responses to this question. Stronger candidates gave comprehensive, well-ordered descriptions of the process from creating a transect line, putting the ranging poles at each break of slope, measuring the distance between each pair of poles, and using a clinometer to view the angle from one ranging pole to the same position on the next ranging pole as they moved up the beach. Some candidates did not realise from the diagram, Fig. 2.1, that the ranging poles were placed where the beach gradient changed and wrote incorrectly that the poles were placed at equal distances apart. Weaker candidates showed little understanding of the fieldwork method and thought that the clinometer was used to measure distance or height of the ranging poles. Some candidates stated that the clinometer was used to measure gradient which was not accepted as the reading is of the angle of slope.

(c) (i) Candidates found it challenging to describe a method to collect a sample of beach material and a number did not attempt the question. Many candidates suggested a sampling technique, but they did not explain how the students could apply the technique. Stronger candidates suggested placing a quadrat on the beach to get an area from which to pick up the material. Some candidates suggested using a quadrat but did not describe how. Many candidates did not make good use of the recording sheet in Fig. 2.2 to recognise that four pieces of beach material were sampled at each site. Many candidates included details about how to measure the beach material which was not appropriate as the question focused on collection of the material.

(ii) Most candidates correctly identified an item of measuring equipment. Examples included a ruler, callipers or pebbleometer. The strongest answers usually focused on how callipers were used with a reference to adjusting them to measure the longest axis or length of the pebble. Some candidates described measuring the volume or weight of the pebbles which was not appropriate as the size was given in millimetres. Some candidates did not attempt the question.

(iii) Most candidates plotted the data accurately. Some did not attempt to plot the result.

(d) (i) Most candidates gave the correct conclusion that Hypothesis 1. The quality of candidates' support for this conclusion varied. Stronger responses described the evidence that supported the conclusion, e.g. that beach material is larger on Centenaire beach which has the steeper gradient. Only the strongest candidates gained a data mark by comparing the average size of material on the two beaches and their gradient or change in height from the low water mark to the back of the beach. Four statistics were needed to gain the data mark. Some candidates compared sample size at individual sites which by themselves did not support the hypothesis. Weaker candidates made the wrong conclusion that the hypothesis was false because they looked at the size of material along each beach profile rather than comparing the two profiles which was the focus of this hypothesis.

(ii) Most candidates correctly identified that Hypothesis 2 was true for one beach which was Centenaire beach. To support this decision, candidates needed to give appropriate data from both beaches. The data had to be taken at the low water mark or 0 m from the sea and the point furthest from the sea at 20 m on Centenaire beach and 24 m on Magnan beach. Some candidates identified sizes at individual distances up the beach, but this did not support the hypothesis that 'material gets bigger from the sea to the top of the beach'.

(e) (i) There were many comparisons of wavelength and wave amplitude by candidates. Often these were described as shorter or longer waves, and smaller and bigger waves. Some candidates also recognised that constructive waves go further up the beach. A common error was where candidates did not refer to the diagrams (Fig. 2.5) but used their knowledge to write about aspects of constructive and destructive waves which could not be seen on the diagram, such as the strength of swash and backwash and wave frequency. Some candidates also described the beach profile rather than the waves which was not correct. Some candidates did not attempt the question.

(ii) Many candidates demonstrated some idea of how to measure wave frequency but could not describe it very well. Good responses gave a detailed description of placing a pole or other object near the water's edge or in the sea, using a timer and counting the waves that hit the pole in a minute or some other measured time, and doing this several times to work out an average. Weaker responses suggested putting a pole on the beach, which was too vague, and 'counting waves' with no clear description of how to do this, i.e. waves hitting the pole or breaking on the beach. Some candidates did not attempt the question.

(iii) Most candidates plotted the cross accurately. A significant minority of candidates did not attempt to complete the graph.

(iv) Most candidates identified that wave frequency was higher at Centenaire beach. They supported this statement with comparative data of average wave frequency. Some weaker candidates made the error of comparing individual measurements which was not credited. A few candidates stated that wave frequency varies more at Centenaire beach which was credited as an alternative to average wave frequency. In this case, their supporting data had to compare the range of frequency at both beaches.

(f) This question proved challenging for many candidates and a number did not attempt it. Many candidates gave vague answers such as 'repeat the measurements', 'use better equipment' and

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'collect more data'. These answers did not explain how the measurement tasks which have been undertaken can be improved. Stronger answers referred to 'collecting data at more beaches', 'more candidates do the measurements of wave frequency and compare their results', and 'collect more than four pieces of beach material at each site'. These answers were specific to the tasks and could improve the reliability of measurements.